Docket No. 50-197

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re application of)
)
Neil Siegel)
)
COMPREHENSIVE MEDICAL)
CONTROL SYSTEM)
)
)
Executed: _____)

POWER OF ATTORNEY

Hon. Commissioner of Patents and Trademarks

Washington, D.C. 20231

Sir:

Compunet, Incorporated, having become the owner of all rights in and to the above-identified application by virtue of an Assignment executed by the inventor concurrently with the execution of the application, said Assignment being submitted herewith for recording, hereby appoints:

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Compunet, Incorporated

Date: 10/28/82

F.G. SPADARO
its President

Attorney's
Docket No.: 50-197

Applicant or Patentee: COMPUNET, INC.

Serial or Patent No.:

Filed or Issued:

For: COMPREHENSIVE MEDICAL CONTROL SYSTEM

VERIFIED STATEMENT (DECLARATION) CLAIMING SMALL ENTITY STATUS
(37 CFR 1.9(f) and 1.27(c)) - SMALL BUSINESS CONCERN

I hereby declare that I am

[ ] the owner of the small business concern identified below:
[X] an official of the small business concern empowered to act on behalf of the concern identified below:

NAME OF CONCERN COMPUNET, INC.

ADDRESS OF CONCERN 11222 La Cienega Blvd., Suite 570/575
Inglewood, CA 90304

I hereby declare that the above-identified small business concern qualifies as a small business concern as defined in 13 CFR 121.3-18, and reproduced in 37 CFR 1.9(d), for purposes of paying reduced fees under section 41(a) and (b) of Title 35, United States Code, in that the number of employees of the concern, including those of its affiliates, does not exceed 500 persons. For purposes of this statement, (1) the number of employees of the business concern is the average over the previous fiscal year of the concern of the persons employed on a full-time, part-time or temporary basis during each of the pay periods of the fiscal year, and (2) concerns are affiliates of each other when either, directly or indirectly, one concern controls or has the power to control the other, or a third party or parties controls or has the power to control both.

I hereby declare that rights under contract or law have been conveyed to and remain with the small business concern identified above with regard to the invention, entitled "Comprehensive Medical Control System" by inventor(s) Neil Siegel and Harry B. Press described in

[X] the specification filed herewith
[ ] application serial no. _____, filed _____.
[ ] patent no. _____, issued _____.

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Attorney's
Docket No.: 50-197

I acknowledge the duty to file, in this application or patent, notification of any change in status resulting in loss of entitlement to small entity status prior to paying, or at the time of paying, the earliest of the issue fee or any maintenance fee due after the date on which status as a small entity is no longer appropriate. (37 CFR 1.28(b))

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application, any patent issuing thereon, or any patent to which this verified statement is directed.

NAME OF PERSON SIGNING MR. F. G. SPADERO

TITLE OF PERSON OTHER THAN OWNER PRESIDENT, COMPUNET, INC.

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X SIGNATURE F. G. Spadero DATE 10/28/82

COMPREHENSIVE MEDICAL CONTROL SYSTEM

Abstract of the Disclosure

A medical control system includes arrangements for both billing and accounting relative to individual patients, for maintaining the complete medical records of the patients, and also for checking for possible adverse interactions between several prescriptions intended for an individual patient, and between such prescriptions and individual medical chronic conditions and allergies of the patient. The system includes a display and input keyboard forming a terminal, a printer, and a disk and tape memory unit. The memory unit includes magnetic disks for high speed access, and a tape cassette whereby information from the disks may be transferred to the cassette and stored for safekeeping. Arrangements are provided for storing on the disk all of the known adverse chemical interactions from drugs employed in prescriptions. In addition, arrangements are provided for recording patient information, both biographical and also historical information relating to successive visits to the doctor or to the medical institution maintaining the records. Display and printout arrangements are provided to show any of the desired records, and also to print them out upon command. The keyboard is provided with special fixed keys relating to accounting, to patient information, to correlation for possible adverse effects, and for system utilities functions, such as information storage and transfer. The keyboard is provided with a series of additional function keys with variable function implementation depending on indications included in the visual display. Also included in the keyboard are the standard number and letter keys, the usual keys for working with a video display including cursor (or marker), movement control keys, and the like.

COMPREHENSIVE MEDICAL CONTROL SYSTEM

Field of the Invention

This invention relates to medical control systems for recording and utilizing patient and medical information.

Background of the Invention

Systems have previously been proposed for the medical accounting and billing of patients. In addition, relatively costly special purpose equipments have been provided for checking for adverse medical interaction of prescription drugs. In this regard, such information is available in certain medical books and other updating publications. In the use of the publications, however, the chemicals in any brand name pharmaceutical drugs must be individually identified, and each of these chemicals cross-checked. Accordingly, because of the inaccessibility and high cost of the medical interaction services, and the difficulty of using the available medical publications, most medical doctors limit their prescriptions to a relatively small number of drugs with which they are intimately familiar, and which relate to their particular field of specialization.

Accordingly, there is a need for a system which will perform all of the accounting, medical correlation and other patient service histories for medical patients at a reasonable cost. Such a comprehensive system will easily and quickly correlate possible undesired drug interactions tying them in with the patient's medical chronic conditions and allergies, and will quickly indicate whether possible selected additional medication will have any adverse effects. Patient accounting and billing can be quickly and easily accomplished by this same system.

Summary of the Invention

In accordance with the present invention,

comprehensive medical control system may include three main types of units: first, an input video display and terminal unit with an associated keyboard; secondly, a digital storage unit which may include both a high access speed magnetic disk unit for normal usage, and an optional tape cassette unit for input and emergency standby storage purposes; and thirdly, an output printer. The keyboard is provided with several fixed function identified keys for (1) medical correlation purposes for adverse interactions (2) patient information, and (3) accounting information. Other fixed function keys may be provided. In addition, certain specially identified variable function keys may be provided, with their functions being matched with indications on the display.

Functions which may be accomplished with the apparatus include the following:

1. Accounting functions including the preparation and printing of individual bills and/or insurance forms for each patient.

2. Biography information and functions including address, social security number, birthdate, telephone numbers, emergency contacts, and the like.

3. Summary medical information.

4. History, or visit-by-visit patient information, including all prescriptions.

5. Editing functions whereby new entries, additions or changes may be made to any of the data.

6. Currently active drug prescription lists for each patient.

7. Correlation, as discussed above, between various drugs and the particular patient's chronic conditions and allergies. In the case of potentially severe adverse reactions, a flashing warning appears on the video screen.

8. Print - - or a printout of the information which appears on the video screen at any particular time.

9. "Return" - - indicating that a typewritten entry

has been completed by the user, and it is time for the apparatus to take the next step. The "return" designation is a holdover from the carriage return concept in typewriters.

10. Cursor Control - - A cursor or visible marker which appears on the video screen may be shifted to different locations on the screen to indicate where new input information is to be entered, or for various selection functions.

11. System Utilities. Under this general heading, controls may be implemented to accomplish functions such as transferring the contents of the storage disk onto a standard magnetic tape cassette, or vice versa, for example.

12. "Help" - - May be requested from stored information to complete a prescription designation, or to complete additional information and have it filled in to supplement or correct the stored information appearing on the video display.

13. Security - - Access to the system is limited by suitable "passwords" which are capable of being edited and updated. In addition, as mentioned above, security against loss of the information stored on the magnetic disk may be prevented through the use of a backup tape, which may be periodically updated and stored, either at the doctor's home or in a safe deposit box, for example.

Other objects, features, and advantages of the invention will become apparent from a consideration of the following detailed description and from the accompanying drawings.

Brief Description of the Drawings

Figure 1 shows an overall external view of a system illustrating the principles of the present invention;

Figure 2 is a block diagram of the system illustrated in Figure 1;

Figure 3 shows the keyboard which may be employed by the operator of the system of Figures 1 and 2;

Figure 4 is a diagram indicating the mode of operation of the system following depressing of the "patient" fixed function key on the keyboard;

Figures 5, 6 and 7 are representations of the video display arising in the course of the operations indicated in Figure 4;

Figures 8A and 8B represent video displays involving the patient's medical "history", obtained in the course of depressing the "history" fixed function key on the keyboard;

Figure 9 is a block diagram of a multi-station implementation of the principles of the present invention; and

Figures 10A and 10B together form a block diagram of a schematic interface circuit and prihted circuit board employed in one illustrative embodiment by which standard commercially available units may be combined to implement the present invention.

Detailed Description

Referring more particularly to the drawings, Figure 1 shows a system illustrating the principles of the invention, including a printer 22, a storage unit 24 including both disk and cassette storage, and a third unit 26 including both a video display screen 28, and a keyboard 30. On the video display screen 28 is the designation "MEDSAFE", the trademark employed in connection with the system disclosed herein.

Figure 2 is a schematic block circuit diagram of the system illustrated in Figure 1. Certain blocks in fig. 2 which deserve special attention are enclosed in double lines. In Figure 2, the printer 22, the storage unit 24, and the unit 26 are interconnected by the printed circuit board 32 designed by the inventors herein in the course of the implementation of the present system. The printer 22

is a standard purchase item which is available from several manufacturers. The unit 25 is basically a terminal-plus-keyboard unit made by Zentec Company of Santa Clara, California, and could be their Model ZMS - 40, Series 8000, Series 2000, or an equivalent unit. Included in the standard unit as purchased from Zentec are the keyboard 30, the display unit 28, the video circuitry 36, the processor 38 (an Intel 8086 or comparable A unit), the processor bus 40, the input/output port 42, and the system memory 45, which may be a random access memory. The random access memory 45 has a capacity of up to 64 thousand bytes of digital information, where each byte includes eight bits. RAM 45 is employed mainly for video and keyboard related functions; and it stores the digital information which is converted into the video image. A programmable read-only memory 44 includes firmware provided by the inventors, relating for example to keyboard sensing, the loading of initial fixed information, diagnostics, monitoring, video display control, time of day, clock and calendar information. It may for example include about 16k bytes.

The random access program memory 46, also provided by the inventors herein, may have a storage capacity in the order of 64 thousand bytes of digital information. This random access memory 46 receives information in blocks from the disk storage unit 46, and provides rapid access to such data.

The disk drive unit 46 may for example be purchased from Micropolis Corporation, of Northridge, California, or Shugart Associates; while the cartridge tape drive unit 48 may be made by Data Electronics, Inc. with cartridges being available from Minnesota Mining and Manufacturing Company, or from Verbatin, Inc. The disk unit 46 may include several "platters" or hard magnetic disks, and with four such disks and eight recording surfaces, tworecording surfaces might be devoted to drug interaction data, one recording surface to software or program instructions, and

five recording surfaces would be available for recording patient information, entered by the doctor, nurse or medical office personnel.

Included in the storage unit 24 is the power supply 47, the disk drive unit 46 and the cartridge drive unit 48, as well as the controller 50.

The storage unit 24 permits the transfer of information from the disk unit 46 to the cartridge tape 48 periodically, such as at the end of each week, so that, in the event of a fire, or erasing of the information on the disk 46, the information may be restored from the cartridge which may be taken to the doctor's home, or periodically to an appropriate safe location, such as a safe deposit box or the like.

The keyboard 30 is shown in considerable detail in Figure 3. In Figure 3, the keyboard has been divided by dashed lines into three main sections designated 52, 54 and 56. The section 52 of the keyboard is substantially that of a standard typewriter keyboard. The upper left-hand section 54 includes a number of variable function keys, designated F1 through F9, and a number of special fixed function keys relating to particular functions to be performed in accordance with the present invention. These seven fixed functions key designations will be discussed in greater detail hereinbelow, but the abbreviations have the following meanings:

TABLE I: FIXED FUNCTION KEYS

1.	ACCT - - - -	Accounting.
2.	PAT - - - -	Patient Identification.
3.	BIO - - - -	Biography: Soc. Security No.; Age, Height, Weight, Responsible Party, etc.
4.	COVER - - -	Cover Sheet, Current Medical Information.
5.	HIST - - -	History, Medical, visit-by-visit.

6. CORR - - - Correlation of Possible Adverse Medical Interactions
7. UTIL - - - System Utilities.

The most important one of the fixed function keys is that designated "PAT" and which relates to individual patients. Many entries and much of the work which is accomplished in the present system will relate to particular patients, and will start by depressing of the "patient" key, as discussed in greater detail below.

At the right in Figure 3 in the area 56, are a number of additional keys which primarily relate to the implementation and coordination of the keyboard with the video display and with the printer. For example, the video display is provided with a "cursor" or marker to indicate a particular area of the video screen, either for selection purposes, or to designate the area where additional information will be written, or where editing will take place. The keys for moving the cursor in different directions are designated by the reference numeral 58. The arrows on four of these keys will serve to shift the cursor in the indicated direction. The information which appears on the video display may at any time be printed out by the printer 22, and this is accomplished by depressing the print key 60.

The "return" key 62 is depressed by the operator or the user of the system after the operator or user has completed the typing of an entry. This signal will be taken by the processor as indicating that the entry is completed, and that the system should respond and take the next programmed step.

Now that the overall components of the system have been identified in a cursory manner, it is useful to show how the system would actually be operated under normal operating conditions. As mentioned above, many of the operations of the system will be initiated by depressing

the "PAT" key with this key representing the designation "patient", and the steps following the depressing of the "PAT" will be indicated in connection with Figure 4, and Table III, which are generally co-extensive.

Following the depressing of the patient key, the video screen will, as indicated in Figure 5, and in the sequence Diagram of Figure 4, provide the instructions "enter last name of patient"; and Figure 5 shows the screen after the operator has entered the name "Smith" and has depressed the "return" key. Figure 6 shows the new video display, listing four possible Smith's (system patients) for selection, and indicating certain other possibilities. There will also be a cursor on the screen, and the operator will shift the cursor by keys 58 on the keyboard to select Beverly Smith, and will then depress one of the subordinate keys, as indicated on Figure 4, such as "Biography", "Cover Sheet", or "History". It may be particularly noted that the fixed function keys 3, 4 and 5 set forth in Table I are essentially "Subordinate" keys and their actuation will normally follow the actuation of the patient key through which the particular individual patient has been identified. The "CORR" key, involving the medical correlation of possible adverse reactions may be a subordinate function under "patient", or it may involve an abstract list of drugs or prescriptions not related to an individual patient.

Figure 7 shows the result of depressing the "cover" fixed function key for Beverly Smith, following the situation as indicated in Figure 6 as discussed hereinabove. The "cover" information is current summary medical information, and particularly includes current prescription and "Allergies and Chronic Conditions".

********** An important function of the presen invention is to make a medical correlation of the drug currently prescribed, and under consideration fo prescription to a given patient, and to have these analyze

for possible adverse effects. This capability of the present system led to the selection of the trademark "MEDSAFE" as a trademark for the present system.

In practice, following a determination of a patient's current prescriptions from the "cover" information, the "CORR" key may be depressed to implement the medical correlation step. A list may also be obtained following the depressing of the "HIST" or history key. Figure 8A represents the video display following depressing of the "history" fixed function key. The same patient name was retained but a more complex list of prescriptions prepared for illustrative purposes. One of the possible "soft" functions which is displayed in Figure 8A is "1/edit". Following the actuation of the variable function key "F-1" as shown in Figure 3. The display shown in Figure 8B is presented; and the indicated "soft" functions give several editing options. For example, if you had the name of a prescription but not the code number, or vice-versa, you could depress the "F-3" key for "3/rx help", after placing the cursor on the vacant zone, and the system would fill in the missing information.

This may be followed by medical correlation accomplished by the depressing the correlation key. As indicated below, the options available to the operator in the "correlation" mode include adding or dropping prescriptions to the list of the patient's active prescription, and, again, more fully identifying a particular prescription through a special function key for "RX HELP". Another special function key available under "correlation" is "analyze". Set forth below is a printout from the video screen of the analysis of a drug list or Barbara Smith, based on the correlation drug list set forth toward the top of the printout.

TABLE II: CORRELATION PRINT-OUT

01/01/82 00:11:19 Page 1

Active Patient: Smith, John 11222 La Cienega Boulevard, Inglewood, CA 90304

- -

CORRELATION DRUG LIST

0000332550 CARMEL HC
0000280002 BUTAZOLIDIN ALKA
0000560174 COUMADIN
0001241275 THYROID
0000710375 DILANTIN WITH PHENOBARBITAL 15 MG

- -

INTERACTION ANALYSIS RESULTS

- -

0000332550 CARMOL HC
0000710375 DILANTIN WITH PHENOBARBITAL 15 MG
SOURCE E PAGE 042 SIGNIFICANCE: OCCURS 20-30% OF THE TIME

- -

0000332550 CARMOL HC
0000710375 DILANTIN WITH PHENOBARBITAL 15 MG
SOURCE E PAGE 045 SIGNIFICANCE: OCCURS 20-30% OF THE TIME

- -

0000332550 CARMOL HC
0000560174 COUMADIN
SOURCE E PAGE 5329 SIGNIFICANCE: EXPECTED TO OCCUR - POTENTIALLY SERIOUS

- -

0000280002 BUTAZOLIDIN ALKA
0000560174 COUMADIN
SOURCE E PAGE 266 SIGNIFICANCE: RATE NOT SIGNIFICANT

- -

0000710375 DILANTIN WITH PHENOBARBITAL 15 MG
SOURCE E PAGE 205 SIGNIFICANCE: OCCURS 20-30% OF THE TIME

- -

0000560174 COUMADIN

0000710375 DILANTIN WITH PHENOBARBITAL 15MG

SOURCE E PAGE 291 SIGNIFICANCE: EXPECTED TO OCCUR - POTENTIALLY SERIOUS

- -

0000280002 BUTAZOLIDIN ALKA

0000710375 DILANTIN WITH PHENOBARBITAL 15 MG

SOURCE E PAGE 565S SIGNIFICANCE: REGARDED AS POTENTIALLY SIGNIFICANT

- -

0000280002 BUTAZOLIDIN ALKA

0000560174 COUMADIN

SOURCE E PAGE 295 SIGNIFICANCE: OCCURS REGULARLY - HIGHLY SIGNIFICANT

WARFARIN-PHENYLBUTAZONE 9, A

ACID DRUGS, SUCH AS PHENYLBUTAZONE, CAN DISPLACE WARFARIN FROM ITS BINDING SITE ON THE ALBUMIN MOLECULE, RESULTING IN A GREATER DONCENTRATION OF UNBOUND WARFARIN IN THE PLASMA. AS THE UNBOUND AMOUNT OF WARFARIN INCREASES THE HYPOPRO-THROM-BINEMIC EFFECT INCREASES. THIS EFFECT CAN OCCUR AS EARLY AS 1 DAY AFTER PHENYLBUTAZONE IS GIVEN TO PATIENTS RECEIVING ANTICOAGULANTS AND QUITE PREDICTABLY IN ALMOST ALL PATIENTS WITHIN THE FIRST WEEK OF CONCURRENT THERAPY.

NOTIFY PHYSICIAN THAT THE CONCURRENT USE OF THESE DRUGS CAN CAUSE SERIOUS BLEEDING EPISODES AND THAT THE USE OF THESE DRUGS CONCURRENTLY SHOULD BE AVOIDED.

The warnings as set forth in the interaction analysis results indicate that certain of the possibilities for medication are undesirable, and that alternative medication for accomplishing the same results should be considered.

In addition, the individual patient chronic conditions and allergies are taken into consideration and appropriate warnings given. Thus, if the patient were allergic to penicillin, and the proposed medication included penicillin, a warning would be produced.

Incidentally, the sources for the drug interaction correlation include "Medicom Drug Interaction Manual", Copyright 1980, by Medicare-Glazer Corporation; "Evaluations of Drug Interaction", Second Edition, published by the American Pharmaceutical Assoc.; and "Evaluations of Drug Interactions", Second Edition Supplement, published by the American Pharmaceutical Assoc. The correlation between various prescription drug is performed on a chemical by chemical basis rather than on the basis of the trademark or the generic name for a prescription drug, which often includes several chemical ingredients. Accordingly, the system identifies the individual chemical included in each prescription and then checks the resultant chemical for adverse reaction.

It may be noted again that the difficulty of determining possible adverse reactions between various drugs tends to inhibit doctors from trying new drugs or new combinations of drugs which might significantly help their patients. Because of the lengthy checking period which would be required to first identify all of the chemicals and then to cross check each chemical in the proposed new prescription against those presently being used by the patient will discourage the doctor from departing from his normal range of standard prescriptions for his particular field of interest. However, with the facility for easily determining all possible adverse interactions, the doctor will have considerably more latitude and freedom to

least consider new drugs which are being offered for use in his field.

The next fixed function key to be considered is "Biography". When the patient has been identified and the "BIO" key is depressed, the following biographical information is displayed in the screen:

No. 1 - Patient's name.

No. 2 - Patient's home address.

No. 3 - Patient's home telephone number.

No. 4 - patient's work address.

No. 5 - Patient's work telephone number.

No. 6 - Patient's birthdate.

No. 7 - Social Security Number.

No. 8 - Spouse's name.

No. 9 - spouse's home address.

No. 10 - Spouse's home telephone number.

No. 11 - Spouse's work address.

No. 12 - spouse's work telephone number.

No. 13 - Emergency contact, including home and work telephone numbers and the relationship between the patient and the emergency contact.

No. 14 - The name of the guarantor or guardian of the patient.

Following the depression of the biography key, the following functions may be accomplished:

1. Editing ("soft" or variable function).

2. Add dependent.

3. Any of the basic seven fixed function keys may be actuated.

4. Select responsible party account (only if the patient is not the responsible party).

5. Select "BIO" of responsible party (only if the patient is not the responsible party).

Incidentally, in the course of the present discussion, certain permissible sequences of activation of fixed or "hard" function keys and variable or "soft"

function keys have been disclosed. In general, arrangements have been made to accommodate virtually all of the steps which an operator is likely to wish to take, without necessarily requiring the identical sequence, when an alternative sequence will be logical to the operator. Frequently, the possibility of pushing an "abort" soft function key is offered, and this permits reversion to the previous video display and the previous status of the system. In the rare cases where the operator seeks to follow a sequence which is not within the capabilities of the system as organized, the system will give a soft beeping signal, and the operator must go back to the start of the particular sequence.

In the foregoing description some of the functions have been described and the associated video displays shown in the drawings. In Figure 4 of the drawings the various possible modes of operation following depressing of the "Patient" key were shown in diagrammatic form.

In the following section of this specification, Man-Machine Diagrams in Tabular Form, will be given, first for the same "Patient" key sequence as shown in Figure 4 and then for others of the available functions. In each case the Table will be entitled by the "hard" or fixed function key which initiates the sequence.

TABLE III

PATIENT

Patient
abort
patient's last name + return
patient
biography
cover sheet
history
correlation
accounting
abort
patient
biography
cover sheet
history
correlation
accounting
system utilities
print

It is useful to compare Table III with Figure 4 of the drawings, as they both relate to the same steps. Note that the first normal step is to type in the patient's last name, and then hit the keyboard "Return" key, indicating completion of the entry. This step is indicated by the entry "patient's last name + return" in Table III. Then, as indicated by Figure 6, the video display presents a listing of the active patients with the entered last name, in this case "Smith". The operator then moves the cursor on the video screen to select the desired patient, and will depress one of the other keys as indicated in Figure 4 and Table III. As mentioned above, for example, Figure 7 shows the result of depressing the "Cover" fixed function key.

Tables IV through IX set forth below follow the pattern outlined above for Table III; and the format of these

Tables IV through IX may be readily shifted to the format of the diagram of Figure 4, as indicated by a comparison of Table III and Figure 4.

TABLE IV

BIOGRAPHY

Biography

```
patient
biography
cover sheet
history
correlation
accounting
system utilities
responsible party account select
responsible party biography select
edit
     indicate primary insurance carrier
          indicate primary insurance carrier
          insurance help
          doctor help
          patient type help
          update
          abort
          add spouse
          delete spouse
          add responsible party
          delete responsible party
     insurance help
          indicate primary insurance carrier
          insurance help
          doctor help
          patient type help
          update
          abort
          add spouse
          delete spouse
          add responsible party
          delete responsible party
```

```
doctor help
     indicate primary insurance carrier
     insurance help
     doctor help
     patient type help
     update
     abort
     add spouse
     delete spouse
     add responsible party
     delete responsible party
patient type help
     indicate primary insurance carrier
     insurance help
     doctor help
     patient type help
     update
     abort
     add spouse
     delete spouse
     add responsible party
     delete responsible party
update
     patient
     biography
     cover sheet
     history
     correlation
     accounting
     system utilities
     responsible party account select
     responsible party biography select
     edit
abort
     patient
```

```
                    biography
                    cover sheet
                    history
                    correlation
                    accounting
                    system utilities
                    responsible party account select
                    responsible party biography select
                    edit
               add spouse
                    abort
                         indicate primary insurance carrier
                         insurance help
                         doctor help
                         patient type help
                         update
                         abort
                         add spouse
                         delete spouse
                         add responsible party
                         delete responsible party
              spouse's last name + return
                    abort
                         indicate primary insurance carrier
                         insurance help
                         doctor help
                         patient type help
                         update
                         abort
                         add spouse
                         delete spouse
                         add responsible party
                         delete responsible party
                   select
                         indicate primary insurance carrier
                         insurance help
```

```
                                    doctor help
                                    patient type help
                                    update
                                    abort
                                    add spouse
                                    delete spouse
                                    add responsible party
                                    delete responsible party
                          delete spouse
                               indicate primary insurance carrier
                               insurance help
                               doctor help
                               patient type help
                               update
                               abort
                               add spouse
                               delete spouse
                               add responsible party
                               delete responsible party
                     add responsible party
                          abort
                               indicate primary insurance carrier
                               insurance help
                               doctor help
                               patient type help
                               update
                               abort
                               add spouse
                               delete spouse
                               add responsible party
                               delete responsible party
                     responsible party's last name + return
                          abort
                               indicate primary insurance carrier
                               insurance help
                               doctor help
```

```
                    patient type help
                    update
                    abort
                    add spouse
                    delete spouse
                        add responsible party
                        delete responsible party
                select
                    indicate primary insurance carrier
                    insurance help
                    doctor help
                    patient type help
                    update
                    abort
                    add spouse
                    delete spouse
                        add responsible party
                        delete responsible party
            delete responsible party
                indicate primary insurance carrier
                insurance help
                doctor help
                patient type help
                update
                abort
                add spouse
                delete spouse
                    add responsible party
                    delete responsible party
        print
```

TABLE V

COVER SHEET

```
Cover sheet
    patient
    biography
    cover sheet
    history
    correlation
    accounting
    system utilities
    edit
        update
        patient
        biography
        cover sheet
        history
        correlation
        accounting
        system utilities
        edit
        select patient history
        print
    abort
        patient
        biography
        cover sheet
        history
        correlation
        accounting
        system utilities
        edit
        select patient history
        print
    chronic help
        update
        abort
```

```
                chronic help
                add chronic
                delete
            add chronic
                update
                abort
                chronic help
                add chronic
                delete
        delete
                update
                abort
                chronic help
                add chronic
                delete
    select patient history
        print
```

TABLE VI

HISTORY

```
History
    patient
    biography
    cover sheet
    history
    correlation
    accounting
    system utilities
    history medical select
        patient
        biography
        cover sheet
        history
        correlation
        accounting
        system utilities
        edit
            drop
                drop
                add rx
                add diagnosis
                help
                check list
                history invoice select
                update/post
                abort
            add rx
                drop
                add rx
                add diagnosis
                help
                check list
                history invoice select
                update/post
```

```
                abort
            help
                drop
                add rx
                add diagnosis
                help
                check list
                history invoice select
                update/post
                abort
            add diagnosis
                drop
                add rx
                add diagnosis
                help
                check list
                history invoice select
                update/post
                abort
            update/post
                patient
                biography
                cover sheet
                history
                correlation
                accounting
                system utilities
                previous entry
                next entry
                edit
                history invoice select
                print
            abort
                patient
                biography
                cover sheet
```

history
correlation
accounting
system utilities
previous entry
next entry
edit
history invoice select
print
previous entry
patient
biography
cover sheet
history
correlation
accounting
system utilities
previous entry
next entry
edit
history invoice select
print
next entry
patient
biography
cover sheet
history
correlation
accounting
system utilities
previous entry
next entry
edit
history invoice select
print
history invoice select

```
                print
                     patient
                     biography
                     cover sheet
5                    history
                     correlation
                     accounting
                     system utilities
                     previous entry
10                   next entry
                     print
           history invoice select
                patient
                biography
15              cover sheet
                history
                correlation
                accounting
                system utilities
20              medical select
                check list
                delete procedure
                     delete procedure
                     post/print
                     abort
25                   check list
                post/print
                     patient
                     biography
30                   cover sheet
                     history
                     correlation
                     accounting
                     system utilities
35                   medical select
                     check list
```

```
                history invoice select
            abort
                patient
                biography
                cover sheet
                history
                correlation
                accounting
                system utilities
                medical select
                check list
                history invoice select
        check list
            procedure help
                procedure help
                delete procedure
                select procedure
                resume
            delete procedure
                procedure help
                delete procedure
                select procedure
                resume
            select procedure
                procedure help
                delete procedure
                select procedure
                resume
            resume
        print
```

TABLE VII

CORRELATION

```
Correlation
    patient
    biography
    cover sheet
    history
    correlation
    accounting
    system utilities
    analyze
        resume
            patient
            biography
            cover sheet
            history
            correlation
            accounting
            system utilities
            print
            include active patient's rx's
            rx help
            add rx
            drop rx
        continue
            resume
            continue
            print
        print
            resume
            continue
            print
    warnings
        resume
            patient
            biography
```

```
                    cover sheet
                    history
                    correlation
                    accounting
                    system utilities
                         print
                         include active patient's rx's
                         rx help
                         add rx
                         drop rx
               continue
                         resume
                         continue
                         print
               print
                         resume
                         continue
                         print
          include active patient's rx's
                    patient
                    biography
                    cover sheet
                    history
                    correlation
                    accounting
                    system utilities
                    print
                    include active patient's rx's
                    rx help
                    add rx
                    drop rx
          rx help
                    patient
                    biography
                    cover sheet
                    history
```

```
                accounting
                system utilities
                print
                include active patient's rx's
          5     rx help
                add rx
                drop rx
           add rx
                patient
          10    biography
                cover sheet
                history
                correlation
                accounting
          15    system utilities
                print
                include active patient's rx's
                rx help
                add rx
          20    drop rx
           drop rx
                patient
                biography
                cover sheet
          25    history
                correlation
                accounting
                system utilities
                print
          30    include active patient's rx's
                rx help
                add rx
                drop rx
           print
          35    patient
                biography
```

cover sheet
history
correlation
accounting
system utilities
print
include active patient's rx's
rx help
add rx
drop rx

TABLE VIII

ACCOUNTING

```
Accounting
    patient
    biography
    cover sheet
    history
    correlation
    accounting
    system utilities
    patient payment
        post
            patient
            biography
            cover sheet
            history
            correlation
            accounting
            system utilities
            patient payment
            insurance payment
            invoice
            adjust
            more
            print statement
            print insurance bill
            print invoice
        abort
            patient
            biography
            cover sheet
            history
            correlation
            accounting
            system utilities
            patient payment
```

```
                    insurance payment
                    invoice
                    adjust
                    more
5                   print statement
                    print insurance bill
                    print invoice
               insurance payment
                    abort
10                      patient
                        biography
                        cover sheet
                        history
                        correlation
15                      accounting
                        system utilities
                        patient payment
                        insurance payment
                        invoice
20                      adjust
                        more
                        print statement
                        print insurance bill
                        print invoice
25             insurance carrier name + return
                        abort
                            patient
                            biography
                            cover sheet
30                          history
                            correlation
                            accounting
                            system utilities
                            patient payment
35                          insurance payment
                            invoice
```

```
                    adjust
                    more
                    print statement
                    print insurance bill
                    print invoice
               post
                    patient
                    biography
                    cover sheet
                    history
                    correlation
                    accounting
                    system utilities
                    patient payment
                    insurance payment
                    invoice
                    adjust
                    more
                    print statement
                    print insurance bill
                    print invoice
               insurance close out
                    abort
                    post
                    insurance close out
                    apply
                    more
                    insurance invoice
               apply
                    abort
                    post
                    insurance close out
                    apply
                    more
                    insurance invoice
               more
```

```
                                abort
                                post
                                insurance close out
                                apply
                                more
                            insurance invoice
                        insurance invoice
                            post
                                abort
                                post
                                insurance close out
                                apply
                                more
                                insurance invoice
                            abort
                                abort
                                post
                                insurance close out
                                apply
                                more
                                insurance invoice
                    invoice
                                patient
                                biography
                                cover sheet
                                history
                                correlation
                                accounting
                                system utilities
                                insurance bill
                                    abort
                                        patient
                                        biography
                                        cover sheet
                                        history
                                        correlation
```

```
                    accounting
                    system utilities
                    insurance bill
                    close
          insurance carrier name + return
                    patient
                    biography
                    cover sheet
                    history
                    correlation
                    accounting
                    system utilities
                    insurance bill
                    close
     close
          post
                    patient
                    biography
                    cover sheet
                    history
                    correlation
                    accounting
                    system utilities
                    insurance bill
                    close
               abort
                    patient
                    biography
                    cover sheet
                    history
                    correlation
                    accounting
                    system utilities
                    insurance bill
                    close
          adjust
```

```
                    patient
                    biography
                    cover sheet
                    history
                    correlation
                    accounting
                    system utilities
                    patient payment
                    insurance payment
                    invoice
                    adjust
                    more
                    print statement
                    print insurance bill
                    print invoice
          more
                    patient
                    biography
                    cover sheet
                    history
                    correlation
                    accounting
                    system utilities
                    patient payment
                    insurance payment
                    invoice
                    adjust
                    more
                    print statement
                    print insurance bill
                    print invoice
     print statement
                    patient
                    biography
                    cover sheet
                    history
```

```
                    correlation
                    accounting
                    system utilities
                    patient payment
                    insurance payment
                    invoice
                    adjust
                    more
                    print statement
                    print insurance bill
                    print invoice
               print insurance bill
                    abort
                    patient
                    biography
                    cover sheet
                    history
                    correlation
                    accounting
                    system utilities
                    patient payment
                    insurance payment
                    invoice
                    adjust
                    more
                    print statement
                    print insurance bill
                    print invoice
               carrier name + return
                    patient
                    biography
                    cover sheet
                    history
                    correlation
                    accounting
                    system utilities
```

```
                    patient payment
                    insurance payment
                    invoice
                    adjust
                    more
                    print statement
                    print insurance bill
                    print invoice
          print invoice
                    patient
                    biography
                    cover sheet
                    history
                    correlation
                    accounting
                    system utilities
                    patient payment
                    insurance payment
                    invoice
                    adjust
                    more
                    print statement
                    print insurance bill
                    print invoice
```

TABLE IX

SYSTEM UTILITIES

```
System Utilities
     patient
     biography
     cover sheet
     history
     correlation
     accounting
     system utilities
     remote/local access
     halt
     daily close
          patient
          biography
          cover sheet
          history
          correlation
          accounting
          system utilities
          close
               patient
               biography
               cover sheet
               history
               correlation
               accounting
               system utilities
               close
               interim reports
               adjust
          interim reports
               print
                    print
                    display
                    abort
```

```
display
     resume
          print
          display
          abort
          patient
          biography
          cover sheet
          history
          correlation
          accounting
          system utilities
          close
          interim reports
          adjust
          adjust
               patient
               biography
               cover sheet
               history
               correlation
               accounting
               system utilities
     restore drug files
          patient
          biography
          cover sheet
          history
          correlation
          accounting
          system utilities
          remote/local access
          halt
          daily close
          restore drug files
```

```
                restore patient files
                backup drug files
                backup patient files
                compress files
                patient report
                set date
                password maintenance
            restore patient files
                patient
                biography
                cover sheet
                history
                correlation
                accounting
                system utilities
                remote/local access
                halt
                daily close
                restore drug files
                restore patient files
                backup drug files
                backup patient files
                compress files
                patient report
                set date
                password maintenance
            backup drug files
                patient
                biography
                cover sheet
                history
                correlation
                accounting
                system utilities
                remote/local access
                halt
```

```
                daily close
                restore drug files
                restore patient files
                backup drug files
                backup patient files
                compress files
                patient report
                set date
                password maintenance
            backup patient files
                patient
                biography
                cover sheet
                history
                correlation
                accounting
                system utilities
                remote/local access
                halt
                daily close
                restore drug files
                restore patient files
                backup drug files
                backup patient files
                compress files
                patient report
                set date
                password maintenance
            compress files
                patient
                biography
                cover sheet
                history
                correlation
                accounting
                system utilities
```

```
                remote/local access
                halt
                daily close
                restore drug files
                restore patient files
                backup drug files
                backup patient files
                compress files
                patient report
                set date
                password maintenance
          patient report
                patient
                biography
                cover sheet
                history
                correlation
                accounting
                system utilities
                remote/local access
                halt
                daily close
                restore drug files
                restore patient files
                backup drug files
                backup patient files
                compress files
                patient report
                set date
                password maintenance
          set date
                patient
                biography
                cover sheet
                history
                correlation
```

```
                accounting
                system utilities
                remote/local access
                halt
                daily close
                restore drug files
                restore patient files
                backup drug files
                backup patient files
                compress files
                patient report
                set date
                password maintenance
          password maintenance
                patient
                biography
                cover sheet
                history
                correlation
                accounting
                system utilities
                edit
                     password update
                          system utilities
                     abort
                          system utilities
                Help
                     select
                     help
                     abort
```

In considering the foregoing TABLES III through IX it is first noted that Table III corresponds to Figure 4, and that the other tables are analogous, and each of Tables IV through IX could be shown in the same manner as Figure 4. Also, no distinction in the tables has been made between "hard" and "soft" key functions, with the "soft" or variable functions being identified in each case by the designations at the bottom of the video display.

Concerning another matter, the Accounting functions are of considerable practical importance; and the capability of the present systems to accommodate both the "Correlation" Medical Safety feature and also the Accounting functions, and their tying back to a common data base, is considered to be particularly important. Accordingly, in the following section of this specification, typical video displays, or print-outs for implementing the Accounting functions will be set forth:

ACCOUNTING EXHIBIT I: DAILY CLOSING

DAILY CLOSING

MONEY ACCOUNT BALANCES

CASH: $xxxxx.xx CHECKS: $xxxxx.xx CREDIT CARDS: $xxxxx.xx

ON-HAND AMOUNTS

CASH: $_____.__ CHECKS: $_____.__ CREDIT CARDS: $_____.__

CASH TO BE RETAINED

$_____.__

ACCOUNTING EXHIBIT II -- DAILY CLOSING ADJUSTMENTS

DAILY CLOSING ADJUSTMENTS

OLD ACCOUNT BALANCES

CASH: $xxxxx.xx CHECKS: $xxxxx.xx CREDIT CARDS: $xxxxx.xx

ADJUSTMENTS

CASH: $xxxxx.xx CHECKS: $xxxxx.xx CREDIT CARDS: $xxxxx.xx

NEW ACCOUNT BALANCES

CASH: $xxxxx.xx CHECKS: $xxxxx.xx CREDIT CARDS: $xxxxx.xx

CASH RETAINED: $xxxxx.xx

EXHIBIT III - PATIENT BIOGRAPHY

EXHIBIT III - PATIENT BIOGRAPHY

PATIENT BIOGRAPHY

_____, _____ CHART # _____

HOME: _____

PHONE: _____

WORK NAME: _____ PHONE: _____

ADDR: _____

BIRTHDATE: __/__/__ SOCIAL SECURITY: __/__/____

DOCTOR: ___ PATIENT TYPE: ___ PRIMARY DOCTOR ___ REFERRING DOCTOR: ___

SPOUSE: _____, _____ CHART# _____

HOME: _____

PHONE: _____

WORK NAME: _____ PHONE: _____

ADDR: _____

RESPONSIBLE PARTIES

NAME	HOME PHONE	WORK PHONE	RELATION
_____, _____	_____	_____	_____
_____, _____	_____	_____	_____

EMERGENCY CONTACTS

NAME	HOME PHONE	WORK PHONE	RELATION
_____, _____	_____	_____	_____
_____, _____	_____	_____	_____
_____, _____	_____	_____	_____

INSURANCE COVERAGE

CODE	GROUP ID	NAME OF INSURED	RELATION
___	_____	_____, _____	_____
___	_____	_____, _____	_____
___	_____	_____, _____	_____

EXHIBIT IV -- PATIENT PAYMENT

PATIENT PAYMENT

CASH

Amount: $_____.__

CHECK

AMOUNT: $_____.__ CHECK NUMBER: _____ BANK: _____

CHECK DATE: __/__/__

CREDIT CARD

AMOUNT: $_____.__ CARD NUMBER: _____ AUTH. NUMBER: ____

EXPIRES: __/__

EXHIBIT V — INSURANCE PAYMENT

```
                              INSURANCE PAYMENT

AMOUNT: $_____._          CHECK NUMBER: ______          BANK NUMBER: ______
                           CHECK DATE: __/__/__

                       OPEN INVOICES FOR CARRIER xxx
  DATE                   PATIENT NAME                BILL DATE  BALANCE    APPLY
xx/xx/xx xxxxxxxxxxxxxxxxxxxxx, xxxxxxxxxxxxxxxxxx xx/xx/xx $xxxxx.xx $_____.__
xx/xx/xx xxxxxxxxxxxxxxxxxxxxx, xxxxxxxxxxxxxxxxxx xx/xx/xx $xxxxx.xx $_____.__
xx/xx/xx xxxxxxxxxxxxxxxxxxxxx, xxxxxxxxxxxxxxxxxx xx/xx/xx $xxxxx.xx $_____.__
xx/xx/xx xxxxxxxxxxxxxxxxxxxxx, xxxxxxxxxxxxxxxxxx xx/xx/xx $xxxxx.xx $_____.__
xx/xx/xx xxxxxxxxxxxxxxxxxxxxx, xxxxxxxxxxxxxxxxxx xx/xx/xx $xxxxx.xx $_____.__

                                   (ETC.)
================================================================================
```

EXHIBIT VI - INSURANCE PAYMENT INVOICE ITEMIZATION

INSURANCE PAYMENT INVOICE ITEMIZATION

LAST BILLING	PATIENT NAME	INVOICE BALANCE
xx/xx/xx	xxxxxxxxxxxxxxxxxx, xxxxxxxxxxxxxxxxxxxxxxxxx	$xxxxx.xx

PERFORMING DOCTOR: xxx ENCOUNTER FORM: xxxxxxxxx DATE OF VISIT: xx/xx/xx

PROCEDURE	NUMBER OF TIMES PERFORMED	LOCATION PERFORMED	CHARGE	BALANCE	AMOUNT TO APPLY	CLOSE
xxxxx.xx	xxx	xxx	$xxxxx.xx	$xxxxx.xx	$_____.__	_
xxxxx.xx	xxx	xxx	$xxxxx.xx	$xxxxx.xx	$_____.__	_
xxxxx.xx	xxx	xxx	$xxxxx.xx	$xxxxx.xx	$_____.__	_
xxxxx.xx	xxx	xxx	$xxxxx.xx	$xxxxx.xx	$_____.__	_
xxxxx.xx	xxx	xxx	$xxxxx.xx	$xxxxx.xx	$_____.__	_

(ETC.)

EXHIBIT VII. - RESPONSIBLE PARTY ACCOUNT INFORMATION

```
                        RESPONSIBLE PARTY ACCOUNT INFORMATION

                                     BALANCES
  TOTAL            0-30        30-60         60-90        90-120       OVER 120
$xxxxx.xx       $xxxxx.xx    $xxxxx.xx    $xxxxx.xx    $xxxxx.xx     $xxxxx.xx

LAST BILLING: xx/xx/xx

                                 ACCOUNT ACTIVITY
                         DEBITS                                CREDITS
  DATE    PATIENT NAME    DESCRIPTION AMOUNT   INS   AMOUNT    DESCRIPTION  DATE
xx/xx/xx xxxxxxxxxxxxxx xxxxxxxxxx $xxxxx.xx x | $xxxxx.xx xxxxxxxxxx xx/xx/xx
xx/xx/xx xxxxxxxxxxxxxx xxxxxxxxxx $xxxxx.xx x | $xxxxx.xx xxxxxxxxxx xx/xx/xx
xx/xx/xx xxxxxxxxxxxxxx xxxxxxxxxx $xxxxx.xx x | $xxxxx.xx xxxxxxxxxx xx/xx/xx
xx/xx/xx xxxxxxxxxxxxxx xxxxxxxxxx $xxxxx.xx x | $xxxxx.xx xxxxxxxxxx xx/xx/xx
xx/xx/xx xxxxxxxxxxxxxx xxxxxxxxxx $xxxxx.xx x | $xxxxx.xx xxxxxxxxxx xx/xx/xx

                                      (ETC.)
==================================================================================
```

EXHIBIT VIII - PROCEDURES CHECKLIST

PROCEDURES CHECKLIST

OTHER: _____.__ NUMBER OF TIMES PERFORMED:

CODE	NO.	PROCEDURE	CODE	NO.	PROCEDURE
xxxxx.xx	xxx	xxxxxxxxxxx	xxxxx.xx	xxx	xxxxxxxxxxx
xxxxx.xx	xxx	xxxxxxxxxxx	xxxxx.xx	xxx	xxxxxxxxxxx
xxxxx.xx	xxx	xxxxxxxxxxx	xxxxx.xx	xxx	xxxxxxxxxxx
xxxxx.xx	xxx	xxxxxxxxxxx	xxxxx.xx	xxx	xxxxxxxxxxx
xxxxx.xx	xxx	xxxxxxxxxxx	xxxxx.xx	xxx	xxxxxxxxxxx

(ETC.)

EXHIBIT IX - INVOICE

INVOICE

LAST BILLING	PATIENT NAME	INVOICE BALANCE
xx/xx/xx	xxxxxxxxxxxxxxxxx, xxxxxxxxxxxxxxxxxxxxxxxxx	$xxxx.xx

PERFORMING DOCTOR: ___ ENCOUNTER FORM: _____ DATE OF VISIT: __/__/__

PROCEDURE	NUMBER OF TIMES PERFORMED	LOCATION PERFORMED	CHARGE	BALANCE	DO NOT BILL CARRIER
_____.__	___	___	$_____.__	$_____.__	-
_____.__	___	___	$_____.__	$_____.__	-
_____.__	___	___	$_____.__	$_____.__	-
_____.__	___	___	$_____.__	$_____.__	-
_____.__	___	___	$_____.__	$_____.__	-

(ETC.)

EXHIBIT X - MEDICAL HISTORY

MEDICAL HISTORY

VISIT DATE: __/__/__ ENCOUNTER FORM: _____

CODE	DIAGNOSIS
---'--	----------
---'--	----------

CODE	NO.	PROCEDURE
----'--	---	----------
----'--	---	----------
----'--	---	----------
----'--	---	----------
----'--	---	----------

(ETC.)

DRUG CODE	DRUG NAME	STRENGTH	DOSE	TIMES	TOTAL	EXPIRES
----------	----------	----------	------	---	------	__/__/__
----------	----------	----------	------	---	------	__/__/__
----------	----------	----------	------	---	------	__/__/__
----------	----------	----------	------	---	------	__/__/__
----------	----------	----------	------	---	------	__/__/__

(ETC.)

COMMENTS:

Returning now to system organization, Figure 9 shows a multi-station system similar to that shown in Figures 1 and 2, but designed with several terminal units to serve a small hospital or medical group. The various input terminals 82, 84....86 appear toward the left in Figure 9, and each of them has associated with it a printer unit 83, 85...87. All of the terminals are connected to a central file and storage unit 90. This central unit 90 includes a disk drive unit 92 and a tape cartridge storage unit 94 with associated input and output electronics designated by the file server block 96 and the controller block 98. These units perform buffering functions and permit the storage of requests from the various terminals and the sequential satisfying of the requests received from the individual terminals. Certain economies are of course achieved by the use of a single central unit 90 as compared with having a storage unit associated with each of the individual terminals. Thus, for example, only a single set of medical correlation data need be retained on the premises, and many of the program functions stored within the disk drive 92 may be used for each of the terminal units, with very little loss of time.

Concerning additional data about the present system, all information is handled in accordance with ASCII format, which is an industry standard coding system in which each letter and number has assigned to it a 7-bit binary number. This of course gives 128 possibilities, corresponding to the number "2" raised to the seventh power.

With each 7-bit binary code providing 128 possibilities, this clearly includes an adequate range for all decimal digits, and capital and lower case letters as well as making available codes for the other functions which appear on the keyboard. With regard to the disk storage included in unit 24 in Figures 1 and 2, it has a theoretical capacity of 35 megabytes, where each byte includes eight (8) bits. For convenience in accessing the

information from the disk, it is formated with certain amount of the available space being employed for "signposts" to indicate the location of the included information. Accordingly, it only has about 27 megabytes of storage actually available. Of this space, approximately 9 megabytes are employed for the storage of the drug interaction information, and about one megabyte is required for program information. The remaining 17 megabytes of storage are available for storing patient information and the like.

Turning to another phase of the operation of the present system, particularly with reference to the block diagram of Figure 2, the system is normally put into operation by the actuation of the keyboard, normally one of the fixed function keys, and most frequently by the initial actuation of the patient key. When the keyboard is appropriately actuated, output signals from the keyboard are coupled through the processor bus 40 to the firmware 44. Appropriate signals are directed to the program memory 46, and the output from the program memory 46 is routed to the microprocessor 38 which calls up suitable information from the disk 35 through the processor bus 40, the interconnection device 32, and the controller 50. Information from the disk unit 46 is routed back to the program memory 46, and the processor 38 operates the video circuitry 36 to produce an appropriate display on the screen 28. It is again noted that the unit 26 is a purchase item available from various companies including Zentec of Santa Clara, California, and includes much of the circuitry for coupling the keyboard to the video display unit 28 and 36.

With reference to the special interconnection logic circuitry 32 included as a special circuit board within the terminal unit 26, it is shown in some detail in Figures 10A and 10B. The connections from this circuitry of Figures 10A and 10B to the rest of the system are accomplished

through connectors 102, 104 and 106. Connector 102 is coupled to the Processor 38; connector 104 to the printer 22; and connector 106 (shown in two parts in Figure 10B) is connected to the printer unit 24).

Now, considering the various circuits included within the interconnection logic circuit of Figures 10A and 10B, the light emitting diodes, or LED's 108 (Figure 10B) are provided for debugging and testing, with energization supplied by the LED driver circuit 110. At the far left in Figure 10A, the microprocessor bus 112 extends to connector 102, and the read/write signal leads 114, 116 appear directly above the parallel bus circuits 112. At the upper left in Figure 10A is the "Power-On" reset circuit 118, which appropriately initializes the various multi-state logic circuits. Suitable terminating resistor networks 120 and 122 are connected to certain of the data buses. Other circuits which are worthy of note include the bidirectional parallel port 124, the line drivers 126 and 128, and the line receivers or input buffers 130. The circuits 132, 134 and 136 are address decoders, and circuit 138 is an output latch. Circuit 140 is an input buffer.

A number of inverting amplifiers 142 are shown, and these are represented by the usual triangles with a small circle at the output representing the inversion from high to low or vice versa. "OR" circuits 144, which provide an output signal when either of the input is energized, are shown by the conventional logic block symbol including a curved rear portion and a somewhat pointed front portion. Two of these "OR" circuits appear toward the lower center in Figure 10A. A "NAND" circuit 146 is represented by the normal logic "AND" symbol, followed by a small circle at its output to represent inversion. Circuits 148 and 150 are line drivers, and circuit 152 is a multiplexer. The flip-flop circuits 154 serve to match the logic between the terminal 26 and the storage unit 24.

For completeness, it may be noted that any of

number of printer units may be employed, but that good results have been obtained using Printer PC-8023A made by Nippon Electric Co. of America, Elk Grove, Illinois; similarly with regard to the storage unit, the disk drive and controller may be obtained from Shugart Associates, and the Tape Drive from Data Electronics, Inc. (D.E.I.), all as mentioned above.

Concerning one further matter, the input/output port 42 is particularly useful for receiving input information over the telephone lines, as indicated by the arrows to the left of block 25 and leading to input/ output port 42. For example, updated medical correlation information may be provided over the telephone lines, when new drugs are added to the listings, or new adverse reactions discovered and added to the texts or supplements thereto, as identified hereinabove.

In the foregoing description and drawings, one complete system has been disclosed including the flow diagrams and tables for implementing the various functions, including medical correlation and accounting, which may be accomplished by the system. It is to be understood that other electronic components may be employed to implement the system, and that the disclosed operations may be implemented in terms of different technological arrangements. Accordingly. the present invention is not limited to that precisely as shown and described herein.

What is claimed is:

1. A comprehensive medical system for accounting and billing patients, for providing historical medical information on patients and for checking for possible adverse medical interactions comprising:

a video display and terminal unit, and a keyboard associated therewith;

a digital storage unit including a magnetic disk and a tape cassette unit;

an output printer;

means for storing in said digital storage unit most known adverse medical interactions between the chemicals in prescription drugs, and also between chemicals in prescription drugs and medical chronic conditions, and allergies indicated by patient histories;

means for identifying active prescriptions of individual patients;

means for checking for possible adverse interactions between said active prescriptions, chronic conditions and allergies, and also against possible additional drugs under consideration for prescribing to the individual patient;

means for recording information relative to successive visits by a patient, including drugs prescribed and billing information;

means for periodically printing bills for services rendered for individual patients;

means identifying certain of the keyboard input keys with specific legends referring to specific functions including (1) patient information (2) correlation of adverse interaction information and (3) accounting functions;

means for identifying additional variable function keys;

circuit means for interconnecting said video displa and terminal unit, said storage unit and said printer;

means for displaying information on said video display in accordance with the fixed function and th

variable function keys which are actuated, and means for including in said video display alternative variable function displays related to the displayed information; and

means for controlling the functions implemented by said additional function keys in accordance with information appearing on said video display.

2. A comprehensive medical system as defined in claim 1 further comprising means for printing out information appearing on said video display.

3. A comprehensive medical system as defined in claim 1 further comprising cursor means for identifying specific information on said video display; and means for changing said video display relative to the identified information on said display.

4. A comprehensive medical system as defined in claim 1 further comprising a plurality of additional video display and terminal units, and means for connecting all of them to said digital storage unit.

5. A comprehensive medical system for accounting and billing patients,. for providing historical information on patients and for checking for possible adverse medical interactions comprising:

a video display and terminal unit, and a keyboard associated therewith;

a digital storage unit including a magnetic disk and a tape cassette unit;

an output printer;

means for storing in said digital storage unit most known adverse medical interactions between the chemicals in prescription drugs, and also between chemicals in prescription drugs and medical chronic conditions and allergies indicated by patient histories;

means for identifying active prescriptions of individual patients;

means for checking for possible adverse interactions between said active prescriptions, chronic conditions and allergies, and also against possible additional drugs under consideration for prescribing to the individual patient;

means for recording information relative to successive visits by a patient, including drugs prescribed and billing information;

means for periodically printing bills for services rendered for individual patients,

means identifying certain of the keyboard input keys with specific legends referring to specific functions including (1) patient information (2) correlation of adverse interaction information and (3) accounting functions;

means for identifying additional variable function keys; and

means for controlling the functions implemented by said additional function keys in accordance with information appearing on said video display.

6. A comprehensive medical system for accounting and billing patients, for providing historical information on patients and for checking for possible adverse medical interactions comprising:

a video display and terminal unit, and a keyboard associated therewith;

a digital storage unit;

an output printer;

means for storing in said digital storage unit most known adverse medical interactions between the chemicals in prescription drugs, and also between chemicals in prescription drugs and medical chronic conditions, and allergies indicated by patient histories;

means for identifying active prescriptions of

individual patients;

means for checking for possible adverse interactions between said active prescriptions, chronic conditions and allergies, and also against possible additional drugs under consideration for prescribing to the individual patient;

means for recording information relative to successive visits by a patient, including drugs prescribed;

means identifying certain of the keyboard input keys with specific legends referring to specific functions including (1) patient information, and (2) correlation of adverse interaction information;

circuit means for interconnecting said video display and terminal unit, said storage unit and said printer;

means for displaying information on said videc display in accordance with the keyboard keys which are actuated, including the results of the adverse interaction correlation analysis.

7. A comprehensive medical system as defined in claim 6 further comprising means for printing out information appearing on said video display.

8. A comprehensive medical system as defined in claim 6 further comprising cursor means for identifying specific information on said video display; and means for changing said video display relative to the identified information on said display.

9. A comprehensive medical system as defined in claim 6 further comprising a plurality of additional video display and terminal units, and means for connecting all of them to said digital storage unit.

10. A comprehensive medical system for providing historical information on patients and for checking for possible adverse medical interactions comprising:

a video display and terminal unit, and a keyboard associated therewith;

a digital storage unit;

an output printer;

means for storing in said digital storage unit most known adverse medical interactions between the chemicals in prescription drugs, and also between chemicals in prescription drugs and medical chronic conditions and allergies;

means for identifying selected prescriptions, and entering such prescriptions through the keyboard;

means for checking for possible adverse interactions between said selected prescriptions;

means for recording information relative to successive visits by patients, including drugs prescribed;

means identifying certain of the keyboard input keys with specific legends referring to specific functions including (1) patient information, and (2) correlation of adverse interaction information;

circuit means for interconnecting said video display and terminal unit, said storage unit and said printer;

means for displaying information on said video display in accordance with the keyboard keys which are actuated, including the results of the adverse interaction correlation analysis.

11. A comprehensive medical system as defined in claim 10 further comprising means for printing out information appearing on said video display.

12. A comprehensive medical system as defined in claim 10 further comprising cursor means for identifying specific information on said video display; and means for changing said video display relative to the identified information on said display.

13. A comprehensive medical system as defined in claim 10 further comprising a plurality of additional videc display and terminal units, and means for connecting all of them to said digital storage unit.

14. A comprehensive medical system as defined in claim 10 further comprising means for entering information on selected chronic conditions and allergies; and means for checking for possible adverse interactions between the selected prescriptions and said chronic conditions and allergies.

15. A comprehensive medical system as defined in claim 10 further including input/output port means for receiving or transmitting data over telephone lines.

9158—Patent application: declaration; joint: without reference to specification and claim: power: 1-78

GREEN INDUSTRIES DIV., EXCELSIOR-LEGAL STATIONERY CO., INC., 62 WHITE ST., NYC 10013

Joint Inventor

Declaration and Power of Attorney

We, Neil Siegel and Harry Baron Press

declare that we are respectively citizens of The United States of America residing respectively at Redondo Beach, California 90278 (ZIP CODE) Northridge, California 91326 (ZIP CODE)

that we verily believe we are the original, first, and joint inventors of the invention in COMPREHENSIVE MEDICAL CONTROL SYSTEM

described and claimed in the attached specification, that we do not know and do not believe that this invention was ever known or used in the United States before our invention thereof, or patented or described in any printed publication in any country before our invention thereof, or more than one year prior to this application, or in public use or on sale in the United States for more than one year prior to this application; that this invention has not been patented or made the subject of an inventor's certificate in any country foreign to the United States on an application filed by us or our legal representatives or assigns more than twelve months before this application; that we acknowledge a duty to disclose information we are aware of which is material to the examination of this application; and that no application for patent or inventor's certificate on this invention has been filed by us or our representatives or assigns or with our knowledge and consent in any country foreign to the United States, except as follows:

We declare further that all statements made herein of our own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment or both under section 1001 of Title 18 of the United States Code and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

~~And we hereby appoint:~~

~~our attorney(s) with full power of substitution and revocation, to prosecute this application and to transact all business in the Patent and Trademark Office connected therewith.~~

Wherefore, we hereby subscribe our names to the foregoing specifications and claims, declaration and power of attorney.

Date 28 January, 1982 Inventor's full name Neil Siegel

3306 Gibson Pl., Redondo Beach, CA 90278
Post Office Address (Include Zip Code No.)

Signature

Date 10-28-82 Inventor's full name Harry Baron Press

11921 Sonoma Way, Northridge, CA 91326
Post Office Address (Include Zip Code No.)

Signature

Date Inventor's full name

Post Office Address (Include Zip Code No.)

Signature

This form may be executed only when attached to the specification (including claims) as the last page thereof.

Fig. 1

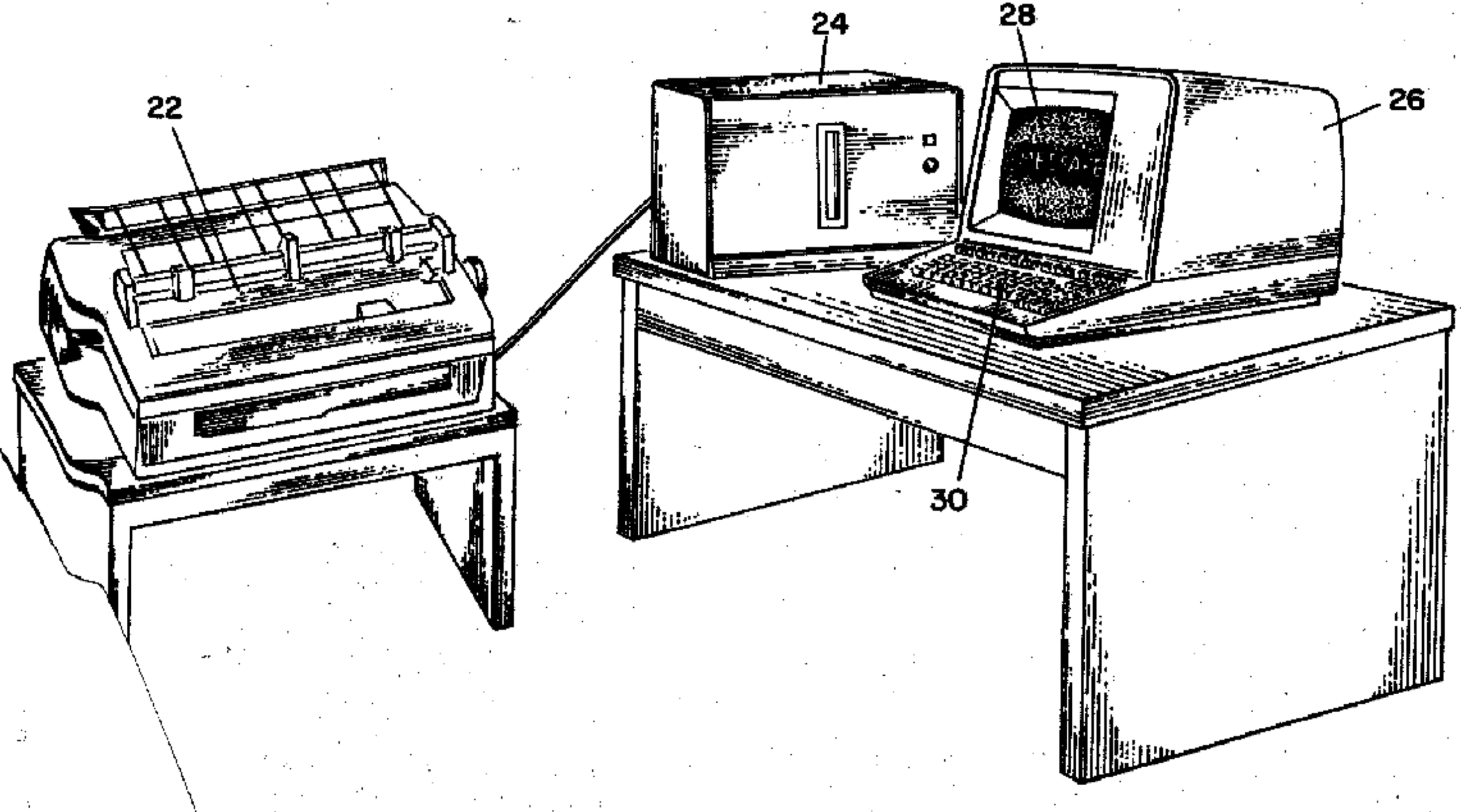


Fig. 2

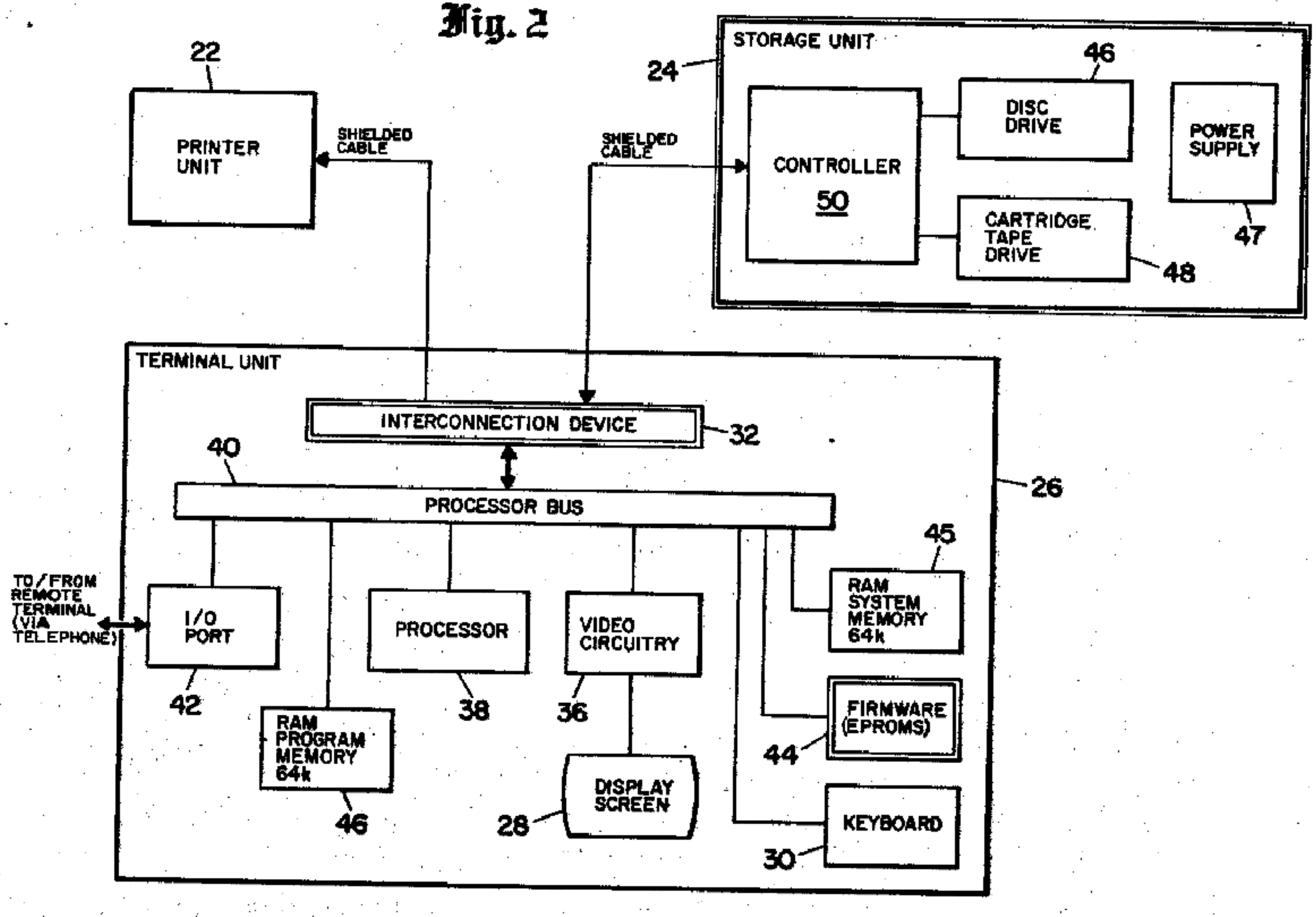

22
PRINTER UNIT
SHIELDED CABLE
SHIELDED CABLE
24
STORAGE UNIT
CONTROLLER
50
46
DISC DRIVE
POWER SUPPLY
47
CARTRIDGE TAPE DRIVE
48
TERMINAL UNIT
INTERCONNECTION DEVICE
32
40
PROCESSOR BUS
26
TO/FROM REMOTE TERMINAL (VIA TELEPHONE)
I/O PORT
42
PROCESSOR
38
VIDEO CIRCUITRY
36
45
RAM SYSTEM MEMORY 64k
FIRMWARE (EPROMS)
44
RAM PROGRAM MEMORY 64k
46
DISPLAY SCREEN
28
KEYBOARD
30

Fig. 3

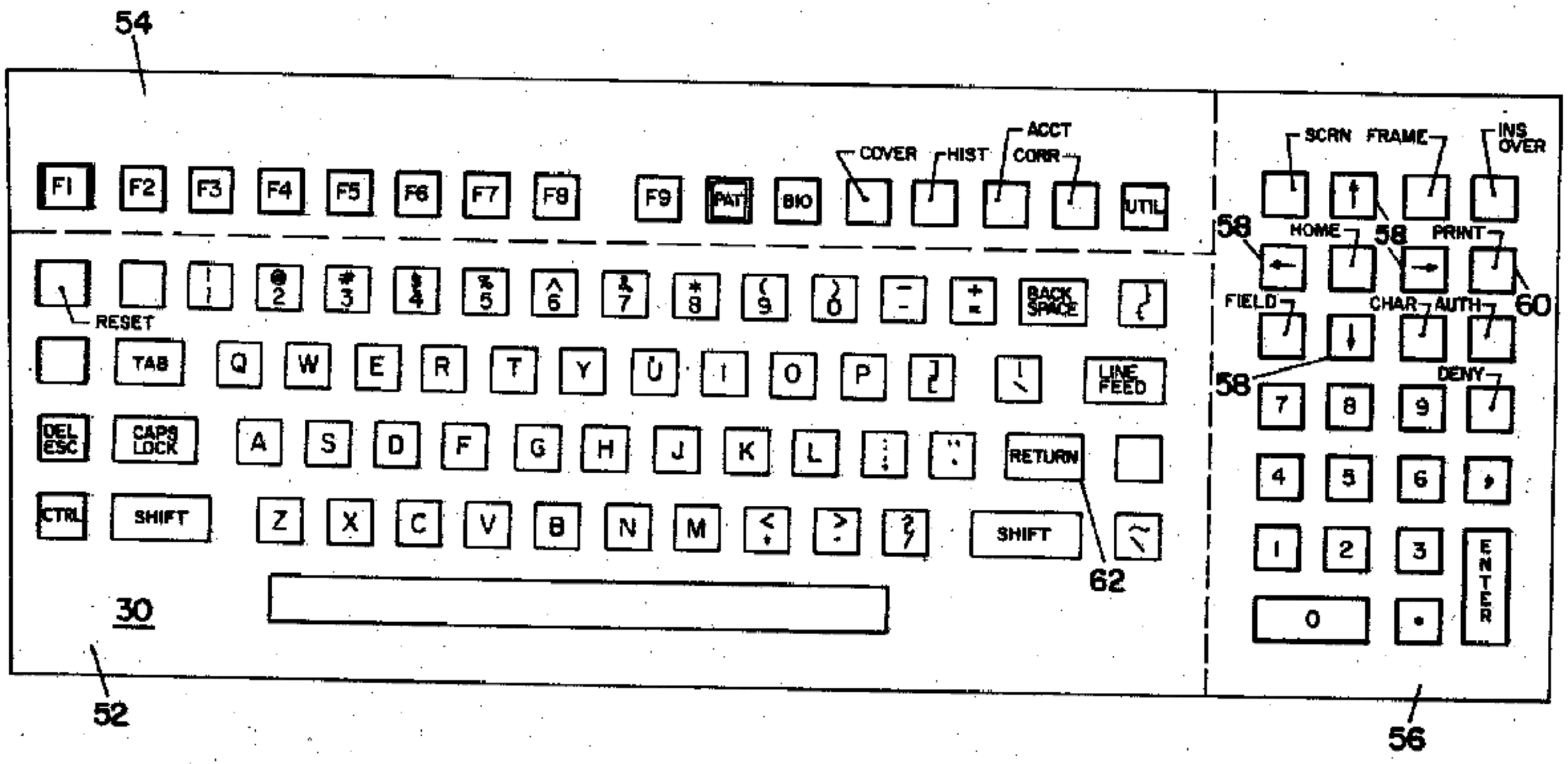

54
F1
F2
F3
F4
F5
F6
F7
F8
F9
PAT
BIO
COVER
HIST
ACCT
CORR
UTIL
RESET
BACK SPACE
TAB
Q
W
E
R
T
Y
U
I
O
P
LINE FEED
DEL ESC
CAPS LOCK
A
S
D
F
G
H
J
K
L
RETURN
CTRL
SHIFT
Z
X
C
V
B
N
M
SHIFT
62
30
52
SCRN
FRAME
INS OVER
58
HOME
58
PRINT
60
FIELD
CHAR
AUTH
58
DENY
7
8
9
4
5
6
1
2
3
ENTER
0
56

Fig. 4

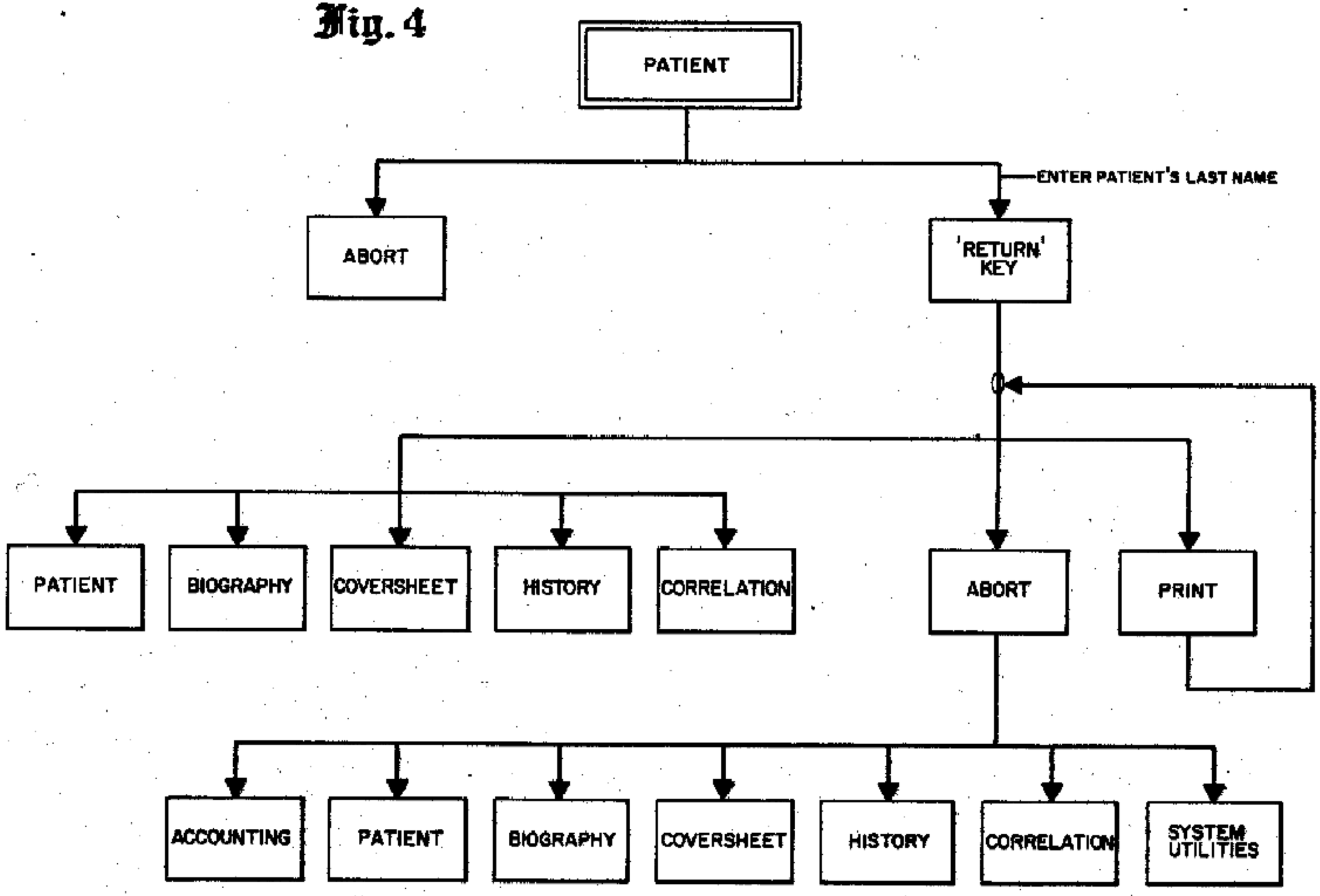

PATIENT
ENTER PATIENT'S LAST NAME
ABORT
'RETURN' KEY
PATIENT
BIOGRAPHY
COVERSHEET
HISTORY
CORRELATION
ABORT
PRINT
ACCOUNTING
PATIENT
BIOGRAPHY
COVERSHEET
HISTORY
CORRELATION
SYSTEM UTILITIES

Fig. 5

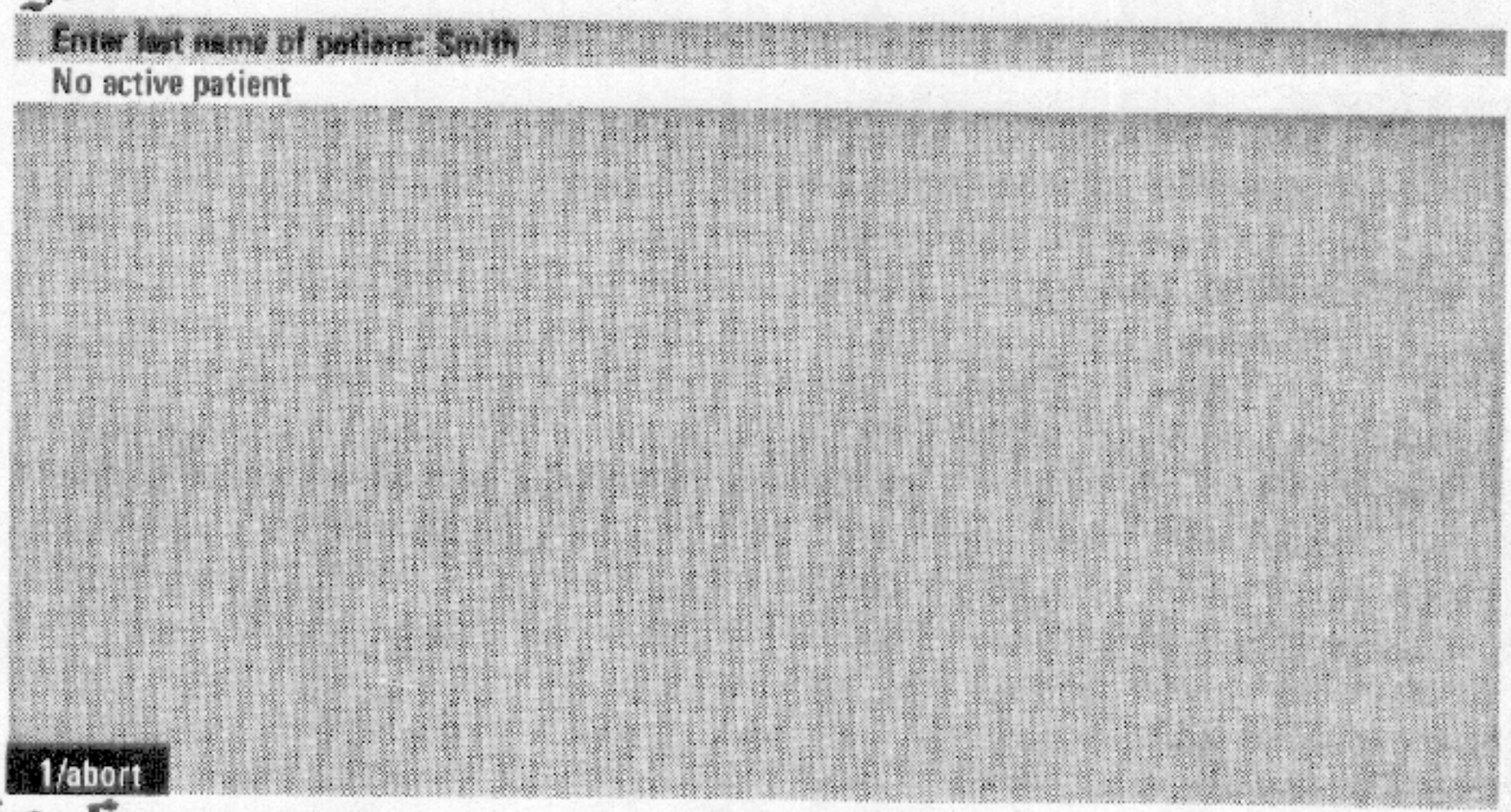


Fig. 6

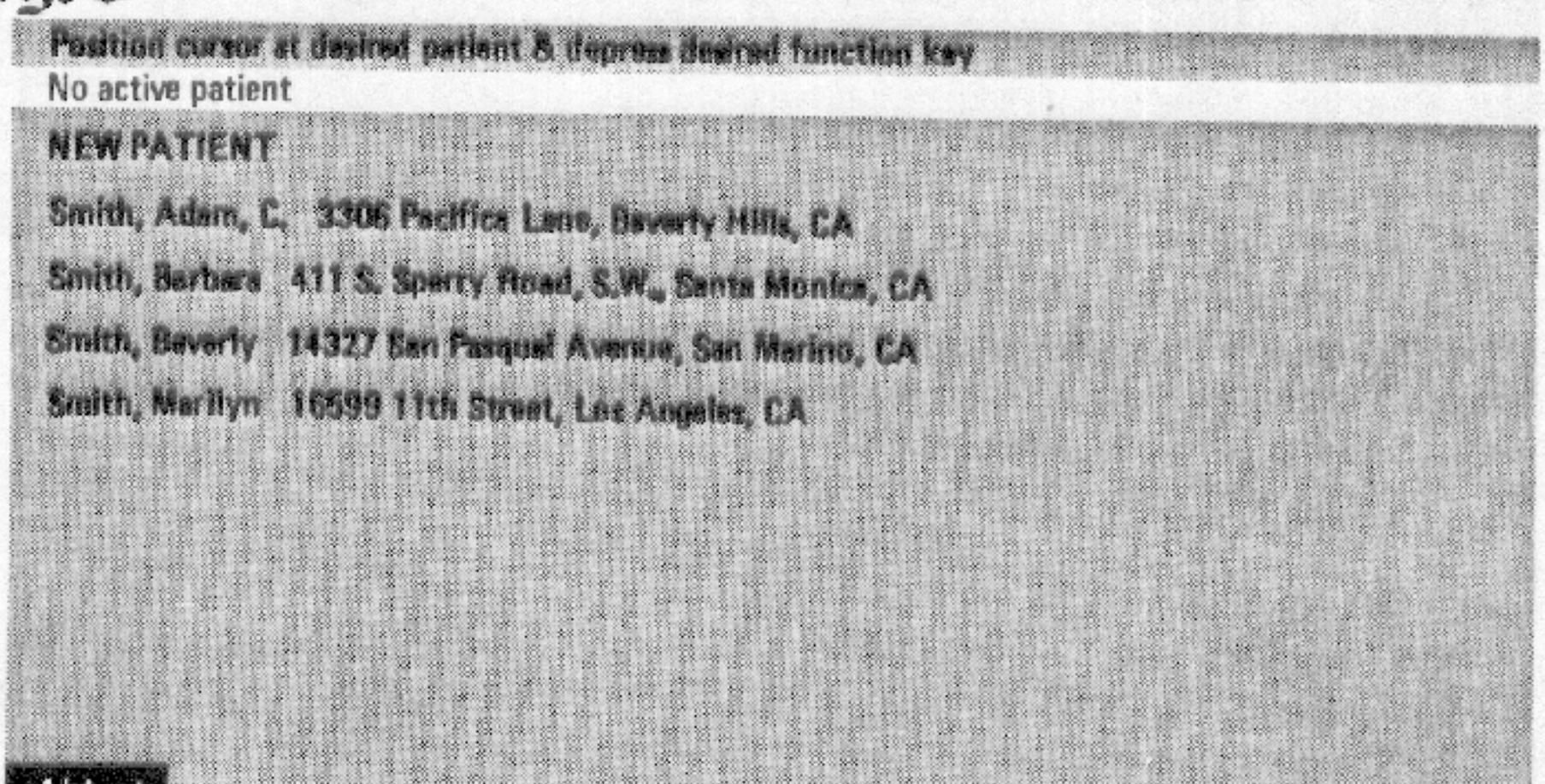


Fig. 7

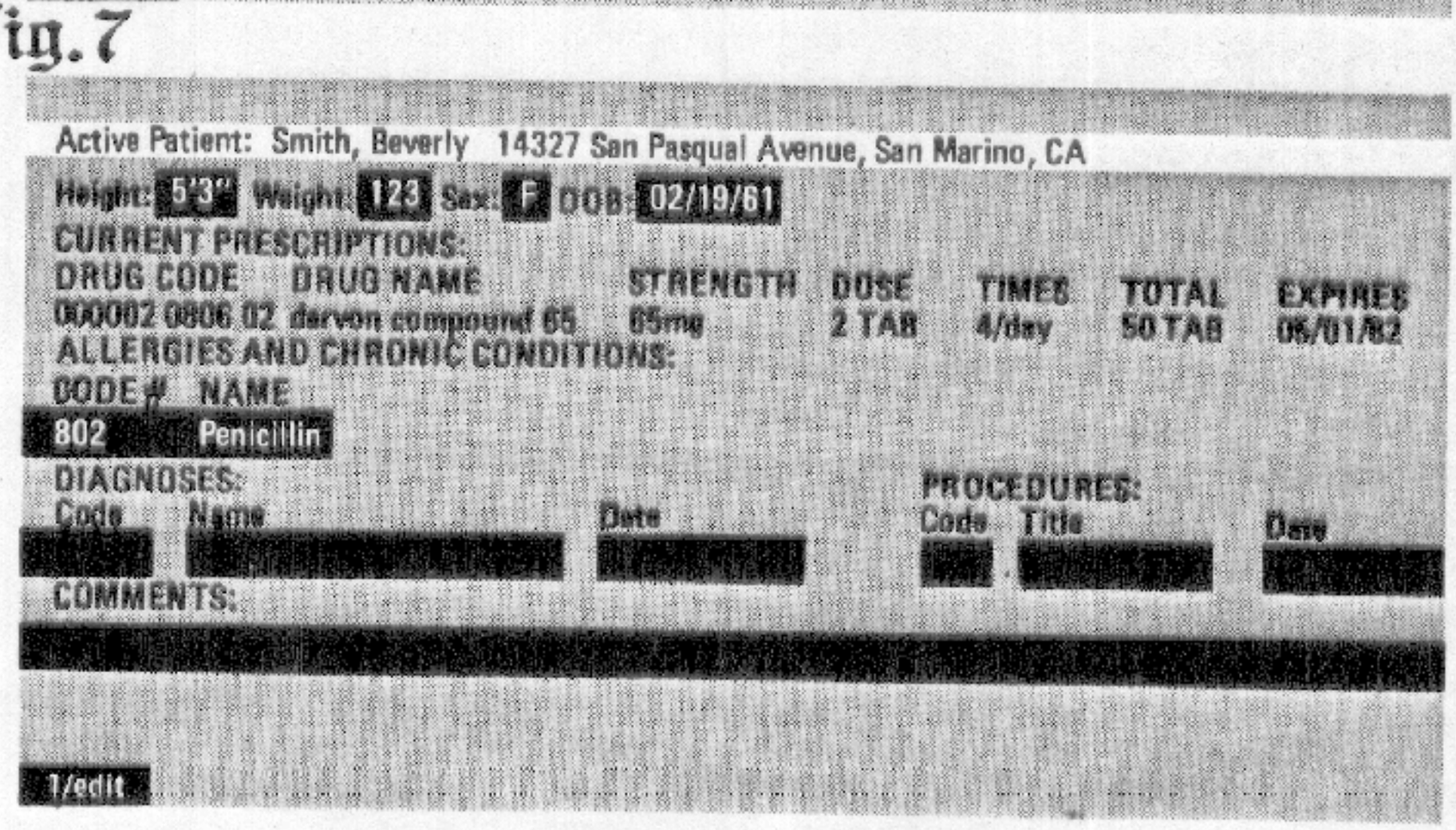


Fig. 8A

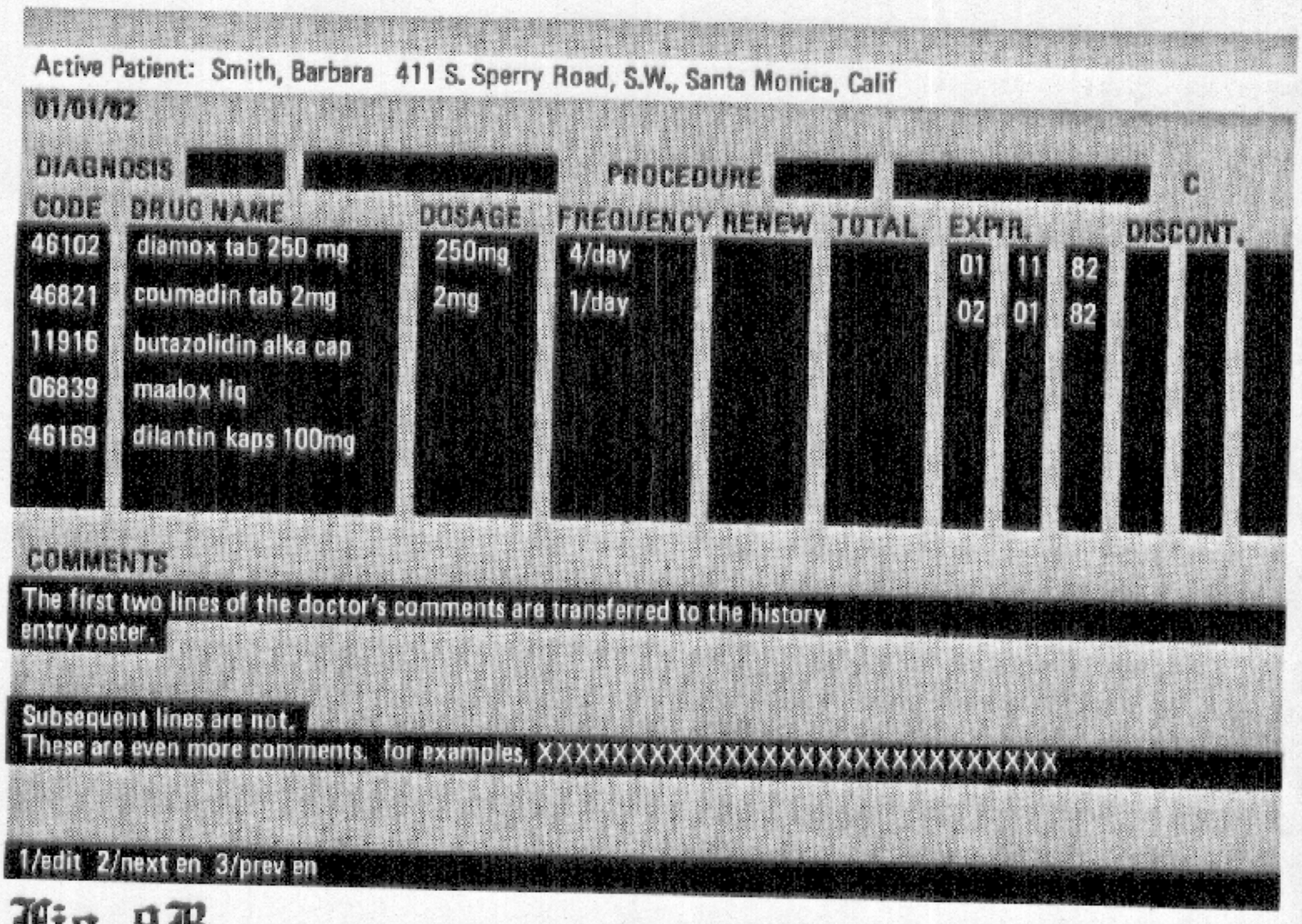

Active Patient: Smith, Barbara 411 S. Sperry Road, S.W., Santa Monica, Calif
01/01/82
DIAGNOSIS
PROCEDURE
C
CODE DRUG NAME DOSAGE FREQUENCY RENEW TOTAL EXPIR. DISCONT.
46102 diamox tab 250 mg 250mg 4/day 01 11 82
46821 coumadin tab 2mg 2mg 1/day 02 01 82
11916 butazolidin alka cap
06839 maalox liq
46169 dilantin kaps 100mg
COMMENTS
The first two lines of the doctor's comments are transferred to the history entry roster.
Subsequent lines are not.
These are even more comments. for examples, XXXXXXXXXXXXXXXXXXXXXXXXXXXX
1/edit 2/next en 3/prev en

Fig. 8B

Active Patient: Smith, Barbara 411 S. Sperry Road, S.W., Santa Monica, Calif
01/01/82
DIAGNOSIS
PROCEDURE
C
CODE DRUG NAME DOSAGE FREQUENCY RENEW TOTAL EXPIR. DISCONT.
46102 diamox tab 250 mg 250mg 4/day 01 11 82
46821 coumadin tab 2mg 2mg 1/day 02 01 82
11916 butazolidin alka cap
06839 maalox liq
46169 dilantin kaps 100mg
COMMENTS
The first two lines of the doctor's comments are transferred to the history entry roster.
Subsequent lines are not.
These are even more comments. for examples, XXXXXXXXXXXXXXXXXXXXXXXXXXXX
1/update 2/abort 3/rx help 4/add rx 5/drop rx

Fig. 9

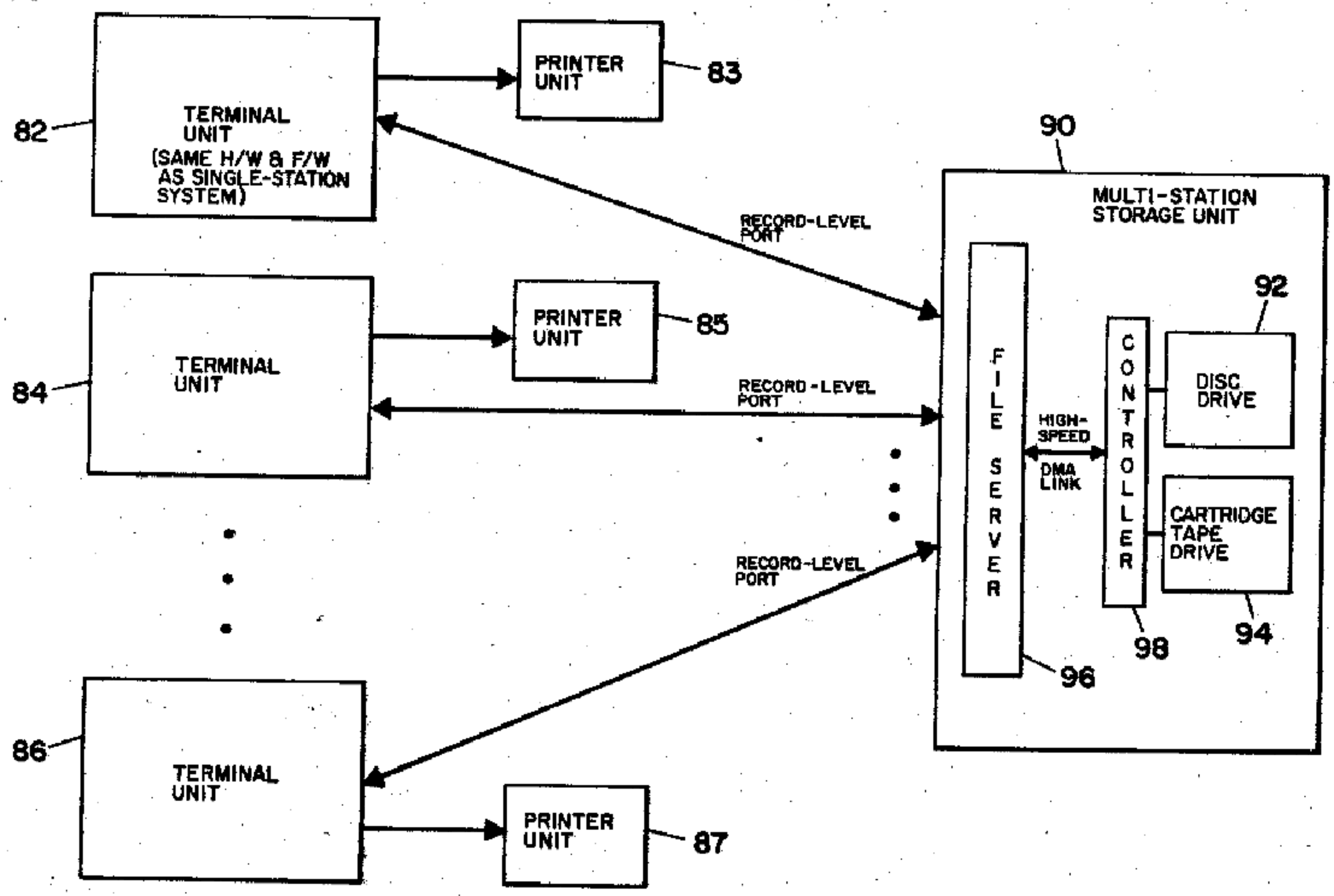

82
TERMINAL UNIT
(SAME H/W & F/W AS SINGLE-STATION SYSTEM)
PRINTER UNIT
83
90
MULTI-STATION STORAGE UNIT
RECORD-LEVEL PORT
84
TERMINAL UNIT
PRINTER UNIT
85
RECORD-LEVEL PORT
92
FILE SERVER
HIGH-SPEED DMA LINK
CONTROLLER
DISC DRIVE
CARTRIDGE TAPE DRIVE
96
98
94
RECORD-LEVEL PORT
86
TERMINAL UNIT
PRINTER UNIT
87

Fig. 11A

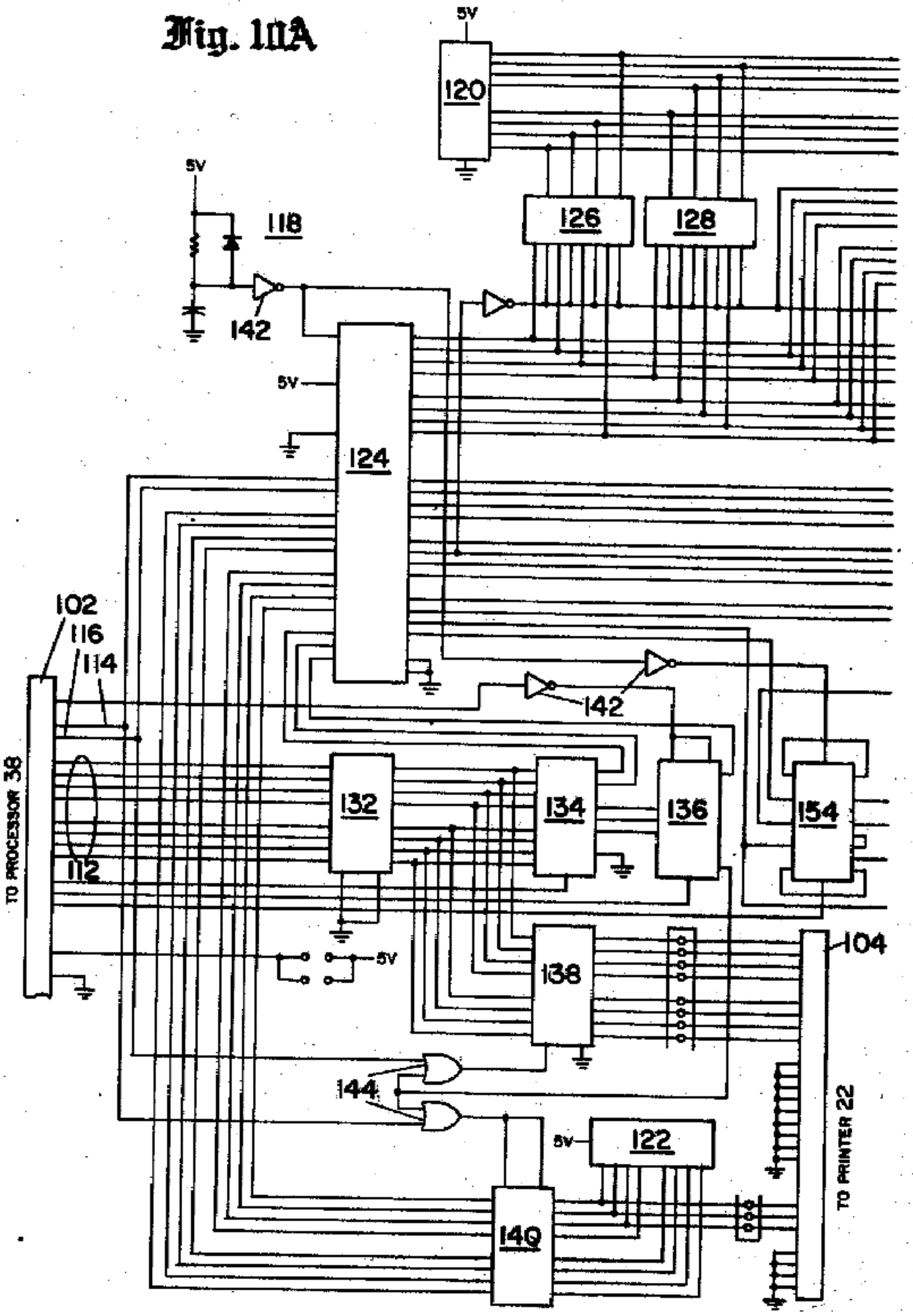
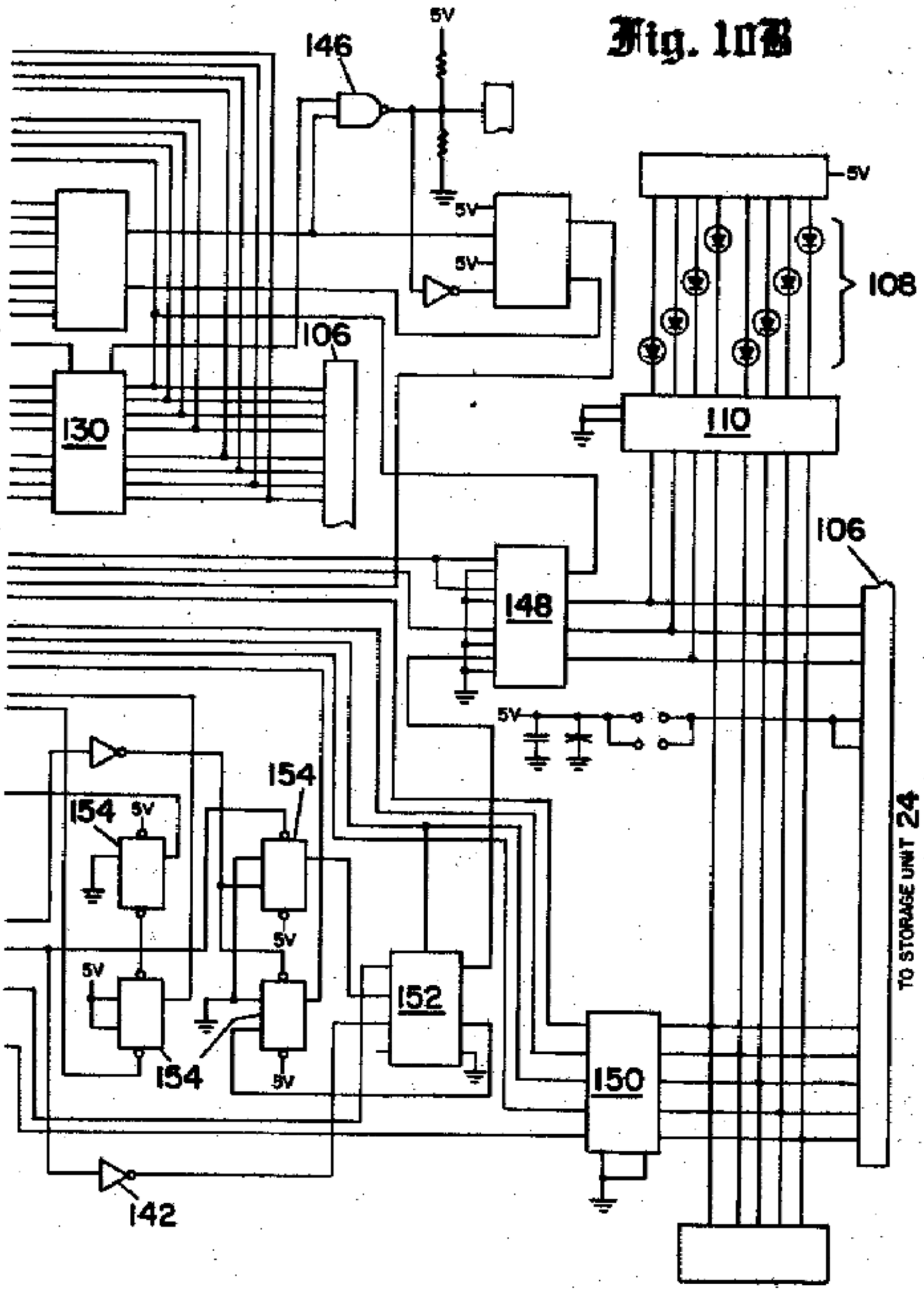

5V
120
126
128
118
142
5V
124
102
116
114
TO PROCESSOR 38
112
132
134
136
154
5V
138
104
142
144
5V
122
140
TO PRINTER 22

Fig. 10B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5V
5V
5V
106
130
110
5V
108
106
148
5V
154
154
5V
5V
154
152
150
142
TO STORAGE UNIT 24