March 19, 1968 E. MOGLER 3,373,931

LOCKING AND ALARM DEVICE

Filed Oct. 22, 1965

3 Sheets-Sheet 1

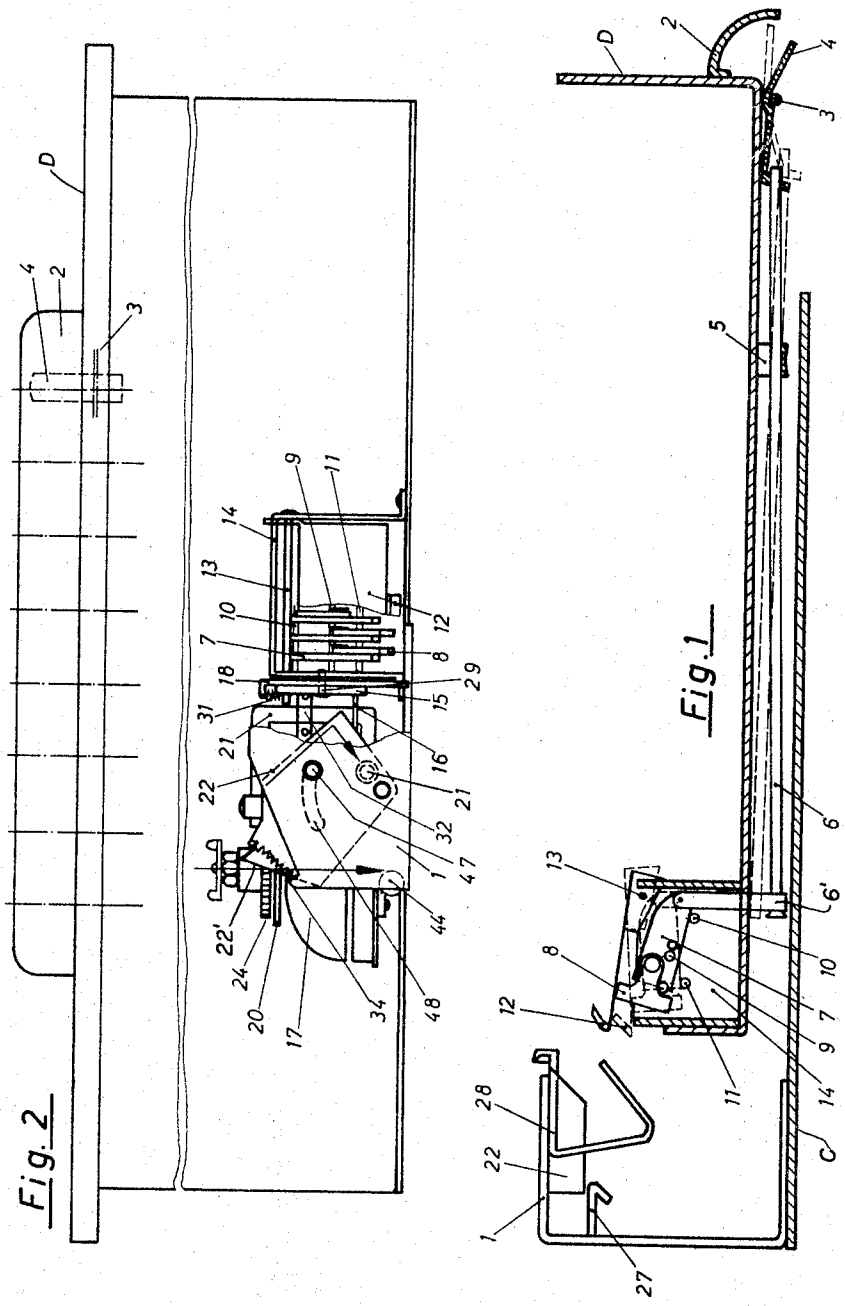

Fig. 1

Fig. 2

INVENTOR
Emil Mogler

BY Spencer & Kaye

ATTORNEYS

March 19, 1968 E. MOGLER 3,373,931

LOCKING AND ALARM DEVICE

Filed Oct. 22, 1965 3 Sheets-Sheet 2

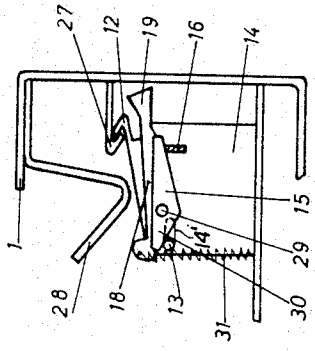

Fig. 3

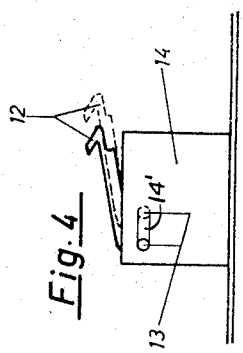

Fig. 4

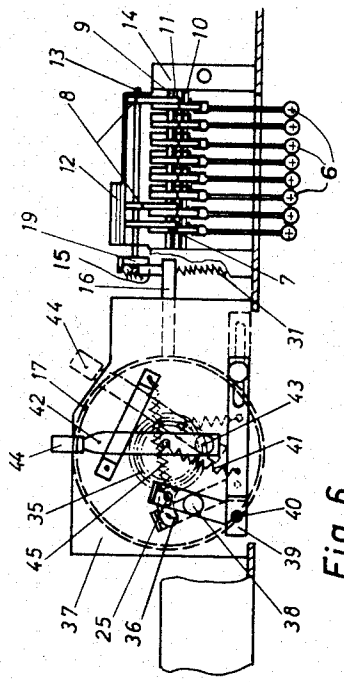

Fig. 6

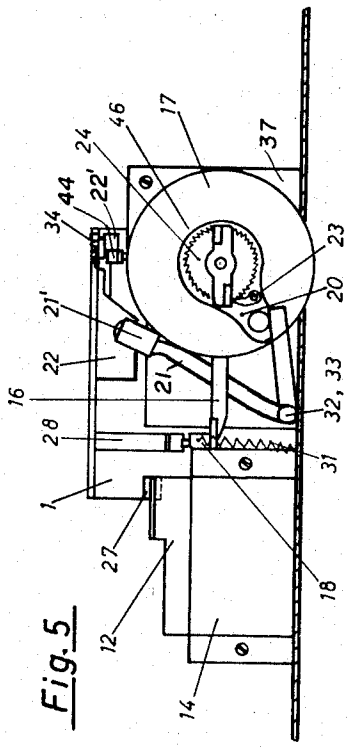

Fig. 5

INVENTOR
Emil Mogler

BY Spencer & Kaye
ATTORNEYS

March 19, 1968 E. MOGLER 3,373,931

LOCKING AND ALARM DEVICE

Filed Oct. 22, 1965 3 Sheets-Sheet 3

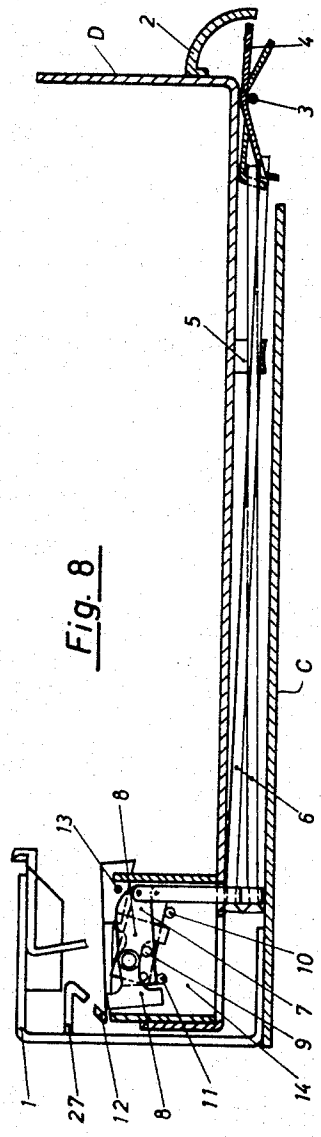

Fig. 8

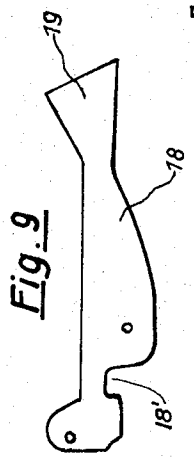

Fig. 9

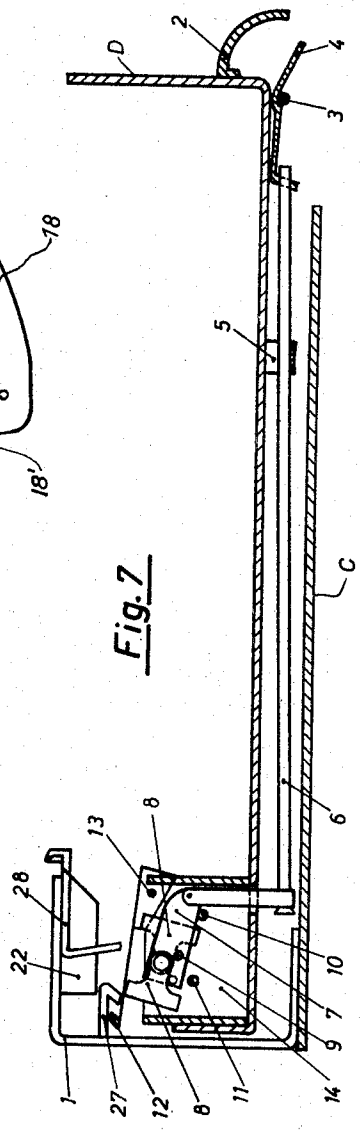

Fig. 7

INVENTOR
Emil Mogler

BY Spencer & Kaye
ATTORNEYS

United States Patent Office 3,373,931
Patented Mar. 19, 1968

3,373,931

LOCKING AND ALARM DEVICE

Emil Mogler, Heilbronn (Neckar), Germany, assignor to Kassenfabrik Emil Mogler, Heilbronn (Neckar), Germany

Filed Oct. 22, 1965, Ser. No. 501,980
Claims priority, application Germany, Dec. 3, 1964, M 63,450
9 Claims. (Cl. 235—22)

ABSTRACT OF THE DISCLOSURE

A pre-settable locking device for preventing the unauthorized opening of a cash register drawer, which device includes a pivotable locking means movable between a locking position and an unlocking position, a plurality of positioning elements capable of being set in either one of two stable positions, and a plurality of levers arranged to be actuated from outside the drawer, the locking means being movable into its unlocking position for permitting the drawer to be opened only when those levers associated with positioning elements in one stable position are actuated, while those levers associated with the remaining positioning elements are not actuated.

The present invention relates to a new automatic locking and alarm device for preventing the unauthorized movement of a device, and particularly for preventing the opening of a cash register drawer when the wrong cash register keys have previously been depressed.

There exist devices of this type in which the movable part can be moved only if a certain number of locking elements are brought out of engagement with a cooperating abutment, the locking elements being part of a plurality of such elements which themselves generally have concealed actuating levers.

In order to make it possible, in devices of this type, to obtain as many locking combinations as possible, each individual locking organ can selectively be put into one of two positions.

In conventional devices of this type, the locking organs are generally constituted by discs or bolts which, in order to obtain the desired unlocking combination, are removed and inserted in inverted position, are put into different positions, or are depressed. In many cases, the levers are pressed in opposition to the return force of a bias spring, and such an arrangement has the drawback that the springs eventually become subject to fatigue, thereby causing the locking organs to fail to return to their respective rest positions.

There also exists a locking device in which the key lever, which is pivotally mounted at a point spaced from the point at which it effects the locking action, is constituted by a pivotable lever, the lever itself carrying the locking organs and being held in the two positions which they can assume by means of spring-biassed detents. Even in the case where the locking organs are constituted by axially displaceable bolts, these bolts are held in their axial position by means of spring-pressed balls which engage in ring-shaped grooves with which the bolts are provided. In order to make certain that the balls will properly seat in the respective grooves, it is necessary that a relatively large amount of pressure be exerted on these locking bolts, as a result of which these locking bolts are frequently not brought into the correct predetermined locking position, in consequence of which difficulties are encountered when the device is opened.

It was even possible that the locking bolts might be subjected to shocks when the mechanism is transported, so that the locking bolts themselves are shifted, as a result of which, after the device arrives at its destination, it is not possible to open the device even if one correctly operates the various keys.

Yet another drawback of conventional devices of this type is that the individual locking organs are relatively large, so that only a relatively small number of locking organs could be accommodated within a housing of given size, in consequence of which the number of possible combinations is greatly diminished.

It is, therefore, the primary object of the present invention to overcome the above-described drawbacks.

It is a more specific object of the present invention to provide a locking and alarm device which comprises a plurality of selectively adjustable locking organs in which the locking organs which are provided on the movable part can be actuated by means of keys or hand levers and in which, when the movable part of the arrangement is moved and the levers do not occupy their correct positions, they abut against a stationary part of the device.

According to the present invention, these objects are accomplished by constituting each locking organ by two cams forming part of a locking piece, the piece being mounted on a rocker which is actuated by a lever, this locking part being T-shaped and being pivotally mounted for movement throughout a limited angle of about 180°, the extremities of this movement being limited by abutments.

Thus, specifically, these objects are achieved by the provision of a locking and alarm device for apparatus of the cash register type, which apparatus includes a stationary portion carrying a locking catch and a movable portion carrying a plurality of levers which are pivotable between a de-actuated position and an actuated position. This device primarily includes locking means pivotably mounted on the movable portion for pivoting between a locking position in which it engages a locking catch, thereby preventing the movable portion from moving with respect to the stationary portion, and an unlocking position in which it is clear of the catch and permits the movable portion to move with respect to the stationary portion. The device also includes a plurality of pivotably mounted rocker means each controlled by a respective one of the above-mentioned levers to pivot to an active position when its associated lever is in its actuated position and to an inactive position when its associated lever is in its de-actuated position, each of the above-mentioned rocker means having a positioning element which is pivotably mounted thereon and which is arranged to control the pivoting of the locking means.

In further accordance with the present invention, there is provided a novel alarm device, such as a bell for example, which is spring-wound, the winding of the spring being controlled by the relative movement of the movable portion with respect to the stationary portion, control means being provided to assure that the power spring for the alarm means is not overwound, without requiring the provision of a slip clutch.

Additional objects and advantages of the present invention will become apparent upon consideration of the following description when taken in conjunction with the accompanying drawings in which:

FIGURE 1 is a longitudinal sectional view through a drawer-type cash register equipped with one embodiment of the present invention.

FIGURE 2 is a plane view of the cash register equipped with a locking and alarm device according to the present invention.

FIGURE 3 is a side detail view of a portion of the device of FIGURE 2.

FIGURE 4 is a schematic representation of several of the parts shown in FIGURE 3.

FIGURE 5 is a schematic representation of a front

view of the locking and alarm device of the present invention.

FIGURE 6 is a rear view of the locking and alarm device of FIGURE 5.

FIGURE 7 is a side cross-sectional view, similar to that of FIGURE 1, showing the key levers in their inactive position.

FIGURE 8 is a side view of the locking device, similar to that of FIGURE 7, showing one of the key levers in its active position.

FIGURE 9 is a side view of an element of the device of the present invention.

Referring now to the drawings, there is shown the fixed part of a locking and alarm device according to the present invention which, in the instant embodiment involving a drawer-type cash register, can be built into the counter C supporting the cash register. Referring particularly to FIGURES 1 and 2, the fixed part comprises a U-shaped iron strip **1**, to which there is secured a catch **27** for the locking hook plate **12**, an inclined surface **22** for a wind-up lever **21** (FIGURE 2) and a control cam yoke **28** for the cam lever **18**, **19** (FIGURE 3) of the alarm device of the present invention.

Arranged at the front of the drawer D are gripping levers **4** which are mounted by means of the pivot pin **3**, the levers **4** being covered by a shell-type drawer pull **2**. A plurality of intermediate levers **6** are pivotably supported on a track **5** and are each connected to be actuated by a respective one of these levers **4**. The levers **6** are each pivotally linked, via a respective connecting lever **6'**, to respective rockers **7**, which are all pivotally mounted on a shaft **9**, there being a plurality of T-shaped positioning elements **8** which are each pivotally connected to a respective one of the rockers **7** and mounted for pivotal movement through an angle of about 180° with respect to its associated rocker. Each positioning element **8** is arranged to be pivoted through an angle of about 180° between the first stable position, as shown in FIGURE 1, and a second stable position, which is represented by the positions of the partially hidden elements **8** in FIGURES 7 and 8. The movement of each positioning element **8** to the desired one of its stable positions is effectuated by hand and can only be accomplished when the cash drawer D is open to permit the operator to gain access to the rear portion of the drawer, where the housing **14** is disposed. With the drawer fully open, it is only necessary to pivot the locking plate **12** around its axis **13** so as to expose the elements **8** and then to manually flip each element **8** into the desired ones of its stable positions. The locking elements **8** are then set in any desired combination of their stable positions. The locking plate **12** can then be pivoted back into the position shown in the figures and the drawer can be closed in preparation for use. Thus, the only way in which elements **8** can be pivoted is by hand with the drawer open and once each element has been set into its desired position, and the locking plate **12** has been returned to the position shown in FIGURE 1, these positioning elements will remain in their respective stable positions until some future time when it may be desired to reset them for the purpose of changing the unlocking combination of the drawer. In its rest position, the rocker **7** is caused to bear against the pin **10** by the weight of its respective linkage lever **6'** and intermediate lever **6** and when its respective lever **4** is actuated, the rocker **7** comes to bear against the pin **11**, assuming the position shown in dashed lines in FIGURE 1. Drawer D is mounted to slide with respect to counter C through the intermediary of any suitable, well-known tracks or rails which have been omitted from the drawings to avoid confusion.

As is best shown in FIGURES 7 and 8, a locking hook plate **12** lies on those ones of positioning elements **8** which have been rotated (tilted) into their operative position, as shown in FIGURE 1.

Each positioning element **8** will be pivoted into a first stable position, i.e. into a position directed toward the

rear wall of the drawer (FIGURE 1), or into a second stable position, i.e. into a position directed toward the front wall of the drawer (FIGURE 7), by hand when the drawer is opened. During the closing of drawer D, when none of the levers **4** is actuated, plate **12** lies on those elements **8** which are in their first stable position. Plate **12** is pivotally mounted, at **13**, on the housing **14** within which the locking mechanism is arranged. Here, the upwardly bent, hook-shaped edge of the plate lies behind the catch **27** so that, so long as the "correct" levers **4** are not actuated, and hence is in the position shown in FIGURE 7, the drawer can not be opened. FIGURE 8 shows, in solid lines, the position of the forwardmost rocker **7**, with respect to the plane of the drawing, when its respective lever **4** is actuated. The plate **12** which rests on every positioning element **8** which has been rotated into its first stable position can, so long as the "correct" levers are actuated, slide below and past the catch **27**. The other positioning elements **8** which are in their second stable positions, and which are hence directed toward the front wall of the drawer, as is the case for the partially hidden element **8** of FIGURES 7 and 8, become effective only when their respective levers **4** are actuated (i.e. pressed upwardly). In that case, the front end of the rocker **7**, to which the intermediate lever **6'** is connected, will be raised so that its positioning element **8**, which is in its second stable position, will urge the plate **12** upwardly into a position where it engages catch **27** even when the "correct" levers **4** have been actuated, thereby preventing the drawer D from being opened.

The present invention has the advantage, as compared to prior art locking devices operating on the same principle, that a larger number of rockers **7** can be arranged next to each other on the shaft **9**, so that the number of possible lever setting combinations is increased.

The alarm device, for example an alarm bell in the illustrated embodiment, is mounted on drawer D and is arranged and operated as follows:

As is best seen in FIGURES 3 and 4, the bearing shaft **13** of the locking hook plate **12** is mounted in elongated slots **14'** in the side walls of the housing **14** within which the locking mechanism is arranged, so that when it is sought to open the drawer, the drawer can be moved forward, by a distance equal to the length of the elongated slots **14'**, despite the fact that the plate **12** is in engagement with the catch **27**. During this time the plate **12** moves from the solid line position to the broken line position of FIGURE 4 and the shaft **13** slides along the lower inclined, bevelled, or oblique edge of a lever **15** pivotally mounted, at **29**, on housing **14**. This movement rotates the lever **15** in a clockwise direction about the shaft **29** so as to cause the other end of this lever **15** to depress a lever **16** which triggers the bell **17**, the arrangement being such that the lever **15**, and therefore the triggering lever **16**, can not return to their rest positions. This result is achieved by the action of a cam lever **18** which is also rotatably mounted on shaft **29** and which, at its lower edge, has a notch **18'** (see FIGURE 9) in which the shaft **13** engages when it is at the right-hand end of slot **14'** (as viewed in FIGURES 3 and 4). The cam lever **18**, which is mounted at **29**, is subjected to the action of a tensed spring **31** which pulls the end of lever **18** which is provided with the cut-out downward.

In order to render the bell **17** inoperative, the correct levers **4** have to be actuated to enable the drawer D to be pulled forward. A cam **19** forming a part of lever **18** then comes to bear against the knee of a yoke **28** mounted on strip **1** and when the drawer is opened further, the cam lever **18** is rotated in a clockwise direction (with reference to the plane of FIGURE 3) against the action of the spring **31**, so that the shaft **13** can clear the notch **18'** of the lever **18** and return into its original position at the left-hand end of elongated slot **14'** of housing **14** under the influence of a return spring (not shown). At the same time, the lever **15** which also is under the influence of a return spring (not shown), is pivoted back in

a counter-clockwise direction into its original position, whereupon the triggering lever **16** also returns to its original position.

As is shown in FIGURES 5 and 6, a coil spring **35** for the alarm bell **17** is wound up automatically by means of a ratchet lever **20** which is driven by a V-shaped winding-up lever **21** which is pivotally mounted in the vicinity of its knee on pivots **32** and **33**. The free end of spring **35** is fastened to a ratchet wheel **24** which is mounted to rotate with lever **20** when one of its teeth is engaged by pawl **23**. When the drawer D is closed, the end of the longer arm of the wind-up lever **21**, which carries a freely rotatable sleeve **21'**, is pressed to one side, transversely of the direction of movement of the drawer, by means of a deflector plate **22** which is resiliently mounted on a stationary part of the assembly and which is pivotable to a limited degree. The relative movement of sleeve **21'** is shown by the bent arrow in FIGURE 2. The ratchet lever **20**, which is held against the short arm of lever **21** by spiral spring **37**, is pivoted through a given angle by the movement of lever **21**.

As shown in FIGURES 2 and 5, the deflecting plate **22** has such a configuration that wind-up lever **21** after it moves out of contact with plate **22** just prior to the complete closing of drawer D, can return to its original position along the rear surface of deflector plate **22** which is at an angle with respect to the direction of movement of the drawer. During the subsequent opening of the drawer, the sleeve **21'** of the wind-up lever comes in contact with the rear surface of the downwardly angled edge of the deflector plate and hence pivots the deflector plate to one side, this pivoting of the deflector plate being guided by an arcuate slot **48** in plate **22** which receives a guide pin **47** mounted on strip **1**. A return spring **34** connected between plate **22** and strip **1** urges the deflector plate **22** back into its original position after the sleeve **21'** of the longer arm of the wind-up lever **21** has passed beyond plate **22**.

In order that the ratchet lever **20** be actuated only when the spiral spring **35** of the bell **17** has run down to a certain extent, there is provided, as shown in FIGURE 6, a feeler lever **25** which is mounted for rotation about pivot **38** and which bears against the outer circumference of the spiral spring **35**, under the influence of spring **45**, when the running down of the bell mechanism has enlarged the outer diameter of spring **35** to a certain extent. The movement of this feeler lever **25** is limited, in both directions, by a pin mounted on lever **25** and engaging in an arcuate slot **36** in a mounting plate **37**. The mounting plate **37** is mounted behind bell **17** on the rear wall of the drawer. A control lever **42** is also mounted on bell **17** on a pivot **43** supported by the bell housing. The lever **42** has a roller **44** which bears against an abutment surface **22'** of plate **22** while drawer D is being closed and when lever **42** is in the position shown in solid lines in FIGURE 6. Thus, when lever **42** is in that position, it will bear against surface **22'** while drawer D is closing and will cause lever **21** to pass behind its corresponding camming surface on plate **22**. As a result, lever **21** will not pivot during the closing of drawer D. When the bell mechanism has run down to a point where spring **35** moves the feeler **25** outwardly by a certain amount with respect to the circumference of spring **35**, a control slide **39**, to which one end of the feeler lever **25** is pivotally connected at **40**, is shifted to the right, causing the drawer spring **41**, one end of which is connected to the control slide **39** and the other end of which is connected to a lever **42**, to also be pulled to the right. This causes the lever **42**, which carries at its upper end a roller **44** and which is pivoted at **43**, to pivot to the right. In this position, roller **44** no longer comes into contact with the abutment surface **22'** of deflector plate **22**. The reason for this is that the roller **44** of the lever **42**, when it is in the vertical position depicted in FIGURE 6, presses against abutment incline **22'**, pivoting plate **22** clockwise to some extent, before the sleeve **21'** contacts the deflector plate **22**. Consequently, the lever **21** can move behind its associated camming surface on deflector plate **22** and thus does not undergo a pivotal movement, so that when the drawer is closed, the spiral spring of the bell mechanism will not be further wound up. When the bell mechanism has run down to a sufficient extent, the roller **44** will lie to the right of the position shown in FIGURE 2 so that the wind-up device once again becomes operative until the diameter of spring **35** is once again sufficiently reduced to cause spring **45** to pull the feeler lever **25** to the right. Thus, the wind-up device remains out of operation most of the time, thereby to prevent an overwinding of the spiral spring of the bell mechanism, it being unnecessary to provide the slip clutch required by the prior art devices.

An additional alarm device can be combined with the bell mechanism. This can be done, for example, by equipping the spiral spring with a contact so that when the spiral spring runs out, an electric circuit is closed.

It will thus be seen that, in accordance with the present invention, there is provided an arrangement incorporating the above-described T-shaped locking piece. Preferably, the cam surfaces of this locking piece do not coact directly with bearings which are provided on the stationary portion of the assembly, but on a locking hook plate which is pivotally mounted on a movable part of the device, which locking hook plate coacts with a bearing on the stationary portion of the device. This T-shaped, pivotally arranged locking piece has the advantage of being gravity-biased into either one of its two extreme positions which are mutually displaced by about 180°. Furthermore, if an additional locking hook plate is provided which lies on the cam, a pivotal movement is prevented.

It will also be seen that, in accordance with the present invention, the locking hook plate is mounted so as to be displaceable, within limits, with respect to the movable part of the device in the direction in which this movable part moves. Furthermore, the shaft of the locking hook plate is arranged in elongated slots, the arrangement being such that when there is transverse movement of the movable part, the shaft acts on a lever which triggers the alarm device.

It will also be seen that, in accordance with the present invention, there is provided a locking lever which is under the influence of a spring and which has an open notch in one end in which the shaft of the locking hook plate can engage to cause the alarm device to remain effective. The alarm device is put out of operation only when the correct levers, corresponding to the combination of keys which previously had been depressed, have been actuated, thereby to unlock the locking hook plate and the movable part.

As also described above, means are provided for winding up the alarm mechanism. While the same can be wound up by means of a special key, the structure according to the present invention makes it possible to wind up the alarm mechanism whenever the drawer is shut.

Also provided are means for preventing the overwinding of the spiral spring of the alarm mechanism, this being done without the need for the slip clutches used in the prior art devices.

It will be understood that the above description of the present invention is susceptible to various modifications, changes, and adaptation, and the same are intended to be comprehended within the meaning and range of equivalents of the appended claims.

What is claimed is:

1. A locking and alarm device for apparatus of the cash register type, which apparatus includes a stationary portion carrying a locking catch and a movable portion carrying a plurality of levers which are pivotable between a de-actuated position and an actuated position, said device comprising, in combination:

(a) locking means pivotably mounted on the movable

portion for pivoting between a locking position in which it engages the locking catch, thereby preventing the movable portion from moving with respect to the stationary portion, and an unlocking position in which it is clear of the catch and permits the movable portion to move with respect to the stationary portion;

(b) a plurality of pivotably mounted rocker means each controlled by a respective one of the levers to pivot to an active position when its associated lever is in its actuated position and to remain in an inactive position when its associated lever is not actuated;

(c) a plurality of positioning elements each pivotably mounted on a respective one of said rocker means, each said positioning element being settable, with respect to its associated rocker means, in a selected one of a first stable position and a second stable position, each said element pivoting through an angle of at least about 180° in moving between said stable positions, and each arranged, after having been set, for pivoting movement together with its associated rocker means, said positioning elements cooperating with said locking means for permitting said locking means to move to said unlocking position only if all of those rocker means whose associated positioning elements are in their said first position are pivoted to their said active position and all of those rocker means whose positioning elements are in their said second position remain in their said inactive position.

2. An arrangement as defined in claim **1** wherein each of said positioning elements is mounted to pivot between said first stable position in which it urges said locking means into its said locking position only when that one of said rocker means associated with said positioning element is in its said inactive position and said second stable position in which it urges said locking means into its said locking position only when that one of said rocker means associated with said positioning element is in its said active position.

3. An arrangement as defined in claim **1** wherein the apparatus is further equipped with an alarm device, said arrangement further comprising: housing means mounted on the movable portion; a bearing shaft supporting said locking means and mounted in said housing for undergoing a limited amount of linear movement parallel to the direction of movement of the movable portion with respect to the stationary portion; alarm triggering means; and a triggering lever pivotably mounted on said housing for actuating said triggering means when an attempt to move the movable portion causes said bearing shaft to undergo its said linear movement.

4. An arrangement as defined in claim **3** further comprising: a locking lever pivotably mounted on said housing and having a notch positioned to engage said bearing shaft to prevent said shaft from undergoing its said linear movement; and a first restraining spring connected to said locking lever for normally maintaining it in engagement with said bearing shaft.

5. An arrangement as defined in claim **4** wherein said locking lever is provided with camming means, said arrangement further comprising abutment means mounted on the stationary portion for engaging said camming means when the movable portion is permitted to move with respect to the stationary portion, said engagement causing said locking lever to pivot to a position where said bearing shaft is clear of said notch.

6. An arrangement as defined in claim **1** further including alarm means mounted on the movable portion, said alarm means comprising: a bell; a coil spring for ringing said bell; and ratchet means connected for winding said spring.

7. An arrangement as defined in claim **6**, further comprising: a winding lever pivotably mounted on the movable portion and connected to drive said ratchet means; lever driving means mounted on the stationary portion for undergoing a limited pivotal movement and having a bearing surface against which said winding lever slides when the movable portion moves with respect to the stationary portion for causing said winding lever to pivot and to drive said ratchet means, said lever driving means being formed to permit said winding lever to return to its original position before the movable portion has reached the end of its movement.

8. An arrangement as defined in claim **7** further comprising winding control means for preventing said spring from being overwound.

9. An arrangement as defined in claim **8** wherein said control means comprises: feeler means bearing against the outer coil of said coil spring; and linkage means driven by said feeler means and controlling said lever driving means for preventing said winding lever from coming in contact with said bearing surface when the diameter of said outer coil is less than a predetermined size.

References Cited

UNITED STATES PATENTS

1,644,957	10/1927	Sherman	235—22
1,856,971	5/1932	Sherman	235—22
1,900,519	3/1933	Piani	235—22
2,276,632	3/1942	Stelter et al.	340—274
2,484,597	10/1949	Wegele	70—88

STEPHEN J. TOMSKY, *Primary Examiner.*