

[54] **AUTOMATIC MERCHANDISE PRICING CALCULATOR**

3,290,491 12/1966 Wahlberg..... 235/151.33 X
3,458,690 7/1969 Chan..... 235/146

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[52] U.S. Cl. **235/151.3, 235/92 AC, 235/146, 235/168**

[57] **ABSTRACT**

[51] Int. Cl. **G06f 7/50**

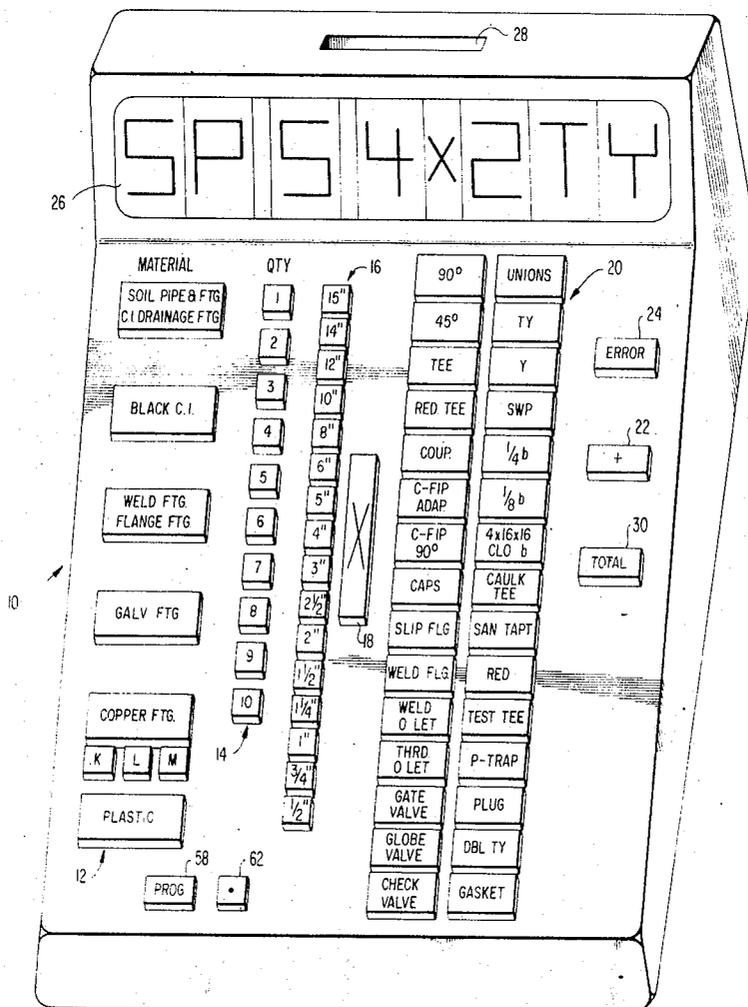
Apparatus for indicating the price of goods defined by a plurality of parameters. A keyboard is provided having a group of keys uniquely associated with each parameter. Each group includes a key uniquely associated with each value of the associated parameter. When the price of goods is desired, the description of the goods is inserted into the apparatus by actuating the associated keys on the keyboard. The price is obtained from a memory or calculated from values within a memory and is indicated.

[58] Field of Search..... 235/151.3, 151.33, 156, 235/160, 168, 92 AC, 92 WT, 145 R, 145 A, 146; 340/365 R

[56] **References Cited**
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6 Claims, 5 Drawing Figures



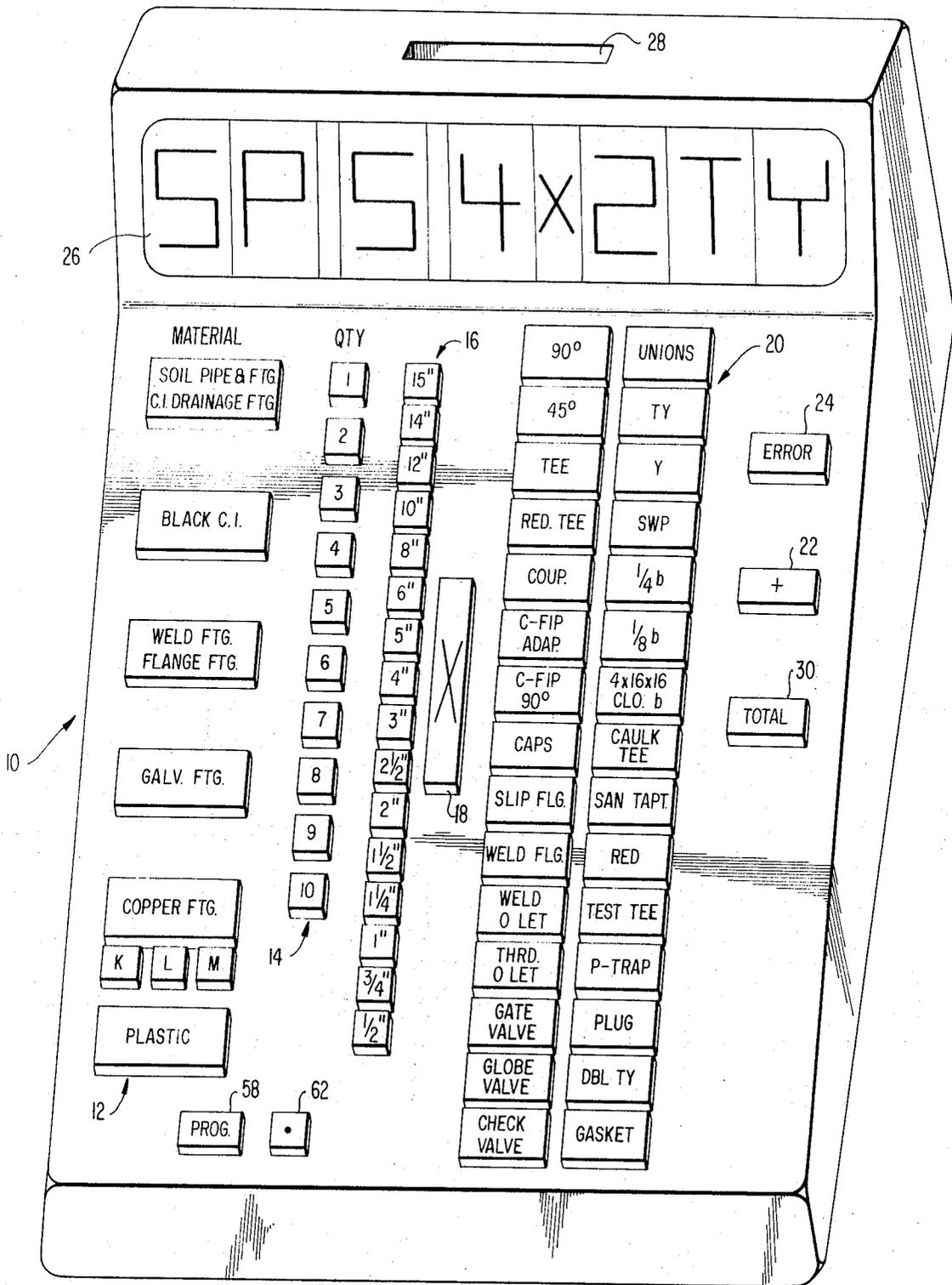


FIG 1

FIG 2

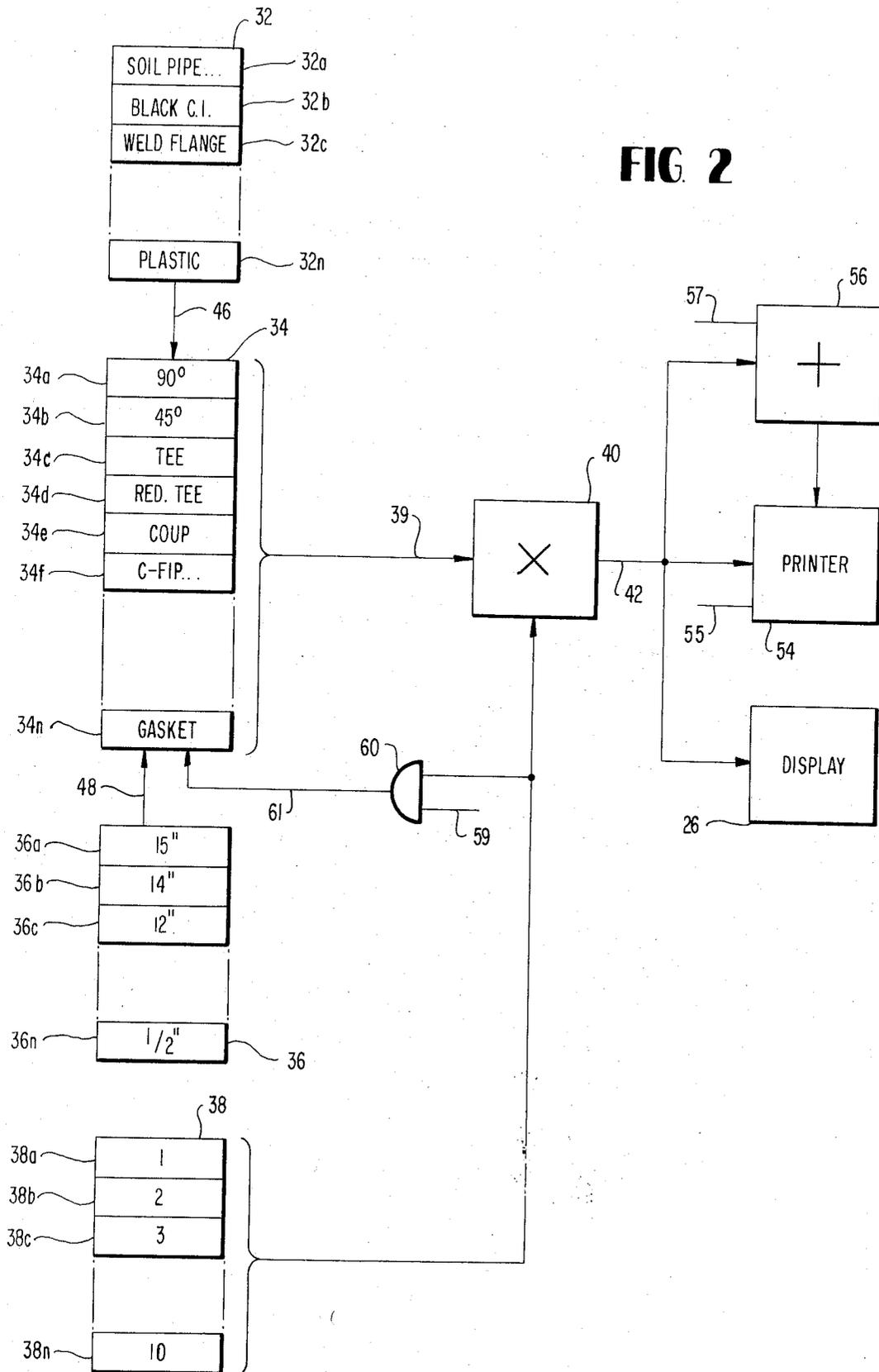


FIG 3

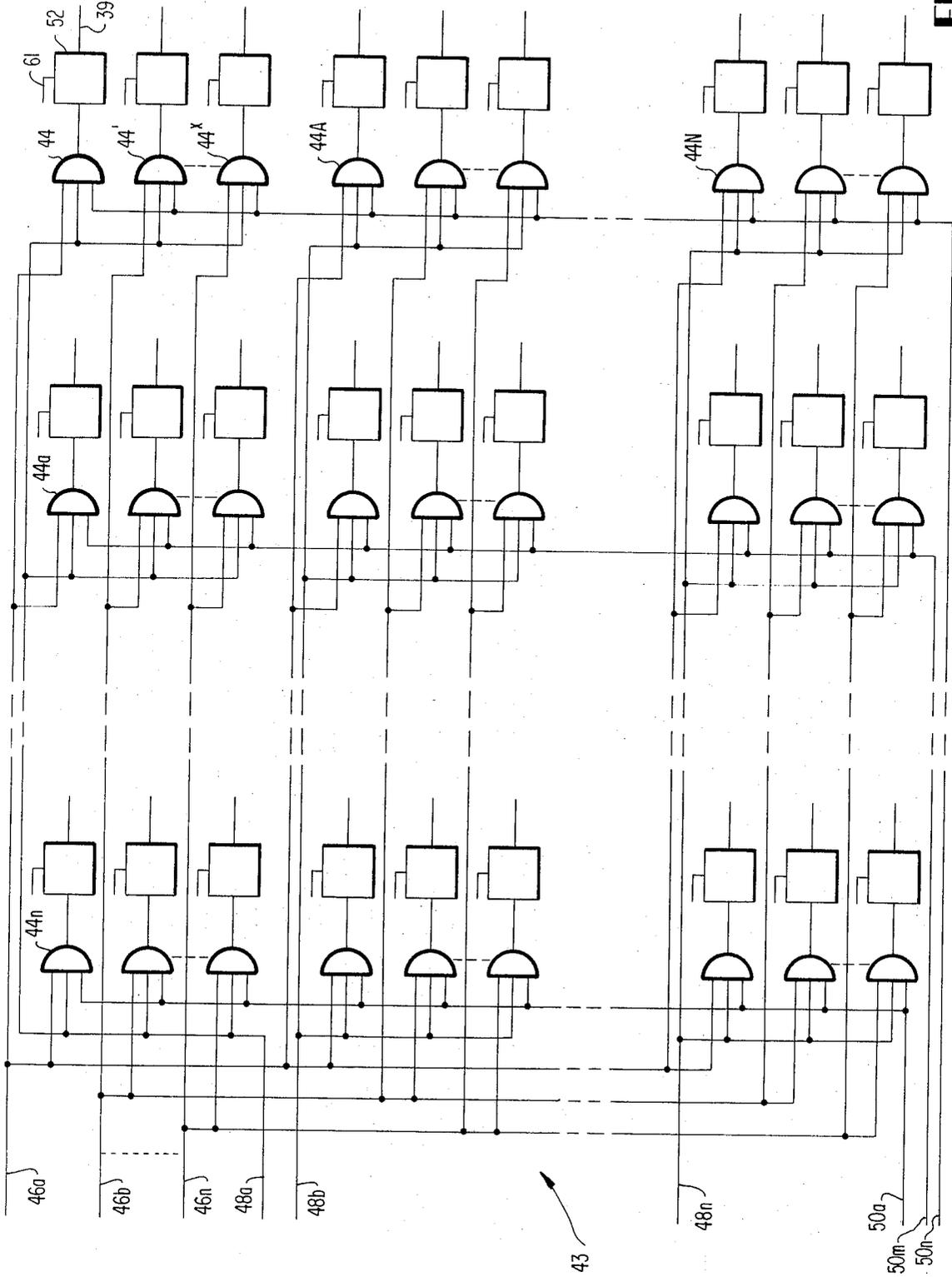


FIG 5

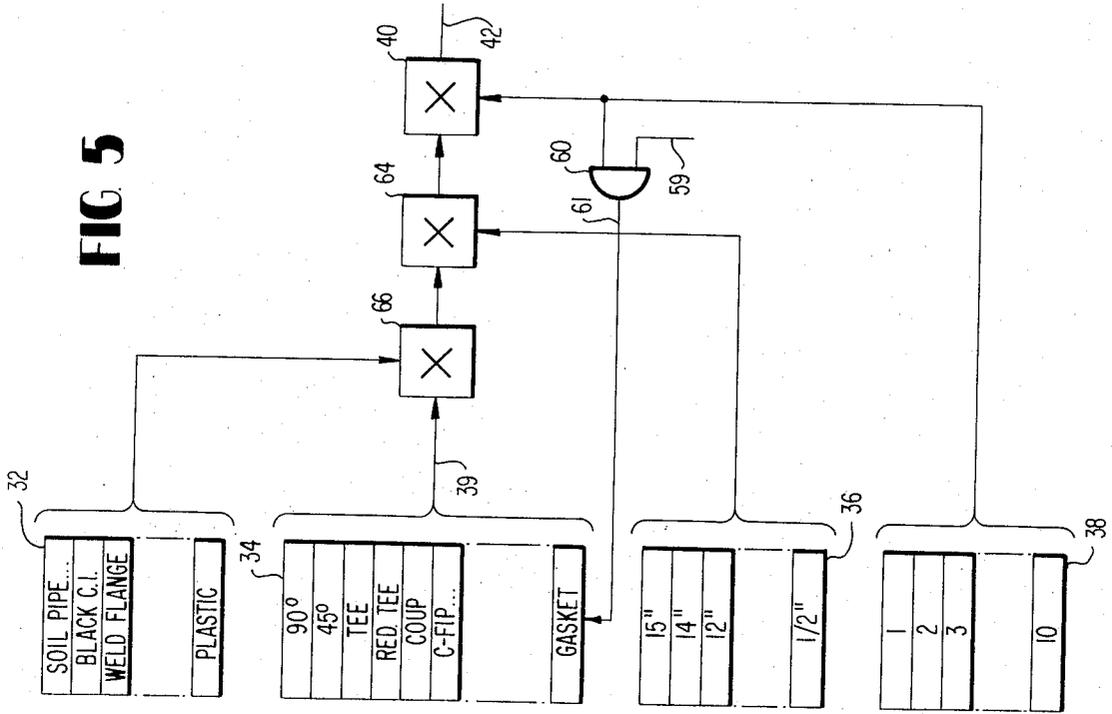
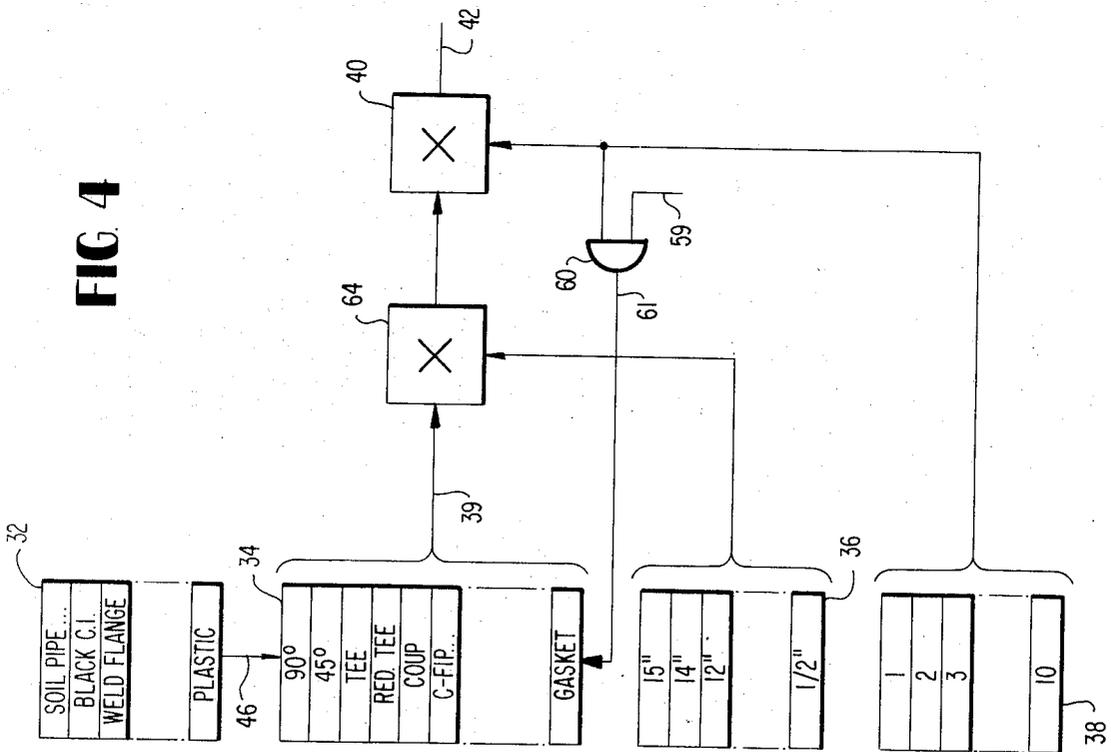


FIG 4



AUTOMATIC MERCHANDISE PRICING CALCULATOR

The present invention pertains to a calculator. More particularly, the present invention pertains to a device for calculating and indicating the price of an item selected from a wide variety of types of items of any of several materials and of any of a wide range of sizes.

In many businesses, a large number of different goods are available for sale in a variety of sizes and materials with the price dependent upon the type of goods, the particular size and the material. By way of example, plumbing supplies and components are available in a wide variety of types made of several different materials and in numerous sizes. The prices of the different plumbing supplies and components vary depending upon these parameters. Because these different parameters can be combined in numerous manners, a large number of different supplies and components are available, and so it is virtually impossible for a person to know from memory the price of everything which might be sold. This is particularly true when prices change from time to time. Price lists can be maintained for ready reference. However, changing of prices necessitates revising these price lists. In addition, errors frequently occur because the sales person refers to the wrong item or reads a number incorrectly on a price list.

Cash registers are available having keyboards with a key for each item of goods which might be sold. The sales person then simply actuates the key corresponding with the goods being sold, and the corresponding price is retrieved from a memory. U. S. Pat. No. 3,458,690, issued July 29, 1969, shows a calculator for the price of goods in which several individual prices are summed and indicated as a single price. Such prior art devices, however, only permit the quantity and a single other parameter to be indicated. Thus, a key and a memory location are required for each of the many different items of goods offered for sale, even though many such items of goods vary from one another only by a change of one or two parameters.

The present invention is a calculator permitting ready and accurate determination and indication of the price of goods sold from a stock including goods having several variable parameters. A calculator in accordance with the present invention includes a keyboard, including keys permitting indication of any selected one of a plurality of values for each of several variable parameters, and means responsive to the selection of parameter values for determining and indicating the corresponding price. As one example, the calculating means responsive to the keyboard can be a properly programmed general purpose digital computer. As an alternative, it could be a special purpose computer such as a series of gated read-only memories and appropriate gating, multiplying and adding circuitry.

These and other aspects and advantages of the present invention are more apparent in the following detailed description and claims, particularly when considered in conjunction with the accompanying drawings in which like parts bear like reference numerals. In the drawings:

FIG. 1 illustrates a keyboard suitable for use on a calculator in accordance with the present invention;

FIG. 2 is a block diagram illustrating one form of calculating circuitry suitable for incorporation into a calculator in accordance with the present invention;

FIG. 3 is a more detailed block diagram of a gate matrix from a memory suitable for use in the calculating circuitry of FIG. 2; and

FIGS. 4 and 5 are block diagrams illustrating alternative forms of calculating circuitry suitable for incorporation in a calculator in accordance with the present invention.

FIG. 1 illustrates a keyboard 10 suitable for use in a calculator in accordance with the present invention. Keyboard 10 includes a plurality of groups of keys, each of the groups being associated with a different parameter of goods for which the price can be determined by means of the calculator of the present invention. Keyboard 10 is illustrated as particularly adapted for use in determining the price of plumbing components and supplies. This, however, is only a representative example of the types of goods with which a calculator in accordance with the present invention can be utilized.

The first group of keys 12 on keyboard 10 is related to the material from which the plumbing components or supplies are made. Thus, group 12 includes a key associated with each material, for example one key for soil pipe and fittings and cast iron drainage fittings, another key for black cast iron fittings, another key for welded and flange fittings, another key for galvanized fittings, another key for copper fittings, and another key for plastic fittings. The keys can have associated with them further keys illustrated in FIG. 1 in association with the key for copper fittings by the further keys designated K, L, and M to indicate different grades or thicknesses of the basic material.

The second group of keys 14 indicates the quantity of items for which the price is to be determined. Thus, ten keys are provided in group 14 designated 1 through 10 to permit determination of the price of any quantity of identical items up to ten.

The third group of keys 16 on keyboard 10 is associated with the size of the particular article to be provided. While any number of size keys can be provided in group 16 having any desired values, FIG. 1 illustrates 16 keys associated with various sizes from $\frac{1}{2}$ inch through 15 inches. Function key 18 is associated with size keys 16 so that an item having two or more dimensions in its size can properly be designated.

The next group of keys 20 contains the descriptions of various types of items. FIG. 1 illustratively depicts thirty keys in group 20 permitting designation of any of thirty different types of plumbing components and supplies.

Addition key 22 is provided so that once the desired ones of the parameter keys 12 through 20 have been actuated, the calculator of the present invention is actuated to indicate the price of the goods defined by the indicated parameters. In addition, that goods price is summed with other goods prices on the same order to provide a total order sales price upon actuation of total key 30. Error key 24 is provided so that should an error be made in the entry of data, the entered data can be erased rather than entered. Alternatively, if desired, addition key 22 can be omitted, and the data entered into the calculator when sufficient ones of the keys have been actuated to define goods for which the price is to be indicated.

At the top of keyboard 10 there is provided a display zone 26 on which the data indicated by the actuated keys 12 through 20 is displayed to indicate the data being entered into the calculator. As one example, display zone 26 can include display tubes such as so-called NIXIE tubes.

To utilize the calculator of the present invention to determine the price of items, the necessary parameter keys 12 through 20 are actuated. By way of example, as illustrated in FIG. 1, if five soil pipe 4 inches \times 22 inches TY connections are desired, then the soil pipe and fitting and cast iron drainage fitting key from group 12 is actuated, the quantity 5 key from group 14 is actuated, the four inch key from size parameter group 16, the function key 18, and the two inch size key from parameter group 16 are actuated. Next the TY key is actuated, and finally addition key 22 is actuated. This causes the calculator to determine the price of the goods. As each key is actuated, a corresponding display is energized on display area 26. Should the operator notice on display 26 that he has made an erroneous entry, he can actuate error key 24 which cancels all of that data entry so that he can start the entry again. As each entry is completed, a printed record is generated by the calculator and is issued through opening 28. Once all of the items on a particular order have been entered on keyboard 10, total key 30 is actuated, causing the calculator to determine and print on the record from opening 28 the total price of that order.

FIG. 2 illustrates one form of circuitry suitable for incorporation in the present invention to determine and indicate the price of selected goods. Memory unit 32 includes memory locations 32a, 32b . . . 32n, with one location associated with each of the material parameter keys 12 on keyboard 10. Memory unit 34 includes memory locations 34a, 34b . . . 34n, with one location associated with each of the item parameter keys 20 on keyboard 10. Memory group 36 includes memory locations 36a, 36b . . . 36n, with one location associated with each of the size parameter keys 16 on keyboard 10. Memory group 38 includes memory locations 38a, 38b . . . 38n, with a location for each of the quantity parameter keys 14 on keyboard 10. As the description of goods is indicated by actuation of keys on keyboard 10, the associated memory locations are energized. Thus, for example, when a key of group 12 is actuated, indicating the selected material, the associated memory location from memory unit 32 is activated to apply a signal to memory unit 34. When a size key of key group 16 is actuated, the associated memory location in memory unit 36 is activated to provide a signal to memory unit 34. Then when an item key of key group 20 on keyboard 10 is actuated, the associated memory location in memory unit 34 is activated.

Memory unit 34 by way of example can include a three-dimensional gate matrix responsive to inputs from memory unit 32, memory unit 36 and key group 20. The indicated gate of the gate matrix then provides an output signal on its output line 39 to multiplication circuit 40 which likewise receives in response to activation of a quantity key from group 14, an input from memory unit 38 indicative of the quantity of indicated items. Circuit 40 multiplies the unit price received from memory unit 34 by this quantity to provide on output line 42 the price for that quantity of items.

FIG. 3 illustrates a three-dimensional gate matrix 43 suitable for use as memory unit 34. In the first dimen-

sion of the matrix, illustrated by AND gates 44, 44a . . . 44n, there are required sufficient gates for each of the keys of key group 12 on keyboard 10. In the second dimension, illustrated by AND gates 44, 44' . . . 44x, sufficient gates are required to provide one for each key of group 16 on keyboard 10. In the third dimension of the matrix, illustrated by AND gates 44, 44A . . . 44N, sufficient gates are required to provide a gate for each of key group 20 on keyboard 10.

A set of input lines 46a, 46b . . . 46n is associated respectively with the memory locations 32a, 32b . . . 32n in memory unit 32, bringing signals therefrom to memory unit 34. These input lines 46 are distributed to the gate matrix 43 in a first dimension. Similarly, a set of input lines 48a, 48b . . . 48n, bring the signals to memory unit 34 from memory locations 36a, 36b . . . 36n, respectively, of memory unit 36 and are associated with the gate matrix 43 in a second dimension. A set of input lines 50a, 50b . . . 50n bring the inputs from the keys of key group 20 on keyboard 10 to the gates of gate matrix 43 in the third dimension. Accordingly, with an input on one of the input lines 46, on one of the input lines 48, and on one of the input lines 50, one and only one AND gate of matrix 43 provides an output.

Each AND gate of gate matrix 43 has its output connected to an uniquely associated price memory 52. By way of example, price memories 52 might be alterable read-only memories having stored therein the prices of the goods associated with the corresponding AND gates. Thus, by way of example, if the keys of keyboard 10 are actuated to indicate that five soil pipe fitting, 4 inches \times 2 inches TY connections are desired, the input line 46a associated with soil pipe and cast iron drainage fittings location 32a of memory unit 32 is energized, the input lines 48 associated with 4 inches and 2 inches dimensions are energized, and the input line 50 associated with TY junctions is energized. The one AND gate of gate matrix 43 which as a result has all of its inputs energized provides an output to its read-only memory 52. That read-only memory provides on its output line 39 an output signal indicative of the price of one 4 inches \times 2 inches soil pipe and cast iron drainage fitting TY junction. This output is applied to multiplication unit 40 which is also receiving from memory unit 38 an input indicative of the quantity "five." As a consequence, within multiplication unit 40 the unit price is multiplied by five, giving on output line 42 the resulting price of that purchase. Output line 42 applies that price to printer 54 which, upon receipt of an enabling signal on input line 55 from entry key 22, prints the description of the goods and the price on the sales slip issued through opening 28. Output line 42 also applies that price to addition circuit 56 which accumulates the total price of all goods on the order and, upon receipt of an input on line 57 from total key 30, provides that total sale price to printer 56 for printing on the sales slip. In the calculator circuitry of FIG. 2, memory units 32, 36 and 38 need no matrix capability, and so read-only memories activated upon actuation of the corresponding keys on keyboard 10 could be utilized.

When it is desired to change the prices of various items, program key 58 is actuated on keyboard 10. This provides an input on line 59 to AND gate 60. The new price data is then inserted, utilizing the keys of quantity key group 14 together with decimal point key 62. Upon actuation of the keys in key group 14 a signal passes

from the associated memory location of memory unit 38, through AND gate 60, and line 61, to the read-only memory 52 which is indicated by the actuated AND gate of gate matrix 43.

In some instances, the prices of a particular type of goods will be the same regardless of the size. In such event, the number and/or size of gate matrices associated with that type goods can be reduced since inputs from memory unit 36 will not be necessary.

FIG. 4 illustrates a modified form of circuitry usable for the calculator of the present invention in those situations in which prices of the various goods vary directly with size, so that only a two-dimensional gate array is required in memory unit 34. The output from memory unit 34, in response to an input on line 46 from memory unit 32 and actuation of a key from key group 20, is applied by line 39 to multiplier 64 which also receives an input from memory unit 36 in response to actuation of a size key from key group 16. The basic price from memory unit 34 is then multiplied by an appropriate factor dependent upon the size as indicated at key group 16. The result of this multiplication is then applied to multiplier 40 in which it is multiplied by the quantity as indicated from memory unit 38.

FIG. 5 depicts a further modified form of circuitry suitable for use in a calculator in accordance with the present invention when the price of goods bears a direct relationship to the material as well as to the size. As illustrated in FIG. 5, the outputs of memory unit 32 are applied to multiplier 66 which also receives an input on line 39 from memory unit 34. Multiplier 66 multiplies the basic price from memory unit 34 by a factor dependent upon the material indicated by the actuated one of the keys from key group 12. The output from memory unit 66 is applied to multiplier 64 which also receives from memory unit 36 a multiplication factor dependent upon the size. The result of this multiplication is applied to multiplier 40 which receives the quantity indication from memory unit 38 and which provides on output line 42 the price for the particular goods indicated. No matrices are required in the memory units of FIG. 5, and so key-activated read-only memories could be utilized.

Should it be desired to provide a calculator for merchandise having prices varying directly with material but indirectly with size, then the outputs of memory unit 36 are applied to a two-dimensional gate matrix within memory unit 34 while multiplier 64 of FIG. 4 receives inputs from memory unit 32 and memory unit 34.

While keyboard 10 in FIG. 1 illustrates a wide variety of parameters of goods and parameter values, these, of course, are only typical examples of those which might be included on the keyboard, and additional keys for other parameters and parameter values and for other types of goods could, of course, be included. Likewise, although the present invention has been described with reference to a calculator for determining the price of plumbing supplies and components, a calculator could be provided in accordance with the present invention for determining the price of other types of goods. Although particular memory unit components have been suggested, others could be incorporated into a calculator in accordance with the present invention. Thus although the present invention has been described with reference to a preferred embodiment, numerous modi-

fications and rearrangements could be made, and still the result would be within the scope of the invention.

What is claimed is:

1. Apparatus for indicating the price of goods defined by a plurality of multi-valued parameters comprising: a keyboard having at least three groups of keys, each group uniquely associated with a particular parameter of the goods, each key in each group uniquely associated with a particular value of the associated parameter; a first memory unit including a memory location uniquely associated with each of the combinations of parameter values of parameters associated with less than all the plurality of keys; a first memory location selection means responsive to actuation of keys defining one of said combinations of parameter values for actuating the first memory unit memory location associated with the defined combination to provide a first combination price signal indicative of the price of the combination of parameter values indicated by the actuated combination-defining keys; a second memory unit including a memory location uniquely associated with each of the combinations of parameter values of the parameters associated with the remaining groups of keys; second memory location selection means responsive to actuation of keys defining one of said last-named combinations of parameter values for actuating the second memory unit memory location associated with that defined combination of parameter values to provide a second combination price signal indicative of the price of the parameter values indicated by the last-named activated keys; combining means for combining the first combination price signal and the second combination price signal to provide a goods price signal indicative of the price of the goods defined; and output means coupled to said combining means for indicating the price of goods as indicated by the goods price signal.
2. Apparatus as claimed in claim 1 in which said keyboard includes a first group of keys associated with the type of the goods for which the price is to be indicated, a second group of keys associated with the size of the goods for which the price is to be indicated, and a third group of keys associated with the quantity of the goods for which the price is to be indicated.
3. Apparatus as claimed in claim 2 in which said keyboard further includes a function key associated with said second group of keys permitting indication of more than one size parameter.
4. Apparatus as claimed in claim 2 in which said keyboard further includes a fourth group of keys associated with the material of the goods for which the price is to be indicated.
5. Apparatus as claimed in claim 4 adapted for indicating the price of plumbing supplies and components in which said first group of keys includes a plurality of keys, each uniquely associated with a different type of plumbing supply or component.
6. Apparatus as claimed in claim 1 further comprising summing means for summing goods price signals to provide a total sale price signal.

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