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C. H. GREEN.
COIN DETECTOR.

APPLICATION FILED JAN. 7, 1915.

1,154,919.

Patented Sept. 28, 1915.

2 SHEETS—SHEET 1.

Fig. 2.

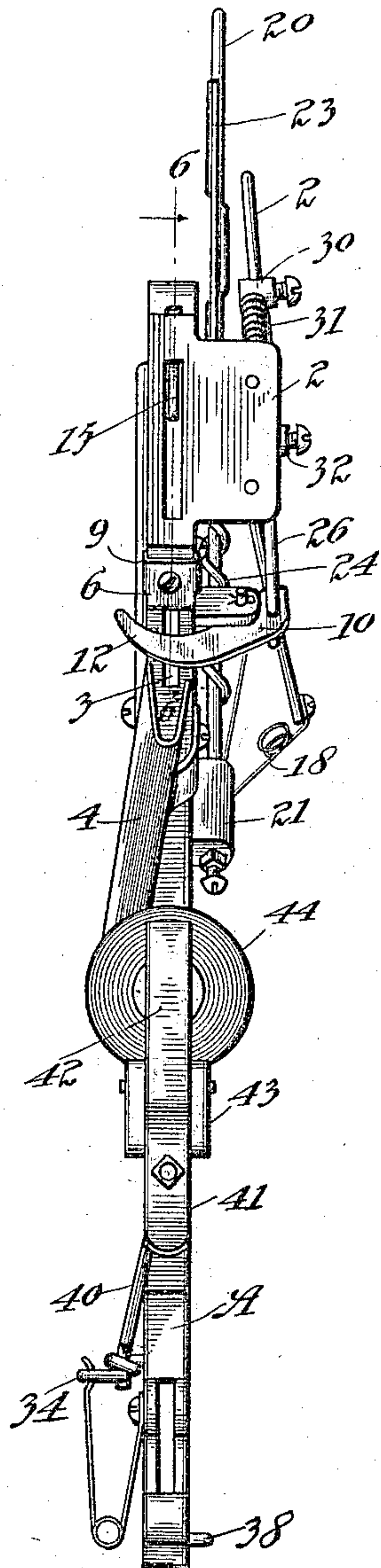
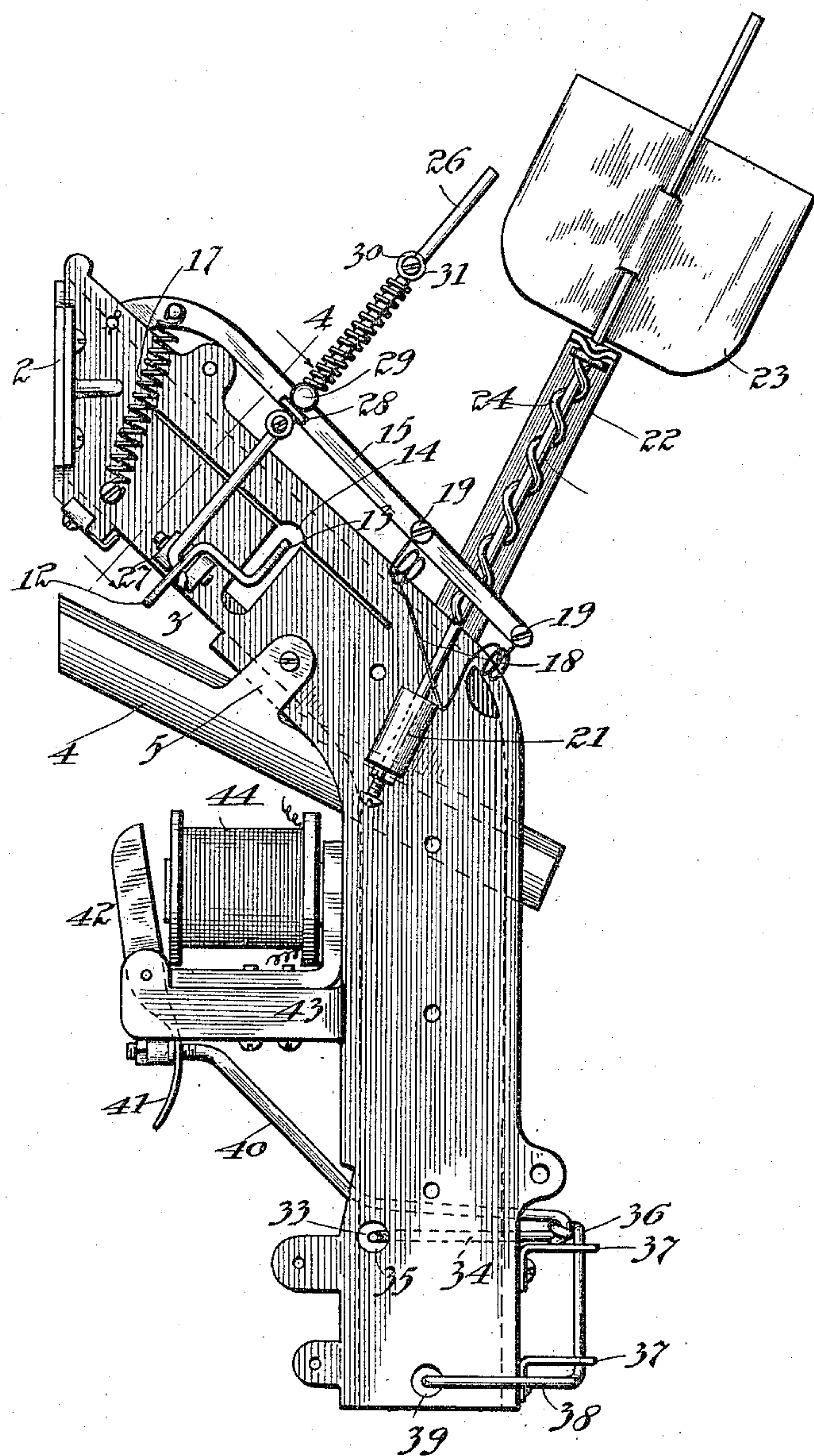


Fig. 1.



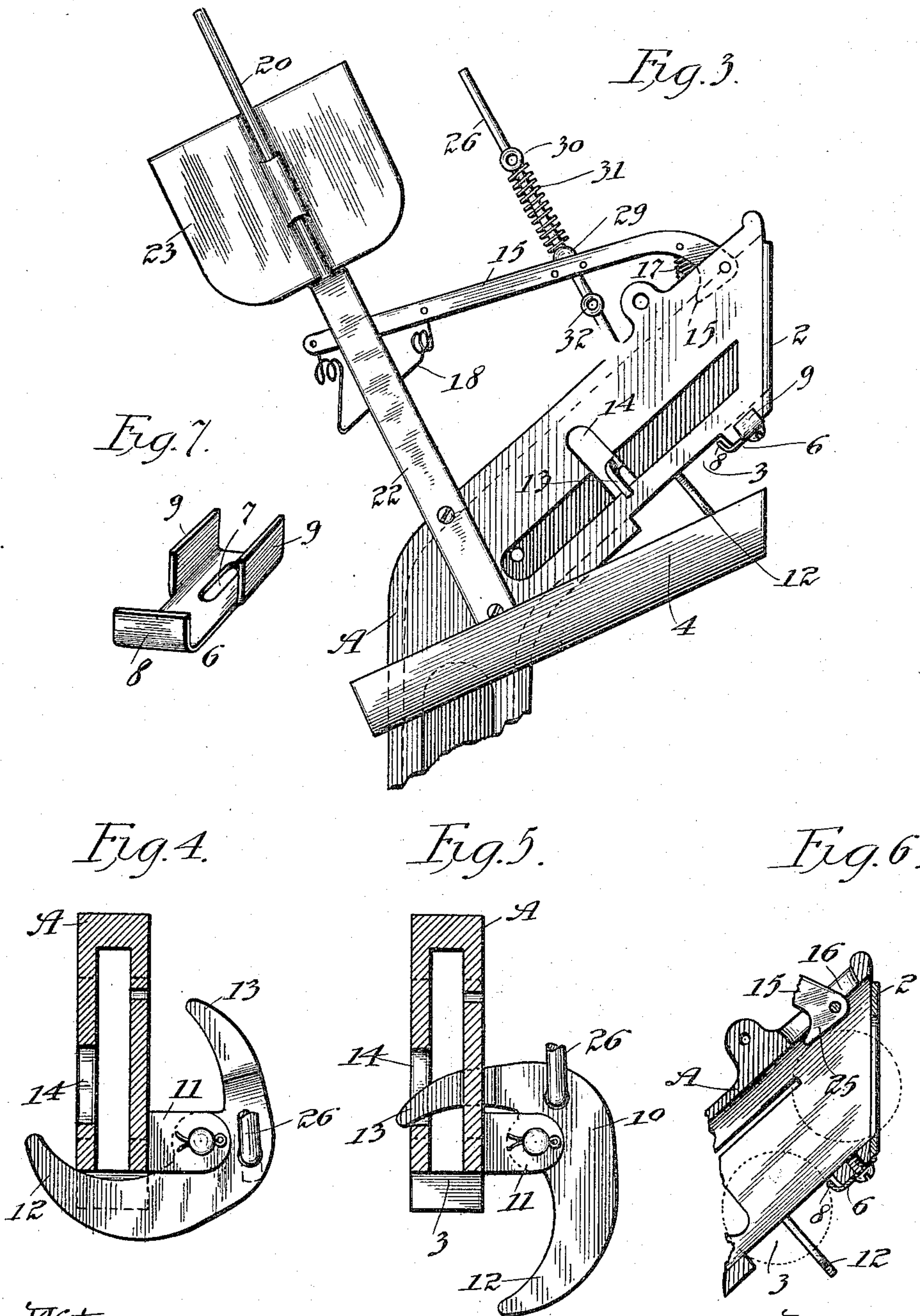
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Robert F. Weir
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Clifford H. Green,
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Atty.

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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

CLIFFORD H. GREEN, OF GRAND RAPIDS, MICHIGAN, ASSIGNOR TO NATIONAL PIANO MANUFACTURING COMPANY, OF GRAND RAPIDS, MICHIGAN, A CORPORATION OF ILLINOIS.

COIN-DETECTOR.

1,154,919.

Specification of Letters Patent.

Patented Sept. 28, 1915.

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To all whom it may concern:

Be it known that I, CLIFFORD H. GREEN, a citizen of the United States, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented new and useful Improvements in Coin-Detectors, of which the following is a full, clear, and exact description.

My invention relates to coin detectors designed for use in connection with coin-operated automatic piano players, and other coin-operated machines.

The object of my invention is to detect spurious coins by the difference in diameter between them and a good coin of the denomination for which they are substituted, and to retain and send the good coins down through the chute in payment of the service rendered and eject the spurious coins and counterfeit substitutes before they can reach the discharge end of the chute. This I accomplish by the means hereinafter fully described and as particularly pointed out in the claims.

In the drawings: Figure 1 is a side view of a coin chute detached from the mechanical contrivance in connection with which it is designed to be used, and having my improvements applied thereto. Fig. 2 is a front edge view of the same. Fig. 3 is a side view of the upper broken away portion of the chute looking at the side opposite that shown in Fig. 1. Figs. 4 and 5 are transverse sections of the chute taken on dotted line 4, 4, Fig. 1, and illustrating different positions of the escapement for retaining the good coins in and ejecting the counterfeits from the chute. Fig. 6 is a longitudinal section of a fragment of the upper end of the chute taken on dotted line 6, Fig. 2. Fig. 7 is a detail view showing the gage-plate in perspective.

The drawings show a coin-chute A, the upper portion of which is inclined downward to and discharges into the lower vertical portion that constitutes a continuation thereof. The throat of this chute is, preferably, of the same dimensions throughout its length, and its upper end or entrance is guarded by a suitably attached escutcheon 2 that has a suitable vertically elongated slot therein of just the proper dimensions to permit the insertion therethrough of the coin desired to be used in connection with

the detector. A short distance to the rear of the upper end thereof the under edge of the chute is cut away for a distance slightly greater than the diameter of the nickel to form an escape-opening 3.

Ordinarily any kind of a coin token will immediately fall through the escape-opening 3 into the upper portion of a trough 4, which latter consists of a suitable length of sheet metal bent V-shaped in cross-section and secured to the side of the chute by a lug 5. This trough has its upper end portion under the upper portion of said chute and it extends obliquely downward past the side of the chute opposite to which its lug 5 is attached. Slugs or counterfeit coins falling into this trough are conveyed thereby to any point desired. The diameter of a good coin is always the same, in view of the great care and the accurate machinery employed in its manufacture, and is slightly greater in diameter than the slugs or counterfeits substituted therefor. The good coin is prevented from falling through escape-opening 3 by means of a gage-plate 6 consisting of a strip of sheet metal having a longitudinally elongated slot 7 near its upper end through which a set-screw is passed that is tapped into the under edge of the chute between the escape and its upper end and secures said gage-plate thereto. The lower end of this gage-plate is bent upward to form a guard 8 which extends into the escape-opening a short distance, but not enough to reach the inclined plane of the floor of the upper portion of the chute. This gage-plate can be adjusted longitudinally to determine the length of the escape opening so as to prevent the good coin from falling through into the discharge trough and supports it about in the position shown in dotted lines in Fig. 6 of the drawings, and yet permits the counterfeit coin or slug to fall through. The sides of the upper end of the gage is provided with upwardly extending wings 9, 9, that lap against the sides of the chute and prevent its twisting in the axis of the set-screw.

The purpose of retaining the good coin in the escape opening is to enable it to be pushed or kicked back into the throat of the chute so that it can continue its course through the same. The good coin is pushed back into the throat of the chute by means

of a transversely disposed somewhat crescent shaped escapement 10 that is pivoted about its center of length between pivotal lugs 11 projecting from the side of the chute opposite that past which the discharge trough extends, in such position that the lower horn 12 can swing up under the center of length of the escape-opening of the chute, and kick said good coin back into the chute. The upper horn 13 of the escapement is offset toward the lower end of the inclined chute, and when the escapement is moved so that the lower horn moves away from escape opening 3 it moves through slots 14 in the side of the chute.

It will be apparent that every coin or substitute therefor must be stopped long enough to permit it to fall into the escape opening. This fact, and the further fact that the lower horn must swing up under the escape-opening every time a coin or its substitute is inserted in the chute, makes it necessary for the movement of the escapement to be retarded a certain length of time to permit the slug or substitute for the coin to fall through the escape-opening into the discharge trough before the lower horn 12 moves up under said opening, as shown in Fig. 4 of the drawings. This requires a timing device for delaying the movement of the escapement. When the coin or substitute therefor is pushed through the escutcheon into the chute it engages the short end of a lever 15, which is pivoted just above the horizontal plane of the upper end of the coin slot of the escutcheon, in a suitable longitudinally extending opening 16 in the upper end of the upper edge of the chute immediately back of the escutcheon. The longer end of the lever 15 extends obliquely to the rear practically over the chute a distance slightly beyond the vertical plane of the rear vertical edge of the vertical portion of the same, and this lever is kept in such a position that its longer arm is practically parallel to the upper edge of the inclined portion of the chute, substantially as shown in Fig. 1 of the drawings, by a spring 17, that connects it, at a point slightly to the rear of its fulcrum, to the side of the chute. The rear end of lever 15 is provided with a wire-detent 18 the ends of which are secured by means of screws 19, 19, to the lever. Next its ends this detent is coiled to give it greater resiliency, and is bent laterally toward the vertical plane of the adjacent sides of the chute so that the substantially straight stretch of the wire between its coiled portions will bear against an upwardly and rearwardly extending shaft 20. The lower end of this shaft is suitably journaled in bearings 21 that are, preferably, cast in one piece with the side of the chute, and its upper part is journaled in the horizontally bent upper end of a post

22 whose lower end is secured in any suitable manner to the side of chute A opposite that from which bearings 21 project. The upper end of shaft 20 extends through its bearings a suitable distance and has butterfly vanes 23 secured thereto. These vanes consist of a single piece of sheet-metal having a knuckle made midway between its vertically disposed edges up through which the shaft extends. Between its bearings shaft 20 is surrounded by a spiral wire 24 the lower end of which terminates a suitable distance above its lower bearing. When a coin is pushed into the chute and engages the upper short end or beak 25 of lever 15 the rear end of said lever is raised into the position shown in Fig. 3 of the drawings, and the straight portion of the wire-detent 18 will engage the spiral wire as the lever is pulled back to its normal lower position by spring 17. This engagement causes shaft 20 to revolve and the air resists vanes 23 and prevents the too rapid movement of the shaft, and thus retards the downward movement of the lever, but when the detent reaches the lower end of the spiral the resistance to the downward movement of the lever is removed and it drops quickly to the lower limit of its movement, and in doing so imparts a quick movement to the escapement that causes horn 12 thereof to kick upward into opening 31.

In order to utilize the action of the device just described to operate the escapement mechanism in the manner desired, I have provided a rod 26, the lower end of which is bent laterally and extends through a suitable opening in the center of length of the escapement and is retained therein by bending its extremity downward. The upper part of this rod extends through a lateral lug 28 projecting from the side of lever 15, and between a suitable boss loosely mounted on the rod just above lug 28 and a longitudinally adjustable stop 30, the rod is surrounded by a coil expansion spring 31. This stop 30 consists of a short interiorly screw-threaded tubular member through which rod 26 extends in a transaxial direction, and a set-screw, which is tapped into the tubular member and bites the rod and maintains the tubular member in any position desired. When lever 15 begins to rise lug 28 engages and commences to compress spring 31, which latter presses against stop 30, and through the medium of rod 26 causes escapement 10 to be moved into the position shown in Fig. 5, at the same time the detent 18 reaches the upper limit of the spiral 24 on shaft 20. Spring 31 compresses until lever 15 reaches the limit of its upward movement, and then commences to expand, but neither this expansion nor the downward movement of the lever 15 affects the escapement until said lever engages stop

32 on rod 26, whereupon the continued downward movement of the lever moves the escapement into the position shown in Fig. 4 of the drawings.

5 When the good coin has been pushed back into the throat of the chute it falls until it reaches the lower portion of the vertical part of the chute and until it is stopped by the laterally bent end 33 of an arm 34, which latter extends through lateral open- 10 ings 35 in the side walls of the chute near the front edge of the same. Arm 34 projects forward from the upper laterally bent end of a vertical spindle 36 that is journaled in 15 brackets 37, 37, secured to and projecting rearwardly from the rear vertical edge of the chute near its lower discharge end. The lower end of spindle 36 is bent laterally in the opposite direction to the laterally bent 20 upper end and has a forwardly projecting arm 38 that laps against the vertical side of the chute opposite the post to which arm 34 extends. Arm 38 is bent laterally and extends through opening 39 in the side- 25 walls of the chute near its lower end.

In operation, when the forward extremity of arm 38 extends through openings 39 the forward extremity of arm 34 will be with- 30 drawn from openings 35, and vice-versa. Spindle 36 is rocked so as to accomplish this action of the arms, 34 and 38, by means of a connecting-rod 40, which latter has one end pivotally connected to the laterally bent 35 upper end of spindle 36, and from thence extending through the lower extended end 41 of an armature 42. This armature is pivoted in the forward end of a bracket 43 secured to and projecting forward from the 40 forward edge of the vertical portion of the chute, and said armature is attracted by the electro-magnet 44 mounted upon bracket 43, which magnet is energized at stated intervals in a manner which it is unnecessary 45 to detail.

What I claim as new is:

1. In a device of the class described, a chute having an escape opening, an irregular shaped member adapted in one position 50 to prevent a coin from passing down through said chute beyond said escape-opening when the latter is open and in another position to open said chute and close the passage through said escape-opening, and means for 55 moving said member.

2. In a device of the class described, a chute having an escape-opening, a crescent shaped member adapted in one position to 60 prevent a coin from passing down through said chute beyond said escape-opening when the latter is open and in another position to open said chute and close the passage through said escape-opening, and means for 65 moving said member.

3. In a device of the class described, a

chute having an escape-opening, an adjust- able plate secured to the chute for regulating the size of the opening, a movable escape- 70 ment controlling both the coin escape-open- ing and the chute opening, and means for moving said escapement.

4. In a device of the class described, a chute having an escape-opening, an adjust- 75 able plate secured to the chute for regulat- ing the size of the opening, a movable es- capement having a crescent-shaped member controlling both the escape-opening and the chute opening, and means for moving said escapement.

5. In a device of the class described, a 80 chute having an escape-opening, a crescent shaped pivotal member which in one po- sition closes the chute and opens the coin escape-opening and in another position 85 opens the chute and closes the escape open- ing, and means for moving said crescent shaped member on its pivot.

6. In a coin detector, the combination with a chute, the downwardly inclined intake 90 portion of which has an elongated escape- opening in the lower edge thereof, and de- vices for regulating the size of the passage through said chute, of a substantially cres- cent-shaped escapement which is adapted 95 when in one position to prevent a coin pass- ing down said chute beyond said escape- opening when the latter is open for the pas- sage of the coin, and when in another po- sition to prevent the passage of a coin 100 through the chute and to close the escape- opening, and means for moving said escape- ment from one position to another.

7. In a coin detector, the combination with a chute the downwardly inclined intake 105 portion of which has an elongated escape- opening in the under edge thereof, of an escapement comprising a substantially cres- cent shaped member fulcrumed between its ends which at its extreme movement in one direction closes the throat of said chute at 110 a point just beyond said escape opening and opens the passage through said opening, and at the limit of its movement in the op- posite direction closes the passage through said opening and opens said throat, and 115 means for moving said escapement from one position to another.

8. In a coin detector, the combination with a chute the downwardly inclined intake 120 portion of which has an elongated escape- opening in the under edge thereof, and a longitudinally adjustable plate secured to the under edge of the chute at one end of said opening for regulating the length of the passage through the latter, of an escape- 125 ment which in one position is adapted to prevent a coin from passing down through said chute beyond said escape opening when the latter is open to the passage of the coin, and in its other position opens said chute 130

and closes said escape opening, and means for moving said escapement from one position to another.

9. In a coin detector, the combination with a chute the downwardly inclined intake portion of which has an elongated escape-opening in the under edge thereof, and a longitudinally adjustable plate secured to the under edge of the chute at one end of said opening for regulating the length of the passage through the latter, of an escapement comprising a suitable crescent shaped member which is adapted when in one position to prevent a coin from passing down through said chute beyond said escape opening when the latter is open to the passage of the coin, and when in its opposite position is adapted to open said chute and close the passage through said opening, and means for moving said escapement from one position to another.

10. In a coin detector, the combination with a chute the downwardly inclined intake portion of which has an elongated escape opening in the under edge thereof, of an escapement comprising a substantially crescent shaped member which is pivoted between its ends which in one position closes the throat of the chute and opens the passage through said openings, and vice-versa, a lever pivoted to the chute near the upper end thereof and having its shorter arm or beak projecting into the throat of the chute near its entrance, and means actuated by said lever for timing the movement of said escapement.

11. In a coin detector, the combination with a chute the downwardly inclined intake portion of which has an elongated escape opening in the under edge thereof, of an escapement comprising a substantially crescent shaped member which is pivoted between its ends, which in one position closes the throat of the chute and opens the passage through said opening and in its other position opens said chute and closes the escape opening, a lever pivoted to the chute near the upper end thereof and having its shorter arm or beak projecting into the throat of the chute near its entrance, and means, including a revolving shaft with butterfly vanes actuated by said lever, for timing the movement of said escapement.

12. In a coin detector, the combination with a chute the downwardly inclined intake portion of which has an elongated escape opening in the under edge thereof, of an escapement comprising a substantially crescent shaped member which is pivoted between its ends, which in one position closes the throat of the chute and opens the passage through said opening and in its other position opens said chute and closes the escape opening, a lever pivoted to the chute near the upper end thereof whose shorter

arm or beak projects into the throat of the chute near its entrance, and means including a revoluble shaft having a suitable spiral surrounding the same which is engaged by a detent attached to said lever; said shaft having butterfly vanes and adapted to time the operation of said escapement.

13. In a coin detector, the combination with a chute the downwardly inclined intake portion of which has an elongated escape-opening in the under edge thereof, and a longitudinally adjustable gage-plate for regulating the length of the passage of said escape-opening, of an escapement comprising a substantially crescent shaped member which is pivoted between its ends, which in one position closes the throat of the chute and opens the passage through said opening and in the other position opens said throat and closes said opening, a lever pivoted to the chute near the upper end thereof and having its shorter arm or beak projecting into the throat of the chute near its entrance, and means including a revoluble shaft having a suitable spiral surrounding the same which is engaged by a detent attached to said lever; said shaft having butterfly vanes and adapted to time the operation of said escapement.

14. In a coin detector, the combination with a chute the downwardly inclined intake portion of which has an elongated escape-opening in the under edge thereof, of an escapement comprising a substantially crescent shaped member which is pivoted between its ends, which in one position closes the throat of the chute and opens the passage through said opening and in its other position opens said chute and closes said opening, a spring depressed lever pivoted to the chute near the upper end thereof and having its shorter arm or beak projecting into the throat of the chute near its entrance, and means including a revoluble shaft having a suitable spiral surrounding the same which is engaged by a suitable detent attached to said lever; said shaft having butterfly vanes and adapted to time the operation of said escapement.

15. In a coin detector, the combination with a chute the downwardly inclined intake portion of which has an elongated escape-opening in the under edge thereof, of an escapement comprising a substantially crescent shaped member which is pivoted between its ends, which in one position closes the throat of the chute and opens the passage through said opening and in its other position opens said chute and closes said opening, a graduated spring depressed lever pivoted to the chute near the upper end thereof and having its shorter arm or beak projecting into the throat of the chute near its entrance, and means including a revoluble shaft having a suitable spiral sur-

rounding the same which is engaged by a detent attached to said lever; said shaft having butterfly vanes and adapted to time the operation of said escapement.

5 16. In a coin detector, the combination with a chute the downwardly inclined intake portion of which has an elongated escape-opening in the under edge thereof, of
10 an escapement comprising a substantially crescent shaped member which is pivoted between its ends, which in one position closes the throat of the chute and opens the pas-
15 sage through said opening and in its other position opens said chute and closes said opening, a lever pivoted to the chute near the upper end thereof and having its shorter arm or beak projecting into the throat of
20 the chute near its entrance, and means including a revoluble shaft having a suitable spiral surrounding the same which is engaged by a resilient wire detent attached to said lever; said shaft having butterfly vanes and adapted to time the operation of said escapement.

25 17. In a coin detector, the combination with a chute the downwardly inclined intake portion of which has an elongated escape-opening in the under edge thereof, of
30 an escapement comprising a substantially crescent shaped transversely disposed member which is pivoted between its ends and one end of which is adapted to move through openings in the sides of said chute
35 and the other under said escape opening, a lever fulcrumed adjacent its upper end and having its shorter branch enter the throat of said chute, a contraction spring connecting the same to said chute, a rod pivotally

connected to said crescent shaped member and extending through a projection from 40 said lever, stops mounted on said rod above and below said lever, an expansion spring between the uppermost stop and said lever, and timing devices for regulating the downward movement of the longer arm of said 45 lever.

18. In a coin detector, the combination with a chute the downwardly inclined intake portion of which has an elongated escape-opening in the under edge thereof, a 50 longitudinally adjustable gage-plate for regulating the length of said escapement, of an escapement comprising a substantially crescent shaped transversely disposed member which is pivoted between its ends, and 55 one end of which is adapted to move through openings in the sides of said chute and the other under said escape-opening, a lever fulcrumed adjacent its upper end and having its shorter branch enter the throat 60 of said chute, a contraction spring connecting the same to said chute, a rod pivotally connected to said crescent shaped member and extending through a projection 65 from said lever, stops mounted on said rod above and below said lever, an expansion spring between the uppermost stop and said lever, and timing devices for regulating the downward movement of the longer arm of 70 said lever.

In witness whereof I have hereunto set my hand this 30th day of Dec., 1914.

CLIFFORD H. GREEN.

Witnesses:

PETER D. VANDER WERP,
F. B. PHIPPS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."