J. H. SAFFORD.

ALARM SYSTEM.

APPLICATION FILED OCT. 15, 1915.

1,241,888.

Patented Oct. 2, 1917.

2 SHEETS—SHEET 1.

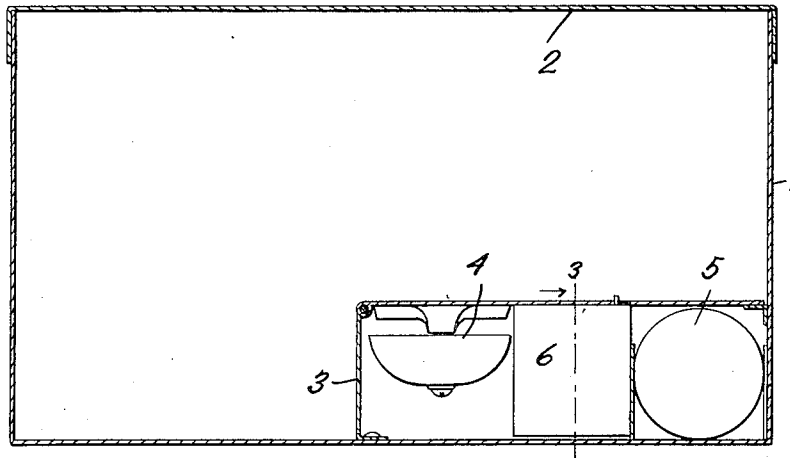
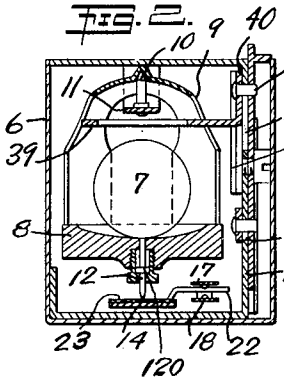


FIG. 1.

FIG. 2.



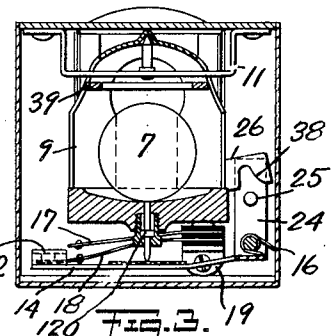


FIG. 3.

FIG. 4.

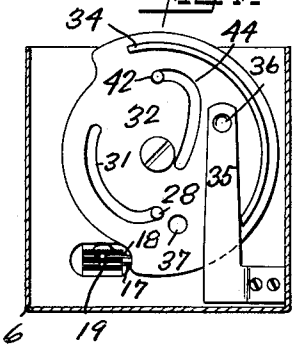
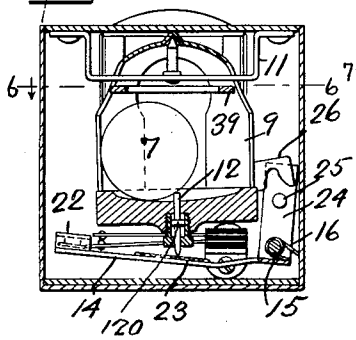


FIG. 5.



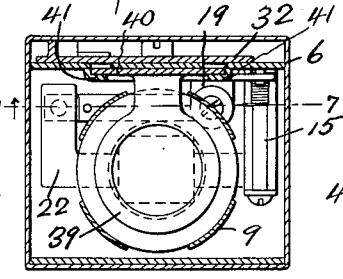
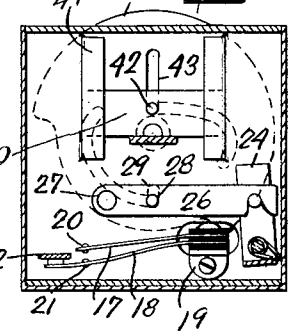


FIG. 6.

FIG. 7.



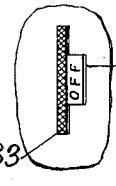


FIG. 8.

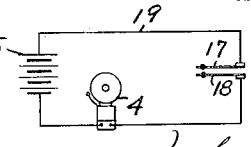


FIG. 9.

Witnesses:
J. Kozinn.
J. Howard Brees.

Inventor
John H. Safford
By his Attorney
M. J. Bissing.

J. H. SAFFORD.

ALARM SYSTEM.

APPLICATION FILED OCT. 15, 1915.

1,241,888.

Patented Oct. 2, 1917.

2 SHEETS—SHEET 2.

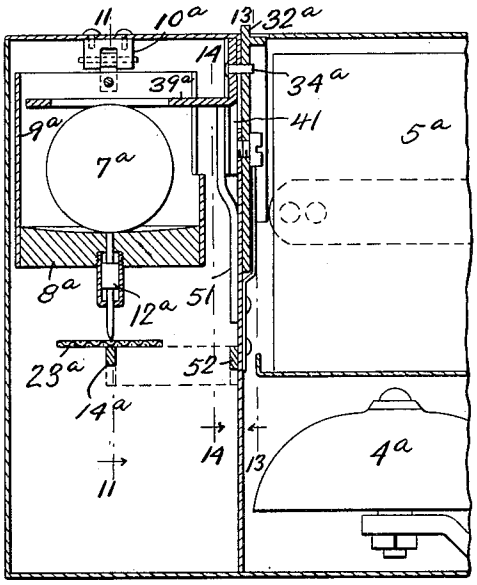


FIG. 10.

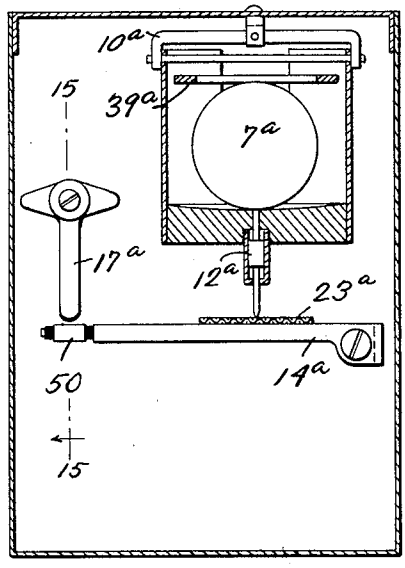


FIG. 11.

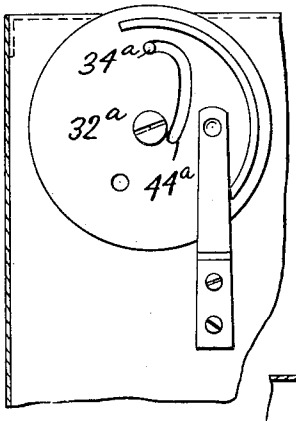
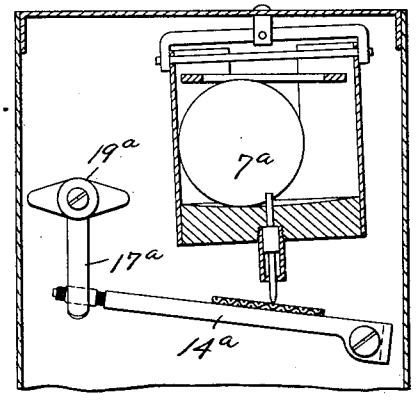


FIG. 13.

FIG. 12.



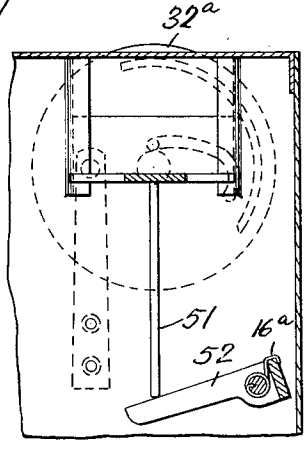


FIG. 14.

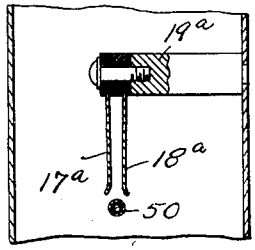


FIG. 15.

Witnesses:

J. J. Kozium

J. Hasbrouck Greene

Inventor

John H. Safford

By his Attorney

W. D. Bissing.

UNITED STATES PATENT OFFICE.

JOHN H. SAFFORD, OF BROOKLYN, NEW YORK.

ALARM SYSTEM.

1,241,888. Specification of Letters Patent. Patented Oct. 2, 1917.

Application filed October 15, 1915. Serial No. 56,020.

To all whom it may concern:

Be it known that I, JOHN H. SAFFORD, a citizen of the United States, residing in Brooklyn, Kings county, State of New York, have invented certain new and useful Improvements in Alarm Systems, of which the following is a specification.

My invention relates more particularly to alarm or signal systems, and is especially adapted for embodiment in safety chests, to give warning in event of the container being disturbed. A gravity-operated or gravity controlled device is used to close an electric circuit in the form of the invention illustrated to sound an alarm, and has for its active element a ball. The ball constitutes one form of a freely movable mass or weight which under the action of the force of gravity or under the action of inertia, when the safety chest is agitated or moved operates to release the alarm. This is disposed upon a concave platform, and one of the features of the invention comprises the mounting of this platform in such manner that it is self-leveling, thus avoiding the necessity of providing the container or supporting structure with leveling screws or the like. Furthermore, in accordance with the invention, means are provided for holding the platform when leveled against further movement under the influence of gravity, so that when the device is set for action disturbance of the box or support by jarring or tilting will not affect the platform but will cause the ball to roll relatively thereto. Means are also provided for rendering the mechanism or instrumentality controlled by the ball and platform device temporarily inoperative, so that for example, the alarm will not be sounded when the box is opened and moved by the owner, and in accordance with the invention the said means also operate to free the platform to swing to a level position on its universal support. When the controlled mechanism is unlocked or rendered operative, the platform is again held steady relatively to its support. Means are likewise provided for locking the ball and the platform against operative movement when desired. Further features and advantages of the invention will become apparent as the specification proceeds.

In the accompanying drawings illustrating the invention:

Figure 1 is a vertical section through a safety chest illustrating a manner of applying the system;

Fig. 2 is a vertical section through the gravity-operated device and the therewith related parts;

Fig. 3 is a vertical section taken at right angles to Fig. 2 on the line 3—3 of Fig. 1;

Fig. 4 is an elevation looking at the back of Fig. 3;

Fig. 5 is a view corresponding to Fig. 3 showing the parts in actuated condition;

Fig. 6 is a horizontal section on the line 6—6 of Fig. 5;

Fig. 7 is a vertical section on the line 7—7 of Fig. 6, looking in the opposite direction to Fig. 4;

Fig. 8 is a detail plan view;

Fig. 9 is a diagram illustrative of the electrical connections;

Fig. 10 is a fragmentary vertical section illustrating a modified construction;

Fig. 11 is a section taken on the line 11—11 of Fig. 10;

Fig. 12 is a view corresponding to Fig. 10, showing the parts in actuated condition;

Fig. 13 is a vertical section on the line 13—13 of Fig. 10;

Fig. 14 is a section on the line 14—14 of Fig. 10; and

Fig. 15 is a vertical section on the line 15—15 of Fig. 11.

The numeral 1 designates the body of a safety chest, and 2 its cover. The parts of the alarm may be incased within a suitable compartment 3 inside the chest. The alarm proper is represented as an electric bell 4, which is energized by current supplied from the battery 5. The means for controlling the operation of the alarm are preferably housed in a box 6.

Inside the box 6 is a freely movable

weight, which in the form of the invention shown, consists of a ball 7, which rests upon the concave upper surface of a platform 8, the said concave surface providing a recess with sloping walls. The said platform is provided with a cage 9, which confines the ball, and the top of which is formed to engage a point bearing 10 projecting vertically from a bracket 11. In this way the platform is universally suspended, so that, except as held in the manner hereafter described, it is free to move in any direction under the influence of gravity, thus assuming a level position irrespective of any slight inclination of the surface on which the chest 1 may be placed.

The means whereby movement of the ball 7 relatively to the platform 8 causes the operation of the controlled mechanism or instrumentalities preferably comprise a pin 12, which is mounted to slide vertically in the center of the platform 8 and which is normally held down by the ball. The devices controlled through this pin may be of various characters, but preferably comprise an electric switch, which in the present instance is adapted to close the circuit 13 including the battery 5 and the bell 4. In the particular construction illustrated a lever 14 is fulcrumed on a pivot 15 and adapted to bear at its intermediate portion upon the point of the pin 12, a spring 16 acting upon the lever so as to raise the latter and the pin whenever the ball 7 is displaced from its normal central position. The pin is separate from the lever and is carried by the platform, wherein it is guided and has free sliding movement. When the lever is depressed the pin descends of its own weight until its upper end is flush with the lowest or central portion of the platform surface. It will be understood that the parts are so proportioned that the weight of the ball 7 is such as to overcome the tension of the spring, which latter, however, is sufficiently strong to tilt the lever and thereby close the circuit when the ball is dislodged. The switch may, of course, be varied, but preferably comprises resilient leaves 17 and 18, insulated from each other at one end on a support 19 and carrying at their opposite ends contact knobs 20 and 21. The extremity of the lower leaf 18 underlies a right angular extension 22 of the lever 14, so that when the latter is held down by the ball 7, the leaf 18 is also held out of contact with the leaf 17, the circuit therefore being open. The tendency of the leaf 18 is to rise, so as to cause the contact points 20 and 21 to touch, and its tension is preferably such as to raise the leaf 17 slightly, in order that a rubbing contact may be produced. The ball 7 is sufficiently heavy to overcome the tension of the leaf 18 in addition to that of the spring 16, but when dislodged, as shown in Fig. 5, the leaf 18 is free to rise and close the circuit.

If the platform 8 were always free to respond to the action of gravity, the platform and ball would be likely to swing in unison, in event of interference with the chest, and this would not cause a sounding of the alarm. When the device is set for action, however, the platform is held steady with reference to its support by the engagement of the lever 14 with the pin 12. In order to make this engagement positive and to prevent sliding of the pin on the lever, the latter is provided with a roughened surface 23, preferably constituted by a section of fine wire mesh suitably affixed to the lever. The interengagement between the lever and pin thus secured is also of advantage in that the angular movement of the lever under the action of the spring 16 when the ball is dislodged operates to tilt the platform and thereby render the action of the device more delicate.

Means are provided for locking the controlled mechanism against operation and for permitting the self leveling action of the platform 8. Such means may be widely varied, but in the particular construction illustrated the lever 14 is provided with an upwardly projecting extension 24 carrying a horizontal pin 25. The latter is adapted to be engaged by a notched locking lever 26, which is fulcrumed at 27 and bears a pin 28. The latter pin passes through a slot 29 in the wall 30 and enters a cam groove 31 in an operating disk 32, which has a milled periphery 33 projecting through the top of the box 6 and a lateral flange 34 bearing designations, as indicated in Fig. 8. A spring detent 35, having a spherical boss 36 near its end to engage circular recesses such as shown at 37 in Fig. 4, constitutes means for holding the operating disk in predetermined positions. In the position shown in Fig. 4, the lock lever 26 is held in the raised or unlocked position of Figs. 3 and 5. When the disk is turned to the other position shown in Fig. 7, the lock lever is depressed so as to engage the pin 25 of the lever 23. The inclined wall 38 of the notch in the lock lever 26 is so formed as to force the pin 25 slightly to the left from the position shown in Fig. 3. This lowers the lever 23 sufficiently to disengage the roughened or recessed surface 23 from the point of the pin 12, the limiting collar or member 120 carried by the pin preventing the pin from following the lever. Under these conditions the platform 8 is free to swing under the influence of gravity, so as to level itself, and, the pin 12 being in its lowermost position, the ball 7 naturally takes up a central position on the platform directly over the top

of the pin. The lever 23, being held against upward movement, prevents the closing of the switch points 20 and 21. Therefore, the box may be handled or moved about without causing the alarm to ring. When the lock lever 26 is raised by the reverse operation of the disk 32, the lever 14 is free to operate upon displacement of the ball 7, and the platform 8 is held against further swinging movement because the spring 16 presses the wire mesh 23 up against the point of the slidable pin 12.

Means are also provided for holding the ball 7 against operative movement on the platform, which is desirable for purposes of shipment. To this end a ring or clamp 39 is disposed normally at a distance above the ball and has a right angular extension 40, which is adapted to slide vertically in guides 41. Said extension is provided with a pin 42, which passes through a slot 43 in the wall 30 and enters another cam slot 44 in the disk 32. The relation of the two cam slots 31 and 44 is such that movement of the disk 32 in one direction serves to lock the platform 8 against swinging and the ball 7 against rolling. During the first part of the movement from the position shown in Fig. 4, however, the pin 42 of the ball clamp 39 is substantially unaffected, because this portion of the cam slot 44 is approximately concentric with the axis of rotation. The cam slot 31, on the other hand, is so formed as to produce movement of the pin 28 of the lock lever 26 almost immediately. Thus, by moving the disk 32 a certain extent the switch-controlling lever 14 may be locked and the platform 8 freed of its restraint, while the ball retainer 9 is still clear of the ball 7. Upon further movement of the disk 32, the pin 28 rides in a substantially concentric portion of the slot 31, whereas the pin 42 is progressively lowered until the ring 39 encircles the ball. At this time, it will be understood, the lever 23 is spaced from the lower end of the pin 12, so that the platform would be free to swing except that the ring 39 in its lowermost position clamps the ball, and thereby the platform, against movement. In this condition the alarm or controlled mechanism is held inoperative and the ball and platform are both held immovable. In the normal or set condition, the alarm or controlled mechanism is unlocked, the lock lever 26 being raised, the platform is held steady by the engagement of the portion 23 of the lever 14 with the pin 12, and the ball 7 is free to roll. In an intermediate position of the disk 32 the alarm or controlled mechanism is rendered inoperative and the platform is freed for movement on its universal suspension, but the ball and platform locking means 39 is not in operation.

Figs. 10 to 15 illustrate a modified form of the gravity-operated device and switch, and different relative positions of the bell 4^a and battery 5^a. Here the platform 8^a with its cage 9^a is supported universally by a gimbal joint 10^a having the same effect as the point bearing 10 of the other construction. The lever 14^a, bearing the wire mesh 23^a for engagement with the slidable pin 12^a, carries at its end an insulated contact 50, which is adapted to enter between two spring terminals 17^a and 18^a insulated from each other on a support 19^a. In the normal position shown in Fig. 11, the contact 50 is below the terminals, but when the ball becomes displaced, as shown in Fig. 12, the lever is raised by its spring 16^a to the position shown in this figure, so as to close the circuit.

The operating disk 32^a in this instance is formed with a single cam slot 44^a, which acts upon the pin 34^a of a ball retainer 39^a. This ball retainer has a downward-projecting finger 51, which extends into proximity to an arm 52, which is united with the lever 14^a. By this means, depression of the ball retainer also lowers the lever 14^a out of engagement with the pin 12^a (said pin carrying a suitable collar for limiting its motion), prevents closing of the circuit, and permits the platform 8^a to take up a level position. The relationships are such that the movement of the disk 32^a from the position shown in Fig. 12 lowers the lever 52 and holds it inoperative, while the same movement locks the ball 7^a.

The operation of the apparatus will now be summarized. When the device is set for action the parts are in the position shown in Figs. 2 and 3 or 10 and 11. In this condition the universally suspended platform is held against swinging by the engagement of the roughened surface 23 or 23^a of the lever 14 or 14^a with the lower end of the pin 12 or 12^a and the ball 7 or 7^a is at the center of the platform directly over this pin, which is consequently kept from rising under the pressure of the spring 16, which tends to tilt the lever 14 or 14^a upward. If now the device be agitated, the ball 7 is dislodged from its central position and the pin and lever are permitted to rise. This closes the circuit and the alarm continues to sound until the parts are reset. The pin when raised prevents the return of the ball to the center. The resetting of the parts is accomplished by turning the disk 32 or 32^a sufficiently to lower the lever 14 or 14^a, thus permitting the pin 12 or 12^a to drop and the ball to reassume its central position over the upper end of the pin. Upon now turning the controlling disk back to normal position the lever is freed to press upward again upon the lower end of the pin, which,

however, is kept from rising because of the weight of the ball. If it is desired to render the device inoperative and hold the parts against movement, the disk 32 or 32ª is turned sufficiently to lower the lever 14 or 14ª and to hold it against all possibility of rising to complete the circuit, at the same time bringing the ball retainer 39 or 39ª down into position preventing movement of the ball or of the platform.

What I claim as new is:

1. The combination in a safety chest of gravity means within the chest comprising a platform, a universal support therefor, a ball on the platform, and suitable instrumentalities controlled by the ball.

2. A gravity operated controlling device for safety chests comprising a self-leveling recessed platform and a ball thereon.

3. A gravity operated controlling device for safety chests comprising a platform, a universal suspension therefor, a ball on the platform, and means for holding the platform against movement on its suspension.

4. A controlling device for an alarm comprising a platform provided with a recess having sloping walls, a suspension therefor, a ball on the platform and means whereby the ball controls an electric contact.

5. Gravity-operated means for controlling an alarm comprising a self leveling platform and a ball thereon.

6. Gravity-operated means for controlling an alarm comprising a platform having a universal mounting and supporting a ball, and means for holding said platform against movement on its mounting when the device is set for action.

7. Means for causing the operation of an alarm comprising a universally suspended, self-leveling recessed platform supporting a ball and means for holding the platform against movement on its suspension when set for action.

8. The combination in a safety chest of a platform, a universal suspension permitting the platform to be self-leveling, a ball on the platform, suitable instrumentalities adapted to be actuated upon displacement of the ball from central position on the platform, and means for holding the platform against movement on its suspension.

9. The combination in a safety chest of an electric circuit, a concave platform, a ball thereon controlling said circuit, means whereby said platform is self-leveling, and means for holding the platform in leveled condition.

10. The combination in a safety chest of a universally suspended platform, means for holding the platform against movement on its suspension, a ball on the platform, a switch, and suitable means whereby said ball controls said switch.

11. A gravity operated device for safety chests, comprising a universally suspended platform, a ball thereon, and a central pin in the platform normally held down by the ball and adapted to rise upon displacement thereof.

12. In gravity-controlled mechanism for safety chests, a platform, means for supporting the same so as to find its own level, a ball on the platform, a central pin therein normally held down by the ball, a part normally held down by said pin, and means of interengagement between said pin and part whereby the latter normally holds said platform against movement on its support.

13. In gravity-controlled mechanism for safety chests, a platform, means for supporting the same so as to find its own level, a ball on the platform, a central pin therein normally held down by the ball, and a member having a roughened portion normally engaging and held down by said pin, said member being urged so as to cause said roughened portion to press upward against the pin.

14. The combination in a safety chest, of a platform, means for supporting the same so as to find its own level, a ball on the platform, a central pin therein normally held down by the ball, a member engaging the pin, and an alarm controlled by said member.

15. The combination in a safety chest of a platform, means for supporting the same so as to find its own level, a ball on the platform, a central pin therein normally held down by the ball, and a part engaging the pin and normally held inoperative thereby and in turn holding said platform against movement, said part controlling an alarm.

16. Gravity controlled apparatus for safety chests, comprising a platform, means whereby the platform is self-leveling, a ball on the platform, suitable means controlled by said ball, and means whereby said controlled means may be rendered inoperative and the platform freed to find its level.

17. In an alarm system, the combination of a platform, a universal suspension therefor, means for holding the platform, a ball on the platform, an alarm controlled by the ball, and means for rendering said alarm inoperative at the same time freeing said platform to find its level.

18. Gravity controlled apparatus for safety chests, comprising a platform, a universal support therefor, a ball on the platform, a slidable pin in the platform normally held down by said ball, a suitable part normally engaging with and held against movement by said pin, and means for removing said part from the pin at will.

19. Gravity controlled apparatus for

safety chests, comprising a platform, a ball thereon, a universal suspension for the platform, a slidable pin on the platform normally depressed by said ball, mechanism adapted to be released by upward movement of the pin and normally engaged therewith, and means operable at will to hold said mechanism against operation and to disengage the same from the pin.

20. In gravity controlled mechanism for safety chests, a universally supported platform, a pin slidably guided therein, a ball adapted to hold said pin down, and a suitable part engaging and separate from the pin and normally held depressed thereby.

21. In a gravity controlled mechanism for safety chests, a platform, a ball thereon, a ball retainer, and means for moving said retainer at will into and out of operative position.

22. In gravity controlled mechanisms for safety chests, a self-leveling platform, a ball thereon, and means engageable at will with the ball to hold the same and the platform immovable.

23. In gravity controlled mechanisms for safety chests, a self-leveling platform, a ball thereon, a slidable pin in the platform normally held down by the ball, a controlled part separate from and normally pressing up against the pin and thereby holding the platform steady, and means operable at will for removing said part from the pin and for holding the ball and platform against operative movement.

24. In gravity controlled mechanisms for safety chests, a self-leveling platform, a ball thereon, a slidable pin in the platform normally held down by the ball, a controlled part separate from and normally pressing up against the pin and thereby holding the platform steady, means for locking said part out of engagement with the pin, means for locking the ball and platform, and a common device for operating both said locking means at will.

25. In gravity controlled mechanisms for safety chests, a self-leveling platform, a ball thereon, a slidable pin in the platform normally held down by the ball, a controlled part separate from and normally pressing up against the pin and thereby holding the platform steady, means for locking said parts out of engagement with the pin, means for locking the ball and platform, and a common device for operating both said locking means at will, said device being operable to lock the said controlled part out of engagement with the pin while leaving the ball and platform free.

26. In gravity controlled mechanisms for safety chests, a self leveling platform, a ball thereon, a slidable pin in the platform normally held down by the ball, a controlled part separate from and normally pressing upward against the pin and thereby holding the platform steady, means for holding said part inoperative away from the pin, and a cam disk connected with said means.

27. In gravity controlled mechanisms for safety chests, a self leveling platform, a ball thereon, a slidable pin in the platform normally held down by the ball, a controlled part separate from and normally pressing upward against the pin and thereby holding the platform steady, means for holding said part inoperative away from the pin, means for holding the ball and platform substantially immovable, and a cam disk adapted to operate both said means.

28. In gravity controlled mechanisms for safety chests, a platform, a ball thereon, a cage surmounting said platform and confining the ball, and a universal suspension for the platform and cage.

29. In gravity controlled mechanisms for safety chests, a platform, a ball thereon, a cage surmounting said platform and confining the ball, a universal suspension for the platform and cage, a slidable pin mounted in the platform and normally held down by the ball, and a controlled part normally pressing upward against the pin.

30. In gravity controlled mechanisms for safety chests, the combination of a self leveling platform, a ball thereon, a slidable pin carried by the platform and normally held down by the ball, a controlled part adapted to press upward against the pin, and means for preventing slippage between said part and the point of the pin.

31. In gravity controlled mechanisms for safety chests, the combination of a self leveling platform, a ball thereon, a slidable pin carried by the platform and normally held down by the ball, and a tilting spring-urged part arranged to press upward against said pin and having its engaging portion roughened.

32. A controlling device for an alarm comprising a suspended platform tending to seek a normal position of rest, a pin carried by the platform, and a freely movable weight for normally holding down said pin, said pin being adapted to move upon displacement of said weight.

33. A device for alarms comprising a support, a suspension therefor, a movable part carried by the support for controlling the actuation of the alarm, a freely movable weight for normally holding down the part and means for holding the support against movement on its suspension.

34. A gravity device for alarms comprising a support, means for holding the support, a suspension therefor, a movable pin carried by the support, a freely movable weight coöperating with said pin and means

for rendering the alarm inoperative at the same time freeing the support to find its level.

35. In gravity controlled mechanisms for alarms, a support, a slidable pin carried by the support, a suspension therefor, a gravity controlled device normally holding said pin down, a part normally pressing up against the pin and thereby holding the support steady, and means operable at will for removing said part from the pin and for holding the support substantially immovable.

36. In gravity controlled mechanisms for alarms, a platform, a suspension therefor, a slidable pin carried by the platform, a gravity controlled device normally holding said pin down, a part normally pressing up against the pin and thereby holding the support steady, means operable at will for removing said part from the pin and for holding the support substantially immovable, and a cam disk connected with said means.

37. In a controlling mechanism for alarms, the combination of a platform, means for supporting said platform so as to find its own level, a pin carried by the platform a limiting member carried by said pin, a freely movable weight coöperating with said pin, a member having a roughened portion normally engaging and held down by the said pin and means for urging said roughened member upwardly so as to press against the pin.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

JOHN H. SAFFORD.

Witnesses:

LOUELLA F. LETTLE,

J. HOWARD BREESE.