June 21, 1949. B. NEEDLMAN 2,474,157

DISPLAY ALARM

Filed Nov. 12, 1947 2 Sheets-Sheet 1

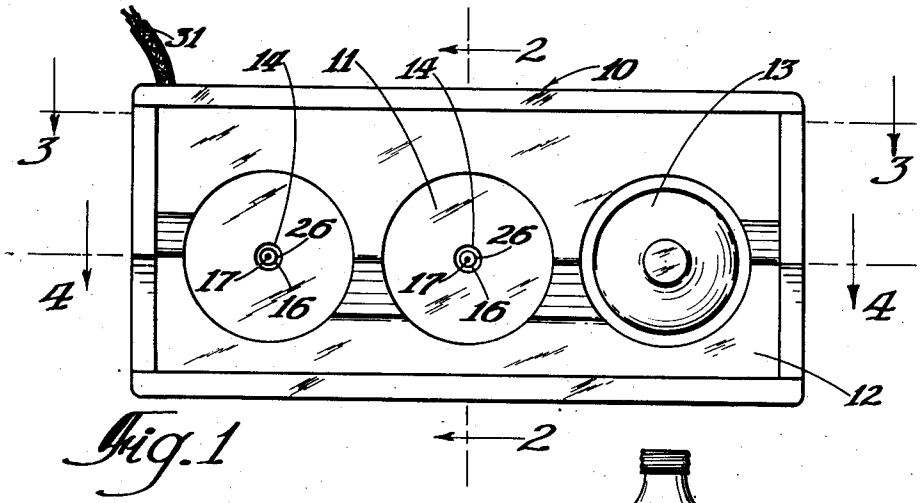


Fig. 1

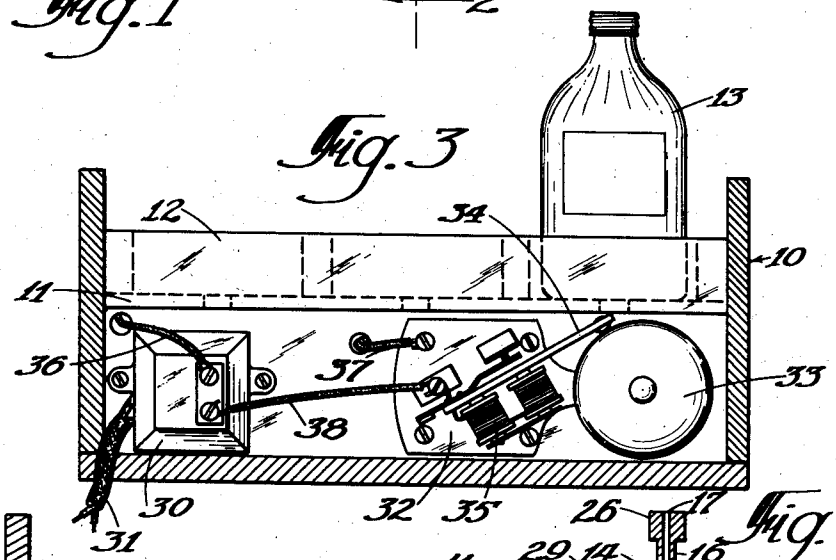


Fig. 3

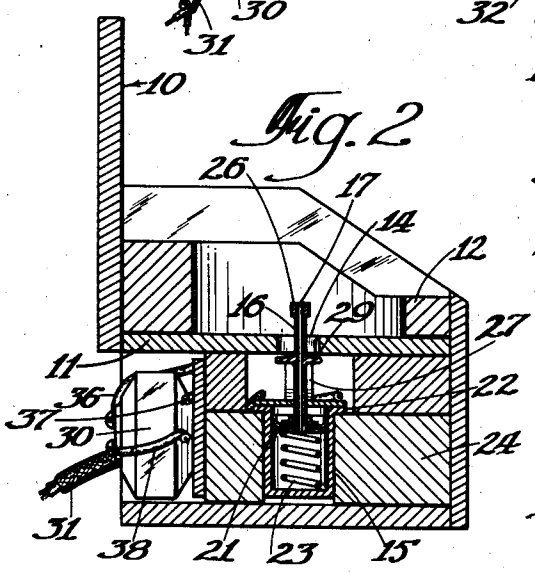


Fig. 2

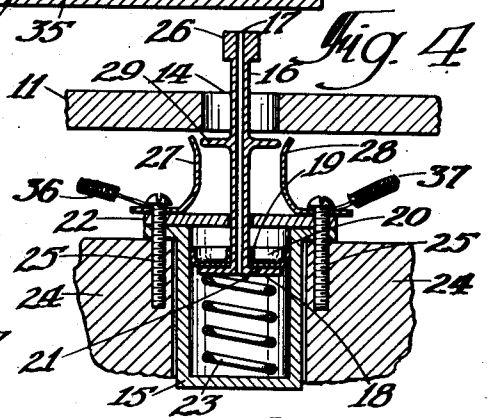


Fig. 4

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DISPLAY ALARM

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2 Sheets-Sheet 2

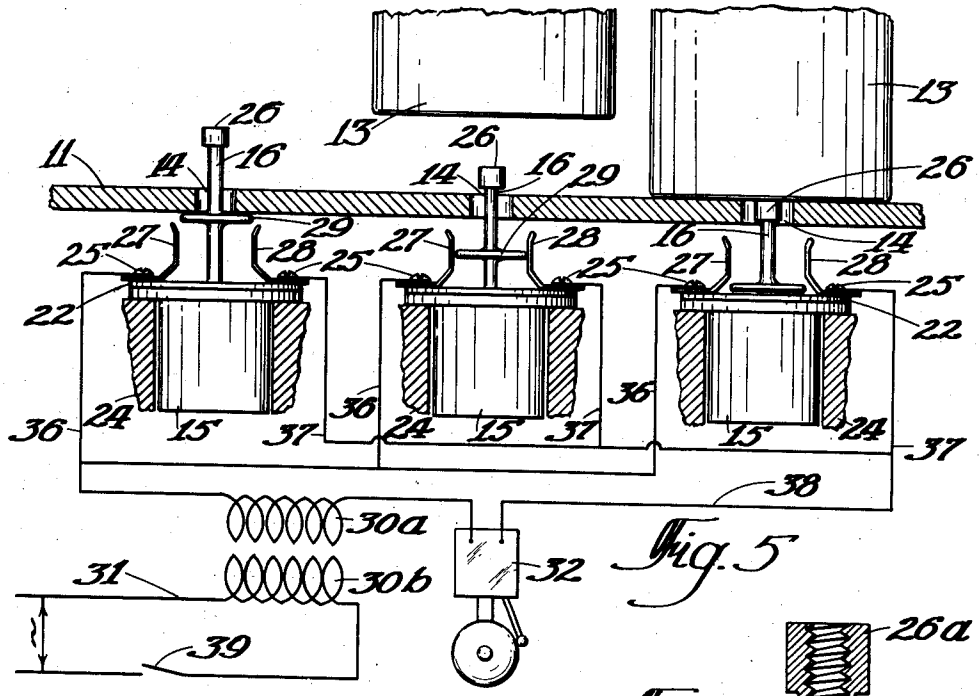


Fig. 5

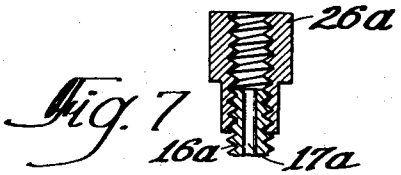
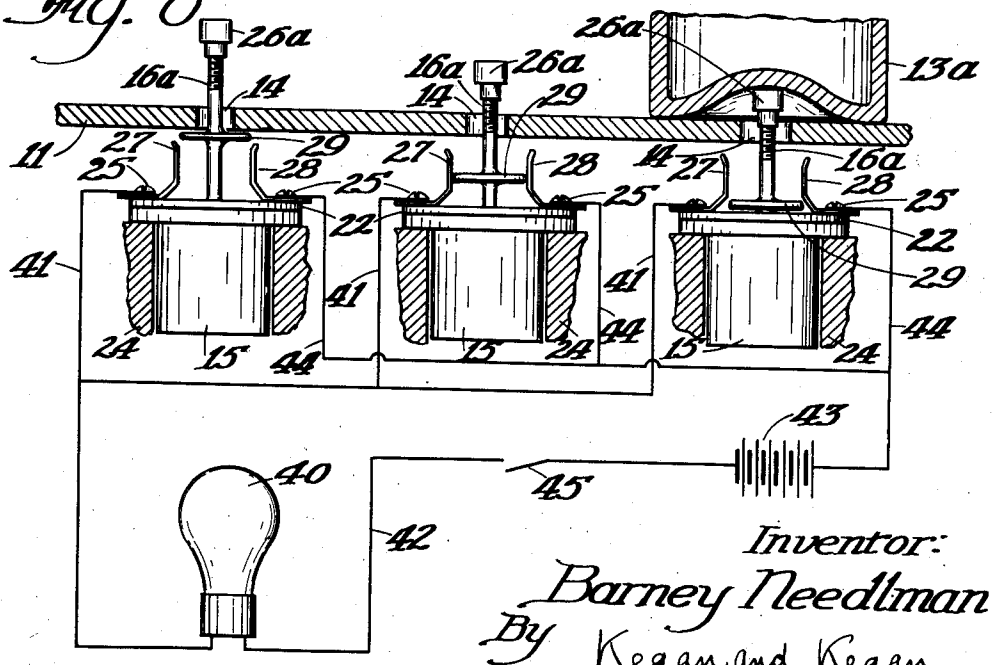


Fig. 7

Fig. 6



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UNITED STATES PATENT OFFICE

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DISPLAY ALARM

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5 Claims. (Cl. 177—311)

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This invention relates generally to merchandise display stands and more particularly to improvements in alarm apparatus used in conjunction therewith.

A principal object of the instant invention is to provide alarm apparatus for merchandise display stands or the like wherein a signal device operates for a pre-selected period of time upon the removal of merchandise from said stand, whereupon the signal device is automatically shut off.

Another object of my invention is to provide alarm apparatus of the type specified above which is completely concealed from view when merchandise is placed in position on the display stand.

A further object of my invention is to provide alarm apparatus of the type specified which is compact, inexpensive to manufacture, and easy to install and to maintain.

In its broad aspect, the present invention comprises an alarm system adapted to be incorporated into a merchandise display stand or the like wherein a signal device, either auditory or visual, is actuated for a pre-selected period of time each time that a piece of merchandise is removed from the stand. A customer desiring to purchase merchandise placed on a display stand incorporating my invention, therefore, need only lift the desired product off the stand, whereupon a bell, buzzer or other signal device notifies the attendant of the customer's desire to purchase. Since the signal is actuated each time that a piece of merchandise is removed, my invention also serves to eliminate shoplifting from open counters. Advantageously, the signal device of my invention operates for only a comparatively short period of time, so that there is no immediate need to replace the merchandise removed from the display stand. In counterdistinction to my invention are prior art devices wherein an alarm system is actuated upon removal of merchandise and does not stop until either the merchandise is replaced or the energy supply to the signal device is cut off. Such alarm devices act to embarrass customers because of the prolonged noise which results each time that a piece of merchandise is removed from a display rack. It is also apparent that such systems cannot be operated for any length of time unless the display stand is completely filled with mechandise.

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In order that my invention may be more fully disclosed, reference is had to the accompanying drawings which illustrate apparatus embodying the foregoing and such other principles, advantages or capabilities as may be pointed out as this description proceeds, or as are inherent in the present invention. For purposes of clarity in exposition, the following description is explicit, and the accompanying drawings are detailed, but it is distinctly to be understood that said exposition is illustrative only, and that my invention is not restricted to the particular details recited in the specification or shown in the drawings.

In the drawings:

Figure 1 is a plan elevational view illustrating a merchandise display stand incorporating one embodiment of my invention;

Figure 2 is a side elevational view taken in section along the line 2—2 of Figure 1;

Figure 3 is a rear elevational view taken in section along the line 3—3 of Figure 1;

Figure 4 is a fragmentary elevational view taken in section along the line 4—4 of Figure 1;

Figure 5 is a schematic view of the apparatus shown in Figures 1 through 4;

Figure 6 illustrates schematically a further modification of my invention; and

Figure 7 is a fragmentary sectional view of a detail of the modification shown in Figure 6.

Like reference characters designate like parts in the drawings and in the description thereof which follows.

Referring now to the drawings, my invention is shown in combination with a display stand 10 which includes a supporting shelf 11 and a merchandise partition 12. The manner in which the partition 12 is adapted to position merchandise, as exemplified by the bottle 13, is best shown in Figures 1 and 3. A plurality of openings 14, 14, 14 pierce the supporting shelf 11, while cylinders 15, 15, 15 are positioned beneath and axially aligned with said openings 14, 14, 14 respectively. Each of the cylinders 15, 15, 15 is provided with a cooperating plunger 16, which plunger 16 is shown as having a passageway 17 of small diameter extending entirely therethrough. In addition, the plunger 16 is provided with a bottom plate 18, a retaining plate 19 and an intermediate packing flange 20. The packing flange 20 may be formed from any flexible material such

as for example leather or other coriaceous material and, in combination with the bottom plate 18 and the retaining plate 19 comprises a piston indicated generally by the numeral 21. The plunger 16 operates through a cover plate 22, which acts to close the cylinder 15 and guide the plunger 16. Inserted between the bottom of the cylinder 15 and the bottom plate 18 is a helical spring 23. The cover plate 22 and the cylinder 15 are secured to the supporting frame 24 of the display stand 10 by means of fasteners 25, 25. When the spring 23 is in its uncompressed, or null position, the end portion 26 of the plunger 16 extends through the opening 14 above the supporting shelf 11.

As best shown in Figure 4, two conductive strips 27, 28 are anchored to the cylinder 15 by means of the fasteners 25, 25. A contact member 29 integral with the plunger 16 is movable vertically between the strips 27, 28. As further shown in Figure 4, the contact member 29 is out of contact with the strips 27, 28 when the plunger 16 is at the top of its stroke. As will be explained in further detail hereinbelow, the coaction between the contact member 29 and the strips 27, 28, provide electrical switch means whereby an appropriate signal device may be actuated for a preselected period of time when the bottle 13 or other merchandise is removed from the stand 10.

By means of apparatus such as that illustrated in Figure 3, it becomes possible to adapt my invention to operate on conventional alternating current supply sources. This apparatus includes a transformer 30 which is energized from an electrical energy supply source (not shown) through the primary lead 31. Said transformer 30 in turn supplies the energy which operates an electrical alarm device, as exemplified by the electric bell unit 32. Like conventional electric bells, the unit 32 includes a bell 33, a clapper 34 and solenoid mechanism 35 which actuates the clapper 34.

In order that the mode of operation of the embodiment shown in Figures 1 through 4 may be better understood, reference is had to the schematic layout thereof shown in Figure 5. It will be seen that one side of the secondary 30*a* of the transformer 30 is connected through the conduit 36 to the conductive strips 27, 27, 27 secured to the cylinders 15, 15, 15, respectively. The conductive strips 28, 28, 28 are in turn common to one side of the electric bell unit 32 through the conduit 37. The other side of the electric unit 32 is connected through the conduit 38 to the other side of the secondary 30*a* of the transformer 30. The primary side 30*b* of the transformer 30 contains a switch 39 by means of which the supply of energy thereto may be conveniently switched on or off. It is apparent that the electric circuit shown in Figure 5 comprises three parallel circuit branches each of which contains a switch as represented by the conductive strips 27, 28 and the contact member 29.

Figure 5 further illustrates the three positions of the plunger 16 which are of importance in the operation of my invention. Thus, in the right hand portion of Figure 5, the weight of the bottle 13 acts to depress the end portion 26 of the plunger 16 in the manner shown. When the plunger 16 is at the bottom of its stroke, the spring 23 is compressed, the contact member 29 is out of contact with the conductive strips 27, 28 and the respective branch of the electric circuit is open.

Upon the removal of the bottle 13 from the shelf 11, however, the plunger acts to displace upward under the action of the compressed helical spring 23. Because of the novel construction inherent to my invention, however, this upward movement is retarded over that which would ordinarily prevail. Specifically the above mentioned construction of the piston 21 is such that the upward movement of the plunger 16 acts to provide an efficient seal between the walls of the cylinder 15 and the packing flange 20. It will be noted, however, that as the piston 21 moves upward under the initial action of the spring that the volume of air trapped within the cylinder 15 increases, with a corresponding decrease in absolute pressure. This action therefore momentarily creates a differential in pressure across the two boundaries of the piston 21, so that a force unbalance exists which acts to retard the upward movement of the piston 21. The physical constants of the spring selected are such, however, that the spring by itself is unable to overcome this force unbalance. On the other hand, the passageway 17 acts as a balance tube and permits the entry of a small quantity of air into the displacement volume of the piston 21 as it moves upward. By dimensioning the passageway 17 so that it effectively throttles all of the air passing therethrough, however, the rate at which air flows into the displacement volume, and hence the rate at which the piston 21 moves upward, may be controlled. Thus the time required for the contact member 29 to traverse the conductive strips 27, 28, may also be set at any value desired. Thus, it will be seen that when the plunger 16 is in the position shown in the middle portion of Figure 5, that the branch of the electric circuit concerned is closed. As a result energy flows from the transformer 30 to the electric bell unit 32. The unit 32 continues to operate as long as the contact member 29 bridges the conductive strips 27, 28.

As the plunger 16 reaches the upward extent of its stroke, the contact member 29 disengages the conductive strips 27, 28 thereby opening the secondary circuit and cutting off the energy supply to the bell unit 32. The appearance of the plunger 16 and its cooperating elements when in this position is best shown in the left hand portion of Figure 5.

As further evidence of the applicability of my invention, it may be combined with other types of alarm circuits, such as for example the visual type alarm arrangement shown in Figure 6. Specifically, this arrangement includes an electric light bulb 40 which flashes on when merchandise is removed from the supporting shelf 11, thereby informing the salesman that a piece of merchandise has been removed from the stand 10. One terminal of the light bulb 40 is connected to the conductive strips 27, 27, 27, through the conduit 41, while the other terminal of the bulb 40 is connected through the conduit 42 to one side of a battery 43. The other side of the battery 43 is in turn connected through the conduit 44 to the conductive strips 28, 28, 28. A switch 45 is interposed in the conduit 42 to provide positive means for opening and closing the circuit. Thus it will be seen that in many respects the electric alarm circuit shown in Figure 6 is similar to the alarm circuit shown in Figure 5. In particular, the coaction between the contact members 29 and

the conductive strips **27**, **28** is the same in each case.

Whereas the plunger **16** illustrated in Figures 1 through 5 is shown as having a fixed and unchangeable height, the height of the plunger **16** as shown in Figure 6 may be adjusted. This adjustability is of particular utility where the display stand **10** must accommodate articles of the class exemplified by the bottle **13***a* wherein the contacting surface is spaced from the shelf **11**. As is best shown in Figure 7, this adjustability is achieved by providing a separate, centrally bored and threaded end portion **26***a* which threads onto the threaded plunger **16***a*. While the adjustability of the end portion **26***a* along the length of the plunger **16***a* makes it possible to utilize this embodiment for articles having both flat and contoured supporting surfaces, the stroke of the piston **21** in each instant remains constant. Thus the operation of the alarm actuating means, as exemplified by the coacting contact member **29** and conductive strips **27**, **28** is in no way impaired.

In addition to the embodiments shown in the drawings, my invention embraces many other useful forms. Thus, for example it is apparent that any number of units comprising a cylinder and cooperating mechanism may be incorporated into a merchandise display stand, and that all of these units may be coupled to a single, appropriate signal device. In addition, many types of throttling arrangements suggest themselves. For example, it might prove practical to throttle the air trapped within the upper portion of the cylinder **15** as the piston **21** moves upward by the simple expedient of providing a throttling orifice or valve in the cover plate **22**. It is also apparent that my invention may be used in conjunction with many other types of signaling devices than those shown in the drawings. Similarly, numerous methods of energizing the signaling device readily suggest themselves to those skilled in the art.

Thus, while I have shown and described certain specific embodiments of my invention, it is to be understood that these embodiments have been given by way of example only and that various changes and rearrangements of the details shown herein may be made without departing from the spirit of the invention, the scope of which is defined in the appended claims.

What I claim is:

1. In a merchandise display stand including a display platform, said platform having an opening therethrough, an electrical alarm device and a source of electrical energy for said alarm device, means for sounding said alarm for a predetermined length of time when merchandise is removed from said platform, said means consisting of: a cylinder and a piston therein, a push rod secured to said piston and axially aligned with said opening, a helical spring within said cylinder opposing downward movement of said piston, the upper end of said push rod extending above said platform under the action of said spring when no downward external force is applied thereto, said upper end being depressed when merchandise is placed thereon, an electrical contact plate integral said push rod, a pair of spaced conductive strips bridged by said contact plate during the intermediate portion of the upward movement of said push rod under the said action of said spring means, one of said pair of strips being conductively connected to one side of said source of electrical energy, the other of said pair of strips being conductively connected to the other side of said source of electrical energy through said alarm device, and means for delaying the speed with which said contact plate traverses said strips which consists of a small passageway piercing said piston and said push rod axially, whereby all air entering the displacement volume of said cylinder as said piston moves upward is throttled through said passageway.

2. An alarm device for merchandise display stands and the like whereby an electrical alarm device connected to an electrical energy supply source is actuated when merchandise is removed from a display platform thereof, said device comprising: a cylinder and a piston movable therein; a push rod secured to said piston and extending upward through said display platform when said piston is at the end of its upward stroke, said push rod being below said platform at the end of its downward stroke; spring means resisting downward movement of said piston; an electrical contact member on said push rod; a pair of spaced conductive strips bridged by said contact member during the intermediate portion only of the stroke of said piston, said electrical energy supply source being connected to said alarm device through said pair of conductive strips upon bridging thereof by said contact member; and means for delaying the speed with which said contact member traverses said conductive strips which comprises a throttling orifice in said piston; whereby placing merchandise over said cylinder depresses said push rod to the end of said downward stroke, and whereby removing said merchandise for said stand causes said push rod to move upward under the action of said spring means, whereupon the air entering the displacement volume of said cylinder is throttled through said orifice and said contact member slowly traverses said conductive strips.

3. Display alarm timing means adapted to be used in combination with alarm means and a display platform having an opening therethrough, comprising: a cylinder beneath said platform, a plunger operating in said cylinder, the free end of said plunger extending through said opening upon upward stroking of said plunger, spring means acting on said plunger resisting downward stroking thereof, said alarm means actuated by said plunger during the middle portion only of the stroke of said plunger, and means for throttling substantially all of the air entering the displacement volume of said cylinder as said plunger moves upwardly, whereby the upward movement of said plunger is retarded.

4. In a device as defined in claim 3, means for adjusting the height of said plunger above said platform.

5. In a display stand for merchandise and the like including a display platform having an opening therethrough, an electrical alarm device and a source of electrical energy therefor, other means for actuating said alarm device for a predetermined time interval whenever merchandise is removed from said display platform, said other means comprising: a cylinder beneath said platform in alignment with said opening, a plunger operating in said cylinder, the free end of said plunger extending above said platform upon upward stroking of said plunger, means for adjusting the height of said plunger above said platform, spring means within said cylinder urging said plunger upward, an electrical contact member carried by said plunger, electrical switch

means bridged by said contact member during the intermediate portion only of the stroke of said plunger, said switch means electrically connected with said source of electrical energy and said alarm device, and means for controlling the increment of time during which said contact member bridges said switch means as said plunger moves upward under the urging of said spring means, said means comprising a small passageway piercing said plunger, whereby substantially all air entering the displacement volume of said cylinder as said plunger moves upward is throttled through said passageway.

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The following references are of record in the file of this patent:

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Certificate of Correction

Patent No. 2,474,157 June 21, 1949

BARNEY NEEDLMAN

It is hereby certified that errors appear in the printed specification of the above numbered patent requiring correction as follows:

Column 1, line 50, for "mechandise" read *merchandise*; column 6, line 36, for the words "for said" read *from said*;

and that the said Letters Patent should be read with these corrections therein that the same may conform to the record of the case in the Patent Office.

Signed and sealed this 20th day of December, A. D. 1949.

[SEAL]

THOMAS F. MURPHY,
Assistant Commissioner of Patents.

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