

Sept. 26, 1939.

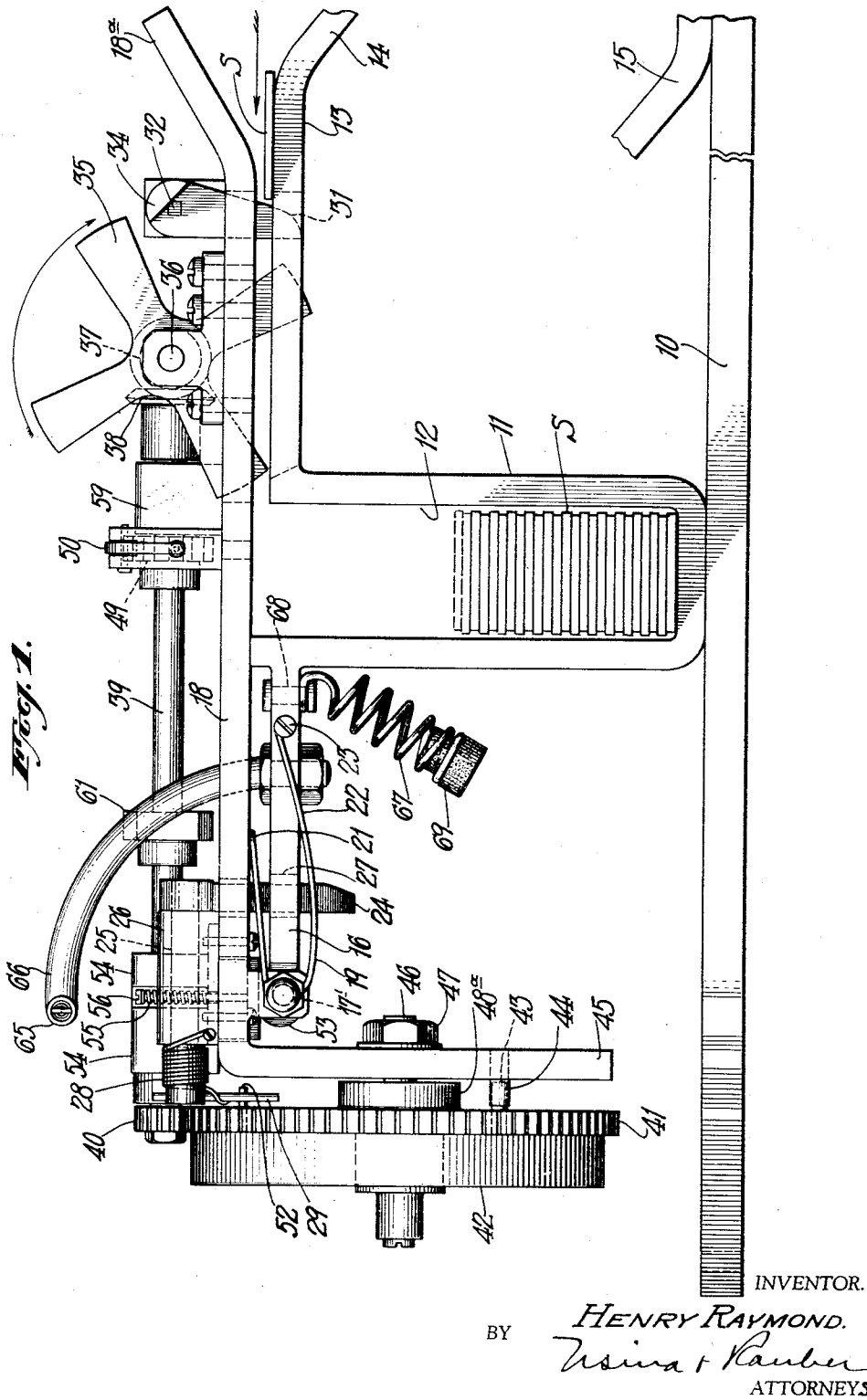
H. RAYMOND

2,174,480

AUTOMATIC STRIP COUNTER

Filed Oct. 16, 1937

4 Sheets-Sheet 1



Sept. 26, 1939.

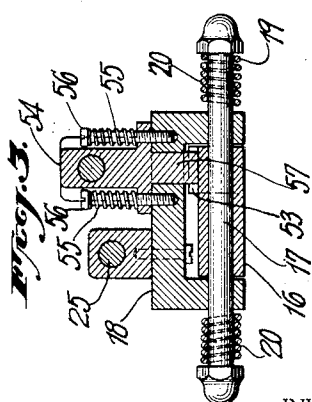
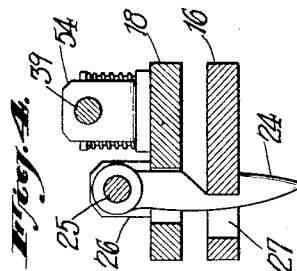
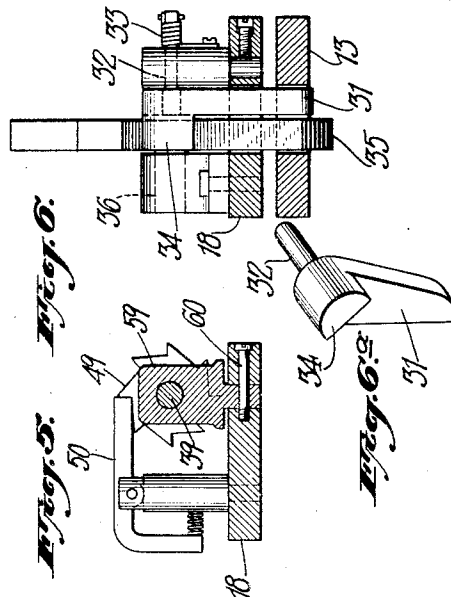
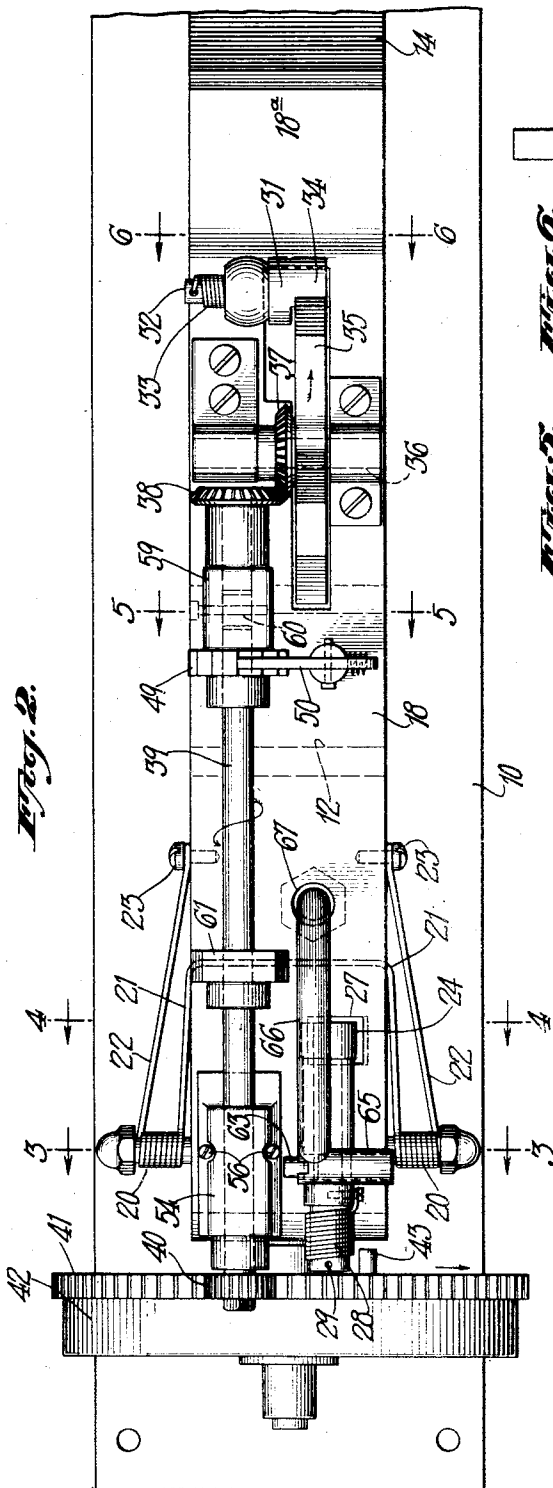
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AUTOMATIC STRIP COUNTER

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4 Sheets-Sheet 2



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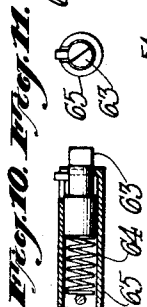
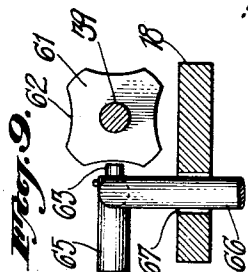
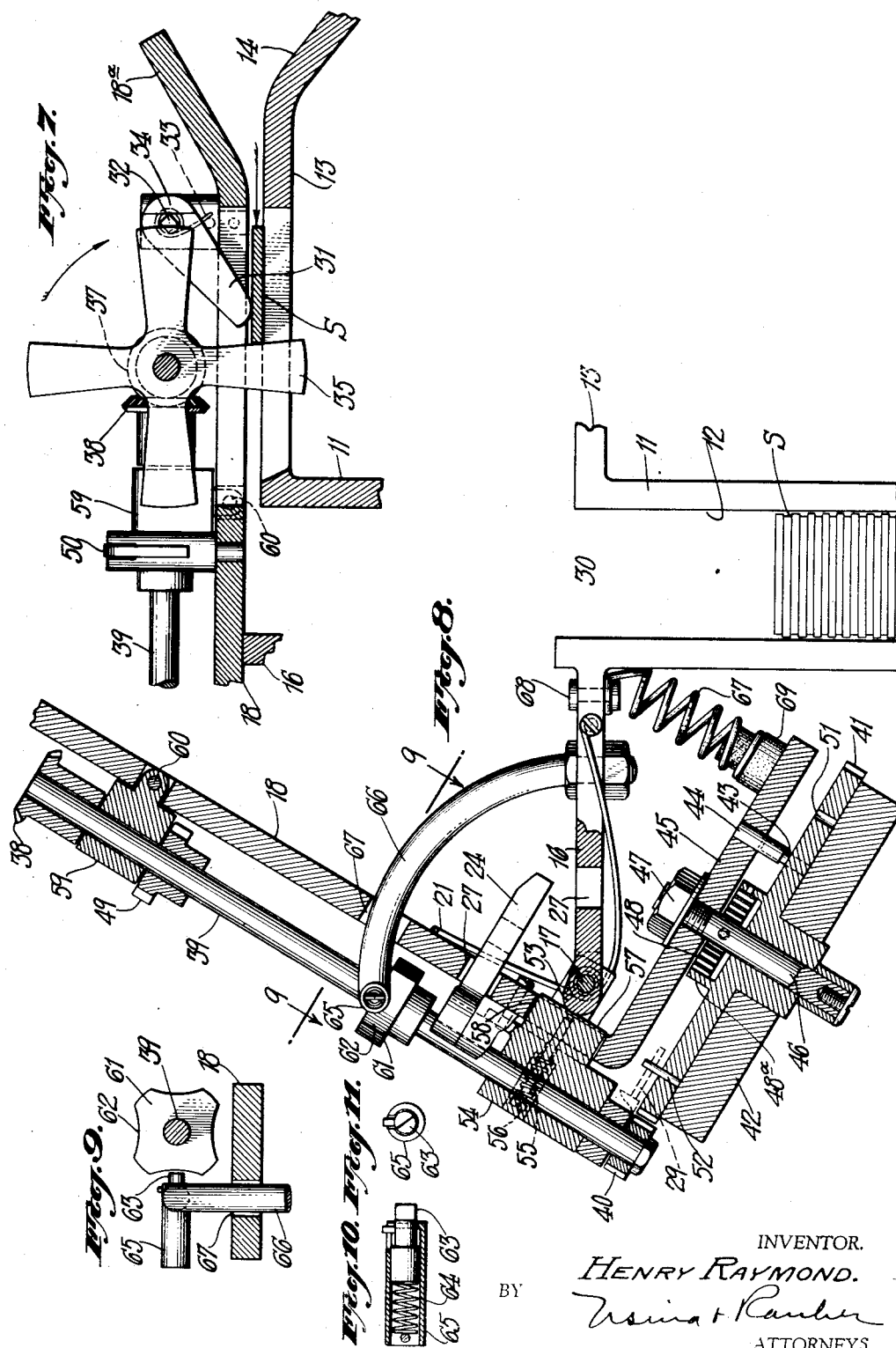
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AUTOMATIC STRIP COUNTER

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4 Sheets-Sheet 3



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AUTOMATIC STRIP COUNTER

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Fig. 13.

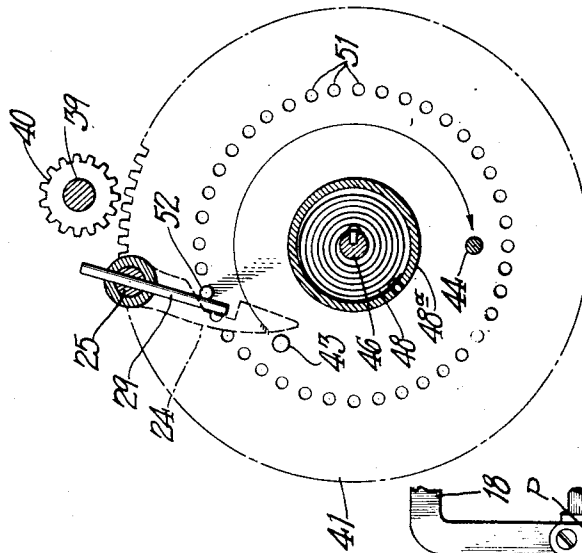


Fig. 14.

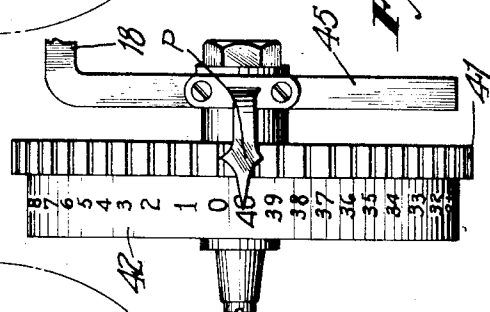
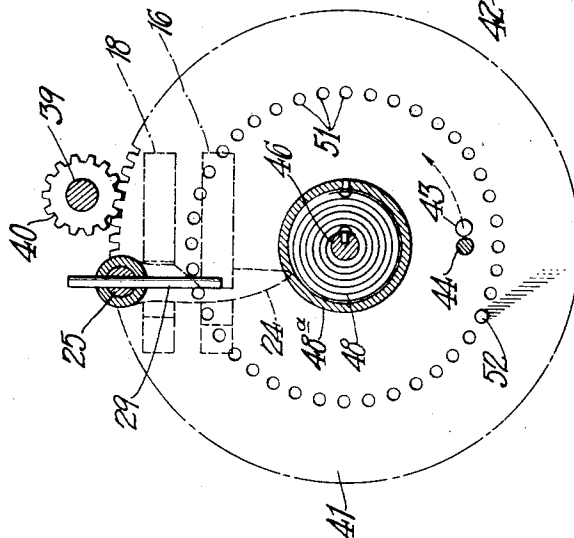


Fig. 12.



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UNITED STATES PATENT OFFICE

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AUTOMATIC STRIP COUNTER

Henry Raymond, Birmingham, Ala.

Application October 16, 1937, Serial No. 169,521

10 Claims. (Cl. 235—98)

This invention relates to improvements in means for automatically counting articles, such as strips, or the like. After handling articles like bars, strips and the like, it is desirable to accumulate them in a magazine prior to shipment or storage in lots of predetermined numbers. The machine embodying the present invention is peculiarly well suited for enabling an operator to readily determine when any predetermined quantity of articles have been fed to the storage point. In the machine of the present invention, each time a strip, or other article is fed to the magazine or storage pocket, an impulse is transmitted to a counting wheel, which is counteracted by a spring tending to turn the wheel to a zero position. This counting wheel is provided with an indexing means, whereby after a predetermined number of strips, or other articles have been accumulated in the magazine, the latter will be uncovered so as to permit removal of the counted articles and the counting wheel will be automatically returned to zero position. And when the magazine is thus uncovered a portion of the strip guiding means is moved bodily to a non-operative position and the operator is, therefore, emphatically notified that the predetermined desired number of articles have been counted and accumulated in the magazine.

A machine embodying the above and further features of the invention is illustrated in the accompanying drawings, in which—

Fig. 1 is a side elevation; Fig. 2 is a plan view; Fig. 3 is a transverse vertical section on line 3—3 of Fig. 2; Fig. 4 is a vertical section on line 4—4 of Fig. 2; Fig. 5 is a section on line 5—5 of Fig. 2; Fig. 6 is a section on line 6—6 of Fig. 2; Fig. 6^a is a detail perspective view of a part shown in Fig. 1; Fig. 7 is a fragmentary detail illustrating the starting position of the parts in fitting strips to the machine; Fig. 8 is a view partly in section showing the position which certain parts assume when a desired number of strips or other articles have been accumulated in the magazine; Fig. 9 is a sectional detail taken on line 9—9 of Fig. 8; Figs. 10 and 11 are detail views of elements shown in Fig. 9; Figs. 12 and 13 are detail views illustrating the operation of the number wheel; Fig. 14 is a detail view of indicating means.

Referring in detail to the drawings, the machine includes a base plate 10 supporting a base member 11 formed with a strip-receiving pocket or magazine 12. The base member 11 includes a substantially horizontal strip guiding portion 13, the rear extremity of which is inclined down-

wardly at 14, the lower end thereof terminating in a foot 15 secured to the base plate 10.

Extending forwardly of the magazine, the base member 11 has an arm 16, which in its extremity carries a trunnion pin 17 forming a pivotal mounting for a swingable frame 18. A spring 19 has coil portions 20—20 which encircle the trunnion pin 17 and includes a bail portion 21, which extends below the swingable frame 18 and arms 22—22, which are secured by screws 23—23 to the arm 16 of the base member. As thus arranged, the springs 20 tend to swing the frame from the position of Fig. 1 to that shown in Fig. 8 about the axis of the trunnion pin 17.

A latch 24, as shown in Fig. 4, mounted on a rock shaft 25 journaled in bearing 26 normally tends to hold the swinging frame 18 in the strip guiding position of Fig. 1 and when the swinging frame is in this position the magazine 12 is closed at the top, thus preventing the material from being removed therefrom by a lifting movement. If desired, means can be provided for preventing the endwise movement of the strips S from the magazine.

The free end of the latch 24 passes through an opening 27 formed in the arm 16 of the frame member and a latch spring 28 surrounding the rock shaft 25 has one end secured to the bracket 26 and has its other end hooked around a trigger pin 29, as shown in Fig. 1. The torsion of the spring 28 normally tends to hold the latch in the closed position, as shown in Fig. 4, and when the trigger 29 is engaged by means hereinafter described the latch will be tripped, thus permitting the spring 19 to throw the swinging frame 18 to the position of Fig. 8, thus uncovering the mouth 30 of the magazine 12. The strips S to be counted may be fed by a flight conveyor or any other suitable mechanical means, or they could also be fed manually.

As each strip S is fed between the converging portions 14 and 18^a of the base member and swinging frame, respectively, it will first engage a detent 31 and rock the same from the position of Fig. 1 to the position shown in Fig. 7 about the pivot 32 thereof against the action of a spring 33. This rocking movement of the detent will move a shouldered stop portion 34 thereof to a point at which it will clear the spokes 35 of a star-wheel mounted on a shaft 36. Continued movement of the strip S being fed will engage the finger 35 of the star-wheel. This continued movement will be transmitted through bevel gears 37 and 38 to a shaft 39 carrying at its end a pin-

ion 40 meshing with the gear 41 carried by the number wheel 42.

This number wheel carries a zero position stop pin 43 for engagement with a fixed abutment 44 secured to an arm 45 depending from the swinging frame 18. The number wheel and gear 41 are mounted to turn together on a spindle 46 fixedly secured to the arm 45 by nut 47 or other suitable securing means. A spiral spring 48, best shown in Figs. 12 and 13, has one end anchored to the fixed spindle 46 and the other end anchored to the inner wall of a drum-like casing 48^a secured to or forming part of the number wheel gear 41. The spring is so wound as to normally tend to turn the number wheel and its gear 41 in a clockwise direction, as viewed in Figs. 12 and 13. The shaft 39 carries a ratchet wheel 49 with which coacts a spring-pressed pawl 50 normally preventing the spring from propelling the number wheel in a clockwise direction, as viewed in Figs. 12 and 13. As thus arranged, it is apparent that each time a strip is fed between the guide members 14 and 18^a to the magazine an impulse will be given to the star-wheel, which in turn will be transmitted through the gearing described to the number wheel 42 and thus wind or put the spring 48 under tension.

The peripheral face of the number wheel 42 in some cases, as shown in Fig. 14, will have numerals marked thereon and a pointer P secured to the frame 18 will serve in coaction with the number wheel to indicate the number of strips in the magazine at any given time.

The gear 41 of the number wheel is provided with a multiplicity of evenly spaced circularly arranged tapped holes 51, any one of which is adapted to receive a pin 52 for coaction with the trigger 29.

The latch tripping trigger 29, above referred to, is located in the path of travel of the pin 52. As thus arranged, it is apparent that the circular distance traveled by the pin 52 before it engages the trigger, and thus trips the latch, will determine the number of strips or other articles which can be accumulated in the magazine before the same is uncovered by the swinging frame. Hence, by proper selection of the particular hole into which the pin 52 is inserted the device can be arranged to open the magazine after the accumulation of any predetermined number of strips therein, of course within a range covered by the number of circularly arranged holes 51.

When the pin 52 strikes the trigger and moves the latch 24 to its disengaged position, shown in Fig. 13, the springs 28—29 will move the swinging frame 18 to the position of Fig. 8. During this movement, a fixed cam 53 formed on the extremity of the arm 16 will force the left hand bearing 54 for shaft 39 outwardly against the action of compression springs 55, which surround the screws 56 positioning this bearing on the frame 18.

This bearing, as best shown in Figs. 3 and 8, has a projecting portion 57 extending through a slot 58 formed in the frame 18. The right hand bearing 59 for shaft 39 is pivotally mounted on a pin 60 carried in frame 18, this pivotal mounting for the bearing permitting the angular movement of the shaft 39. The movement of the bearing 54 and shaft 39 by the cam 53 results in unmeshing the pinion 40 from number wheel gear 41 and thereupon the spring 48 will rotate the number wheel and gear 41 clockwise, as indicated by the arrows in Fig. 13, until the pin 43 carried by the gear comes to rest against the fixed

abutment 44, thus restoring the number wheel to starting or zero position, shown in Fig. 12.

Means are provided to prevent the spokes 35 of the star-wheel from being turned to improper position when the pinion 40 and gear 42 are disengaged and also to insure that, when the parts are swung from the position of Fig. 8 to the position of Fig. 1, said star-wheel spokes will be in proper starting position, as shown in Fig. 1 for engagement with further strips to be fed to the magazine. To these ends, I provide on shaft 39 a disc 61 having notches 62 therein for coaction with a plunger 63 urged outwardly by a spring 64 mounted in a shell 65 secured to the extremity of a fixed rod 66 bent to a curvature corresponding to an arc struck from the axis of the trunnion 17, this rod passing freely through an opening 67 formed in the frame 18.

With such an arrangement, it will be apparent that the plunger 63 will be positioned for yielding engagement with a notch 62 in the disc 61, when the parts are in the position of Fig. 8, in which the pinion 40 and gear 41 are disengaged. And in the event that any slight turning movement should be inadvertently imparted to the shaft 39, said shaft will be properly reset to its starting position by camming action of the plunger 63 against the face of a notch in the disc 61 when the frame 18 is swung downwardly, it being clear that during such swinging movement the disc 61 will be capable of making a rubbing contact with the plunger 63 in the event that the disc 61 has become turned one way or the other from its normal position shown in Fig. 9. Thus, when the swinging frame 18 is returned to the position of Fig. 1, the star-wheel will have one of its spokes 35 disposed as shown in that figure and, therefore, ready for coaction with sheet S, or other article fed to the magazine.

When the latch 24 is tripped and the springs 20 rock the frame 18 to the position of Fig. 8, the shock is absorbed as the frame and parts carried thereby come to rest upon the arm 45 of the frame, striking a cushion spring 67, one end of which is secured by a suitable fastening device 68 to the underside of the arm 16 of the base member and the other end of which carries a rubber buffer 69.

While the device illustrated is particularly well suited for counting metal strips, bars, or the like, it is to be understood that the same type of machine can be readily adapted for quickly and easily informing an operator when any predetermined number of articles have been accumulated in a magazine, whereupon the magazine will be opened, so as to permit the ready removal of such articles.

Various modifications and substitution of equivalents may be made by those skilled in the art without departure from the invention as defined in the appended claims.

What I claim is:

1. In a machine of the character described, coacting guide members for material to be counted, one of which is fixed and the other of which is movable, a magazine normally closed by the movable guide member, means actuated by movement of articles to the magazine for counting such articles, and means controlled by the counting means for automatically shifting the movable guide member to an open non-guiding position giving free access to the magazine thus giving an emphatic indication that the same is in readiness to be emptied after a predetermined

number of articles have been accumulated therein.

2. In a machine of the character described a magazine to receive articles to be counted, a movable guide member effective in one position to close said magazine and in another position to open it, means actuated by the movement of articles to the magazine for counting such articles, means tending to move said movable guide member to open position, holding means normally effective to prevent the opening movement of said guide member, and means actuated by said counting means for releasing said holding means when a predetermined number of articles have been accumulated in said magazine whereby the normal guiding function of said movable guide member is negated, thus emphatically indicating that the magazine is in readiness to be emptied.

3. In a machine of the character described, a fixed and a movable member coacting to form a guideway along which articles to be counted are moved, yieldable means tending to move the movable member away from its guiding relationship with the fixed member, holding means coacting with said movable member normally tending to prevent such a wayward movement, mechanism effective to release said holding means after a predetermined number of articles have been fed through said guideway said mechanism including an element extending into said guideway.

4. In a machine of the character described, a fixed guide member, a coacting guide pivotally supported in juxtaposition thereto, means tending to swing the latter away from the fixed guide member, a latch normally restraining the pivoted guide, a star-wheel having spokes for engagement with the articles to be counted, mechanism driven by said star-wheel including means for predetermining the number of articles to be counted, and means actuated by said predetermining means for tripping said latch.

5. In a machine of the character described, a fixed guide member, a coacting guide pivotally supported in juxtaposition thereto, means tending to swing the latter away from the fixed guide member, a latch normally restraining the pivoted guide, a star-wheel having spokes for engagement with the articles to be counted, a shaft driven thereby and carrying a pinion, a gear driven by said pinion and having a multiplicity of holes therein, a stop on the gear, an abutment for coaction therewith and a trip pin in a selected one of said holes effective to trip said latch after a desired number of articles have been fed past said star-wheel, said stop and abutment serving to arrest the rotation of said gear at a constant starting position.

6. A machine of the character described comprising a magazine for accumulating articles fed thereto, respective fixed and movable members jointly forming a guideway leading to the magazine, a counter actuating member extending into the guideway having a plurality of spokes each arranged to be actuated by articles fed through the guideway, a shaft driven by said counter-actuating member and carrying a pinion, a number wheel gear for coaction with the pinion and carrying a zero stop, an abutment for coaction with said stop, spring means urging said stop toward said abutment, a trip element securable selectively in different positions in said number wheel gear for predetermining the number of articles to be counted, and means coacting with said trip for disengaging said gear and pinion

after a predetermined number of articles have been counted thus permitting the spring means to return the number wheel gear to zero position.

7. A machine of the character described comprising a fixed guide member, a movable guide member pivotally supported in juxtaposition thereto, means tending to swing the latter away from the fixed member, a latch normally restraining the movable guide member, a star-wheel rotatably supported on the movable member and having spokes for engagement with articles fed between said members, a shaft mounted in bearings supported by but movable relatively to said movable guide member, means for transmitting movement from the star-wheel to said shaft, a ratchet on said shaft coacting with a pawl permitting the shaft to rotate in one direction only, a pinion secured to said shaft, a number wheel gear engaged by said pinion, spring means tending to turn said gear in a direction reverse to that in which said pinion turns it, coacting stop elements one of which is affixed to the gear and the other of which is affixed to a rigid support, adapted to arrest the movement of said gear at a zero position, a trip element arranged to be selectively positioned on said gear to predetermine the number of articles to be counted and means located in the path of said trip element for releasing said latch after a predetermined number of articles have engaged the spokes of said star-wheel.

8. A machine of the character described comprising a fixed guide member, a movable guide member pivotally supported in juxtaposition thereto, means tending to swing the latter away from the fixed member, a latch normally restraining the movable guide member, a star-wheel rotatably supported on the movable member and having spokes for engagement with articles fed between said members, a shaft mounted in bearings supported by but movable relatively to said movable guide member, means for transmitting movement from the star-wheel to said shaft, a ratchet on said shaft coacting with a pawl permitting the shaft to rotate in one direction only, a pinion secured to said shaft, a number wheel gear engaged by said pinion, spring means tending to turn said gear in a direction reverse to that in which said pinion turns it, coacting stop elements, one of which is affixed to the gear and one of which is stationary, adapted to arrest the movement of said gear at a zero position, a trip element arranged to be selectively positioned on said gear to predetermine the number of articles to be counted and means located in the path of said trip element for releasing said latch after a predetermined number of articles have engaged the spokes of said star-wheel, a bracket carrying a yieldable plunger and a member carried by said shaft for coaction with said plunger adapted to prevent movement of the star-wheel after said pinion has been disengaged from said gear and to insure proper positioning of the star-wheel when the parts are restored to starting position.

9. A machine of the character described comprising a fixed guide member, a movable guide member pivotally supported in juxtaposition thereto, means tending to swing the latter away from the fixed member, a latch normally restraining the movable guide member, a star-wheel rotatably supported on the movable member and having spokes for engagement with articles fed between said members, a shaft mounted in bearings supported by but movable relatively

to said movable guide member, means for transmitting movement from the star-wheel to said shaft, a ratchet on said shaft coacting with a pawl permitting the shaft to rotate in one direction only, a pinion secured to said shaft, a number wheel gear engaged by said pinion, spring means tending to turn said gear in a direction reverse to that in which said pinion turns it, co-acting stop elements, one of which moves with the gear and the other of which is affixed to a stationary support adapted to arrest the movement of said gear at a zero position, a trip element arranged to be selectively positioned on said gear to predetermine the number of articles to be counted and means located in the path of said trip element for releasing said latch after a predetermined number of articles have engaged the spokes of said star-wheel and a pivotally mounted detent having a shouldered portion yieldingly positioned in the path of the star-wheel and arranged to be shifted out of the path thereof by articles fed between said guide members.

10. A machine of the character described comprising a fixed guide member, a movable guide member supported in juxtaposition thereto so

that the two jointly define a passage through which articles to be counted are fed, yieldable means tending to urge the movable guide member away from the fixed guide member, a latch normally holding the movable guide member in guiding position, a member carrying a plurality of spokes arranged to be actuated by articles moved through said guide passage, a shaft which has a turning impulse transmitted thereto each time an article fed through said passage strikes one of said spokes, a pinion turning with said shaft, mechanism for predetermining the number of articles to be counted including a gear normally driven by said pinion, a stop moving with the gear, spring means urging said gear and stop toward a fixed abutment, a selectively positionable trip element moving with the gear, said trip element being effective to automatically trip said latch to thus permit said yielding means to shift the movable guide member to non-guiding position, and cam means effective upon such movement of the guide means to disengage the pinion from said gear, thus permitting the stop thereon to be moved by said spring to zero position against said abutment.

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