Jan. 27, 1942. H. F. ROBINSON 2,270,898

LISTING MACHINE

Filed June 1, 1939 2 Sheets-Sheet 1

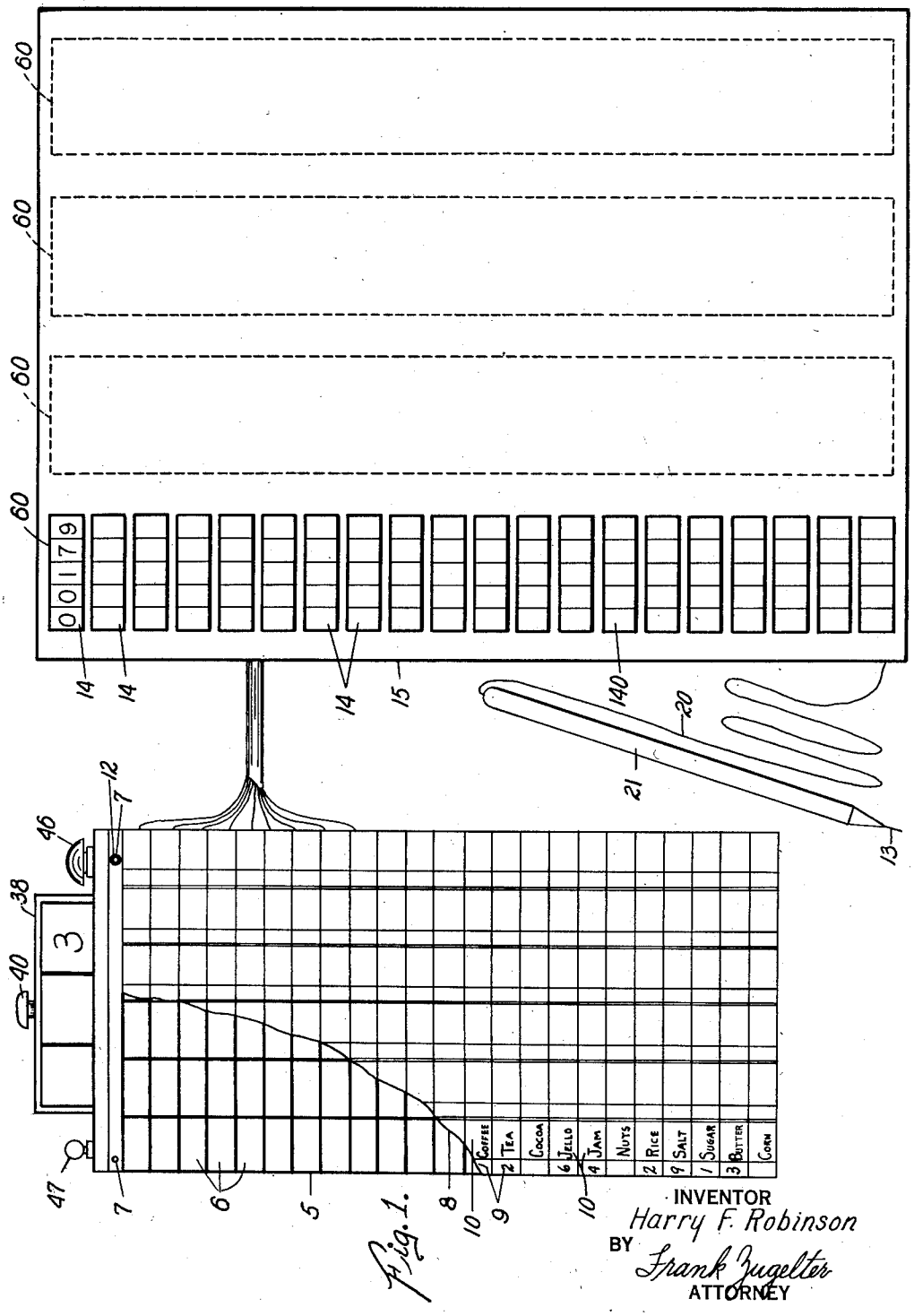


Fig. 1.

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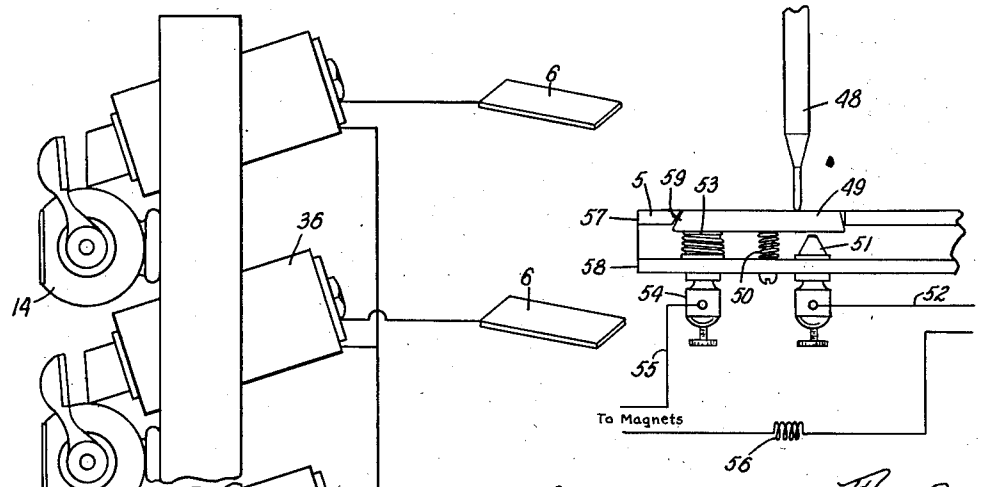


Fig. 3.

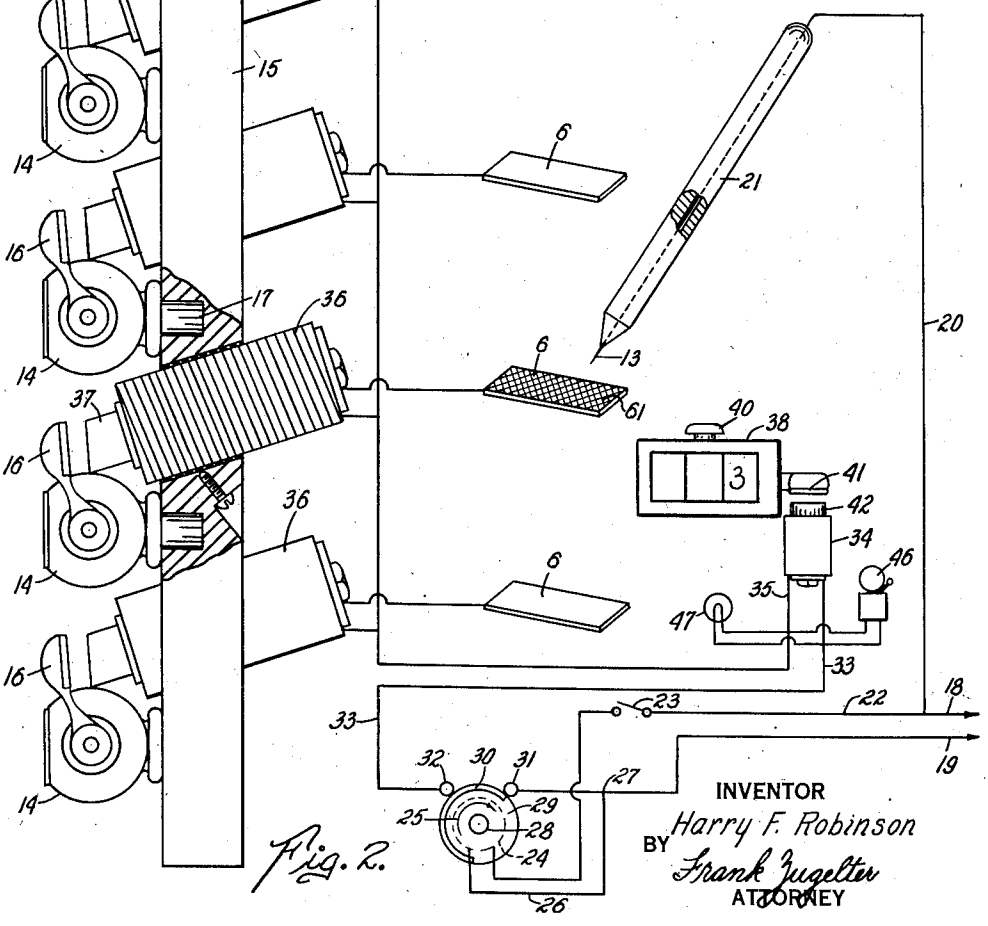


Fig. 2.

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UNITED STATES PATENT OFFICE

2,270,898

LISTING MACHINE

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Application June 1, 1939, Serial No. 276,862

2 Claims. (Cl. 235—92)

This invention relates to a listing machine or registering device such as is applicable to instances wherein a great number of order blanks or the like, calling for odd lots of different items, are to be segregated and accumulated as large totals of the various items. Such accumulating or totaling of the segregated items is necessary in many different businesses, and especially in the conduct of mail order and general merchandise sales establishments, and the like. Heretofore this type of work was performed laboriously and under conditions conducive to inaccuracies and loss of time, using inferior methods and means.

An object of the invention is to simplify and expedite the performance of the procedure outlined above.

Another object of the invention is to provide a method and means for the accomplishment of the process stated, whereby the operator may be an unskilled worker not required to memorize a key board or to have any particular training or skill, thereby enabling progress of the work of totaling and accumulating by clerks or workers having other duties.

Another object is to increase efficiency and to eliminate fatigue in an operator performing the procedure mentioned, it being unnecessary for the operator to spread the order blanks or sheets and the cumulative record over a large area requiring the operator to undergo undue stretching and activity, as well as severe eye strain in the performance of his or her duties.

A further object of the invention is to provide a listing machine of the character mentioned, which is completely automatic and rapid in its operation, so that the possibility of error is practically eliminated while at the same time the work of segregating and accumulating the odd lot items is performed at great speed, and with much less effort than was heretofore necessary.

The foregoing and other objects are attained by the means described herein and disclosed in the accompanying drawings, in which:

Fig. 1 is a view, shown partly in diagrammatic form, disclosing generally the device of the invention.

Fig. 2 is a view of a board or panel equipped with a bank of counters, and disclosing the necessary hook-up for actuating a preferred form of the device.

Fig. 3 is a detailed view showing a modification of the device of the invention.

With reference to Fig. 1, the character 5 indicates a board or panel which may properly be referred to as a key board, although the blocks or sections thereof that would correspond to keys, are not numbered or identified, and need not therefore be memorized. The various blocks or sections 6 are arranged in vertical and horizontal rows or columns, and, if desired, they may form the entire supporting surface of the key board. The board preferably is provided with means, for example pegs or studs 7, adapted to serve as impaling means for an order blank or like sheet 8, part of which has been broken away in Fig. 1. Like most office or order sheets, the sheet 8 has vertical rows and columns marked off in blocks or sections carrying the name of the commodity or item to be ordered, and associated with each division of the sheet is a block or space 9, wherein the salesman or the purchaser may write or otherwise indicate the number of various items that are to constitute the order. The identification sections for the various items are indicated by the character 10, and as will be understood, such sections and their associated sections 9 may be arranged upon the sheet 8 in any suitable manner or arrangement. Certain types of office sheets such as 8, and particularly order blanks, will be found to have the sections 9—10 interspersed with advertising matter, and others may be quite irregular as to their general layout. As will be understood, the device of the invention can be arranged to accommodate order blanks or office sheets 8 of all types, irrespective of their usage or the arrangement of the items specified thereon. It should accordingly be understood that the terms "order blank" and "order sheet" when used herein are not employed in a limiting sense, but rather for the purpose of clarity and convenience of explanation.

From the disclosure of Fig. 1, it will at once be evident that the merchandise divisions of the sheet overlie and coincide with the various blocks or sections 6 of the keyboard, and in practice this may be accomplished either by constructing the keyboard to accommodate the sheet, or the sheet may be printed so as to adapt itself to the keyboard. The sheet 8 may be perforated as at 12 so as to receive impaling means 7, thereby ensuring a proper aligned relationship between the keyboard and the sheet supported thereon.

In the operation of the device, the order blanks or sheets 8 may be successively applied to the keyboard, and the operator need only apply a stylus or needle 13 to the sheet within the limits of the various divisions 10 or 9, whereupon the stylus or needle will penetrate the paper of the sheet and make electrical contact with a section

or segment 6 which underlies the space or division identifying any selected item of merchandise on the sheet. Penetration of the sheet may be made more certain by pitting or otherwise roughening the exposed faces of the sections or segments as indicated at 61, for purposely marking the sheet for reasons to be explained. Each of the sections or segments 6 is electrically wired to actuate one or another of a series of counters 14 on an accumulator board or panel which may be situated either remotely or adjacent to the operator's station. Each of the blocks or sections 6 on key board 5 is thereby associated with a counter such as 14. Thus, if the 14th division of the order sheet, counting from top to bottom, be marked to designate the item "Tea," the 14th counter indicated at 140 on the accumulator panel will be associated with the 14th block or section 6 of the key board, so that application of the stylus or needle thereto will actuate that particular counter for totalizing the number of "tea" items specified on a stack of order sheets 8 successively applied to the panel 5. Thus it should be understood that each item of merchandise on the order blank will be represented by a counter on the accumulator panel, which panel may be indicated generally by the character 15.

Referring now to Fig. 2, 15 indicates the accumulator panel which carries the series of counters 14, and as will be understood, only a limited number of counters is disclosed due to lack of space upon the drawing sheet. Each counter is provided with an actuator arm 16 or an equivalent means whereby the counter may be advanced numerically one digit at a time. The particular manner of mounting the counters upon the panels is immaterial to the invention, there being shown, however, a shank 17 adapted to be embedded in the material of the board.

In Fig. 2, the blocks or sections 6 are illustrated as metallic contactors through which an electrical circuit may be closed when the point 13 of the stylus is applied thereto. It will readily be understood from the illustration, that the line wires or conductors 18 and 19 leading from a suitable source of electricity are connected one to the stylus, and the other to the series of sections or contacts 6, with certain electrical devices connected in circuit as will be explained.

Line wire 18 has connected thereto a conductor 20 which is electrically connected to the stylus point 13, and as is evident, the handle 21 should be electrically insulated from the point 13 and the conductor 20. The same line wire 18 is connected by means of a conductor 22, through a suitable electrical switch 23, to a motor 24 having an armature rotating in the direction of the arrow 25. The return lead from the motor, indicated at 26, is connected at 27 to the other line wire 19. Therefore, whenever the switch 23 is closed, the motor will be energized. Upon the motor shaft 28 there is mounted a disc 29 furnished with a metallic arcuate segment 30, which is less than a full circle in extent, and said segment is adapted to make contact with the stationary switch elements 31 and 32 during a portion of the disc rotation. It will be understood from the foregoing, that the rotating disc 29 and its segment 30 constitute a current interruptor or timer, which will permit current to flow from switch element 31 to switch element 32 intermittently. Accordingly, when the circuit is closed through the segment 30, electrical energy may pass from conductor 19, through segment 30 and conductor 33, to an electromagnet 34, leaving the magnet by way of a conductor 35 which is common to the plurality of electromagnetic devices 36, the coils of which are in circuit with the common conductor 35 and one of the sections or contactors 6; and when the stylus is applied to any one of the contactors 6, current will flow through the stylus and to the line wire 18 by way of conductor 20.

Although the electromagnetic devices 36 herein are represented as electromagnets, it should be understood that any other form of electrical units suitable for actuating a counter, may be substituted for the electromagnets 36. When electromagnets are used, the iron cores 37 thereof are magnetized upon each circuit closing operation of the timer or interruptor 29, resulting in attraction of a counter actuating arm 16 toward the magnet core, for advancing the counter digits in succession, (contacts 6—13 being closed).

The electromagnet 34 together with a separate counter 38 located at the operator's station, may properly be referred to as an impulse counter or checking device, for visibly indicating the number of impulses imparted to any given counter 14 while the stylus is held continuously against one of the blocks or contactors 6. This may be more readily evident by reference to Fig. 1, wherein 38 represents the impulse counter or checking device located within the view of the operator. If the stylus 13 of Fig. 1 be applied to the section of the order sheet marked "Butter," for example, the order for three units of "butter" as required by the order sheet, will be transferred to the corresponding counter of the accumulator panel 15 by holding the stylus upon the contactor beneath the "butter" designation, during the period of time required for the timer 29 of Fig. 2 to complete three rotations. The timer then will impart three separate impulses to the "butter" totalizer on the accumulator panel. The three impulses will be registered upon the impulse counter or checking device, so that the operator will know that the "butter" totalizer had been correspondingly advanced. The impulse counter 38 preferably is a counter which readily may be instantly normalized to a zero reading, at the will of the operator. For the purpose indicated, a normalizing button 40 is indicated upon the impulse counter. Counters of this general type are old and well known, wherefore it is deemed unnecessary to disclose and explain the details thereof. The character 41 indicates an actuator arm which may be in all respects similar to the arms indicated at 16 on the totalizing counters 14. It will be understood that the impulse counter herein disclosed by way of example is actuated by reason of the magnetizable core 42 of electromagnet 34 attracting the actuator arm 41 intermittently in synchronism with rotation of the timer 29.

By preference, though not of necessity, an audible signal in the form of a bell or the like 46, and a visible signal 47 in the form of an electric lamp, may be connected across the conductors 33 and 35, or across the timer contacts, for audibly and visibly indicating the number of electric impulses delivered to the totalizing counters while the stylus is held stationarily against any contactor such as 6.

At this point in the description, it may be mentioned that by reason of the fact that the stylus point penetrates the order sheet in order to make contact with any electrically charged segment 6, the order sheet will be perforated and thereby marked for the purpose of indicating the fact

that the operator had observed and registered the ordered item. In those instances in which the order blanks are quite large, it may be desirable to furnish means more conveniently accessible than the button 40 for normalizing the impulse counter 38, however, such means may be considered well within the skill of the mechanic, since a remote control may be effected either mechanically by means of links and levers, or electrically by means of a magnet, solenoid, or the like.

In Fig. 3 is disclosed an alternative form of contactor which might be substituted for the contactors 6, for the purpose of eliminating the need for an electrically charged stylus. In accordance with Fig. 3, the stylus 48 may be a pencil or any suitable implement, of insulating material, by preference. It may be of electrically conductive material, provided that the source of electricity employed in operating the device is not of a dangerous character. The character 49 indicates a switch contact member which may be supported in an elevated position by means of a spring or the like 50, out of contact with the stationary contact point 51 connected electrically to the line wire 52. When the contactor 49 is depressed by means of the stylus or other implement 48, an electric circuit is completed through it to the upper end 53 of a binding post 54, from which latter a conductor 55 conveys electric energy to the various electromagnets of the totalizing counters as heretofore explained. The impulse counter in Fig. 3 is diagrammatically illustrated at 56. It should be noted that the timer 29 of Fig. 2 may be electrically connected in the circuit of the Fig. 3 modification if desired. Although the timer is considered a very desirable element in the combination, the listing or registering device of this invention would not be rendered inoperative by omission of the timer but in that event it would be necessary for the operator to apply the stylus intermittently to the order blank at the prescribed locations identified by the items printed thereon, in order to actuate the totalizing counters of the accumulator panel. The omission of the timer or interrupter 29, of course, would render the work of the operator more laborious and fatiguing than would be the case when the timer or interruptor is included in the combination.

In the modification of Fig. 3, the keyboard or panel 5 would preferably be constructed with an upper board 57 and a lower board 58 spaced therefrom to furnish an intermediate channel for accommodating the elements 50, 51, and 53 of the contactor. When the stylus 48 is applied to the section 49, the section may pivot about the point 59 as it descends against the resistance of spring 50. The audible and visible signals indicated at 46 and 47 of Fig. 2 may be included in the Fig. 3 arrangement as will be well understood.

In constructing the keyboard or panel 5, the contactors made up of the segments 6 will of course be dimensioned and spaced apart according to the requirements dictated by the layout of the order sheet. In some instances, the sections 6 may be replaced with dummy sections where the order sheets do not carry a designated item, and such dummies will not have a corresponding totalizer on the accumulator panel 15. It need hardly be stated that the various sections 6 will be electrically isolated from one another, either by air gaps or by the use of suitable insulating material interposed between the sections. It may be observed also that the sections 6 may be reduced in size to coincide with the smaller divisions of the order blank indicated at 9 on the panel 5.

In the broadest sense, the present invention resides in the provision of a sectional panel or board upon which an ordinary order sheet or form is directly applied, coupled with means whereby an operator may segregate and accumulate totals of odd lot items ordered, by applying an implement or a force to the order sheet and the panel or board sections which underlie the item divisions of the order sheet or form. Broadly considered, it is immaterial whether the totalizing counters be actuated by the electrical means or by purely mechanical means, and the counters may be of any acceptable type irrespective of their mode of operation. The counters 14 may be arranged on the accumulator board or panel otherwise than in columns 60, and they may be disposed at any desirable location with respect to the sectional board or panel 5, either remotely or locally.

The speed of operation of the interruptor 20 may be varied in any suitable known manner, such as by regulating the speed of motor 24, in order to accommodate the apparatus to the operator's ability to count the impulses delivered to the counters. The impulses may be quite rapid, but they should occur at such frequencies as will enable the operator to lift the stylus between any predetermined successive impulses, for an accurate listing or registering of items.

It is to be understood that the particular form of the invention herein illustrated and described is exemplary only of the invention, and that various modifications and changes in the structural details may be made, within the scope of the appended claims, without departing from the spirit of the invention.

I claim:

1. An apparatus of the class described, for operating upon an order sheet or the like, and comprising in combination: a sectional exterior and exposed panel of electricity conducting material providing a suport for an order sheet marked off in divisions and adapted to be superposed on the panel for unrestricted access and visibility by an operator, the sections of the panel being electrically insulated from one another and being spaced and dimensioned to correspond with divisions of the sheet which specify items of merchandise and quantities thereof, the sections of the panels directly underlying the divisions of the order sheet in registry, counters including electromagnetic operators and corresponding in number to the number of panel sections, a stylus of electricity conducting material for selective application to any one of the panel sections by penetrating the order sheet, electrical circuits each including an electromagnetic operator for a counter, a panel section, the stylus, and a source of intermittent electrical potential pulsating at a rate sufficiently slow to enable an operator to count the pulsations, the stylus when used for penetrating the order sheet serving to close an electrical circuit through a selected one of the panel sections and its associated counter corresponding to an order sheet division penetrated by the stylus.

2. An apparatus of the class described, comprising in combination: a panel comprising exposed and visible electrically isolated metallic sections in a common plane, providing a support for an office sheet to be superposed thereon for

unrestricted visibility to an operator of the apparatus, said sheet being marked off in sections specifying items of merchandise and including spaces for receiving an indication of quantities of such items, the sections of the panels underlying the spaces of the sheet in registry therewith, a series of electrical circuits all including a source of pulsating electricity, a panel section, and a means operative for selectively completing any one electrical circuit through a selected panel section, said means including a stylus for manipulation to electrically connect it in one or another of said circuits by penetration of the office sheet to reach a selected panel section, and separate means associated with each of said circuits for registering the number of pulsations occurring so long as the stylus continuously electrically contacts a panel section corresponding to any given registering means.

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