

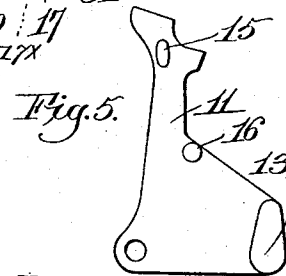
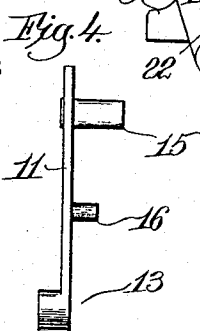
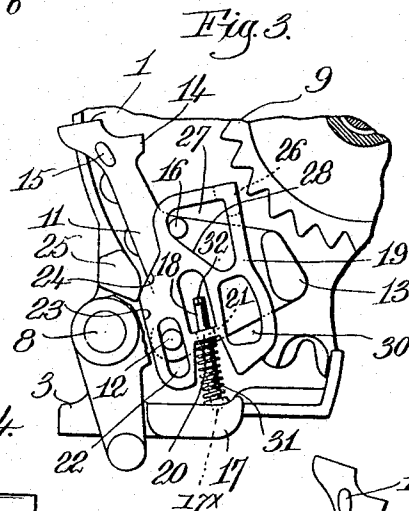
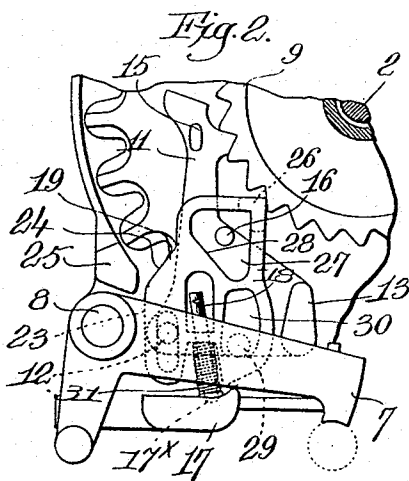
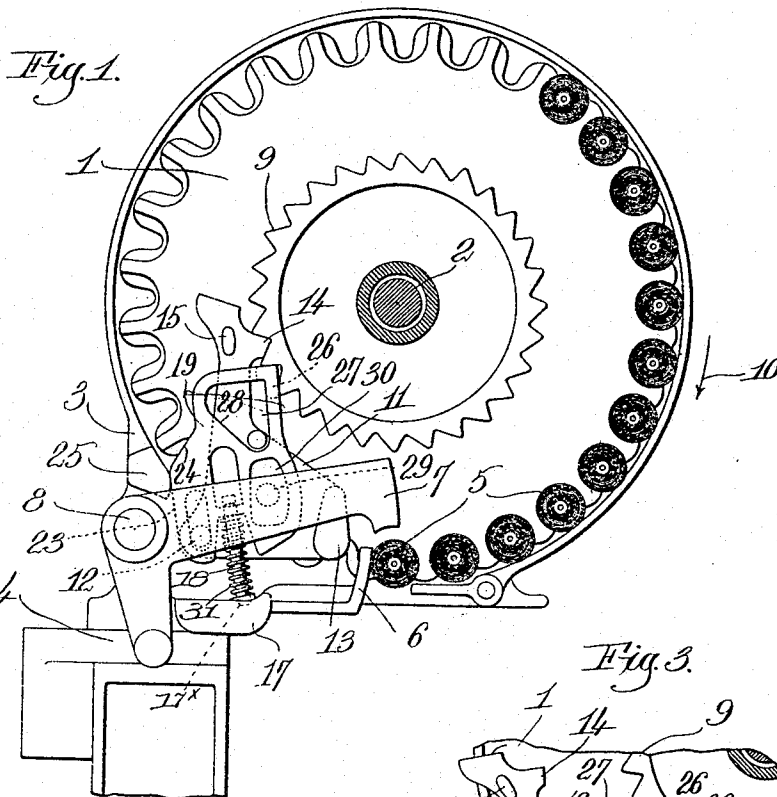
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No. 823,644.

PATENTED JUNE 19, 1906.

E. S. STIMPSON & W. S. SOUTHWICK.
HOPPER ACTUATING MECHANISM FOR AUTOMATIC LOOMS.

APPLICATION FILED JULY 20, 1905.



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UNITED STATES PATENT OFFICE.

EDWARD S. STIMPSON AND WILLIAM S. SOUTHWICK, OF HOPEDALE, MASSACHUSETTS, ASSIGNORS TO DRAPER COMPANY, OF HOPE-DALE, MASSACHUSETTS, A CORPORATION OF MAINE.

- HOPPER-ACTUATING MECHANISM FOR AUTOMATIC LOOMS.

No. 823,644.

Specification of Letters Patent.

Patented June 19, 1906.

Application filed July 20, 1905. Serial No. 270,488.

To all whom it may concern:

Be it known that we, EDWARD S. STIMPSON and WILLIAM S. SOUTHWICK, citizens of the United States, and residents of Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Hopper-Actuating Mechanism for Automatic Looms, of which the following description, in connection with the accompanying drawings, is a specification, like numerals on the drawings representing like parts.

This invention relates to looms of the automatic type wherein the running filling is replenished from time to time as may be required by the insertion of a fresh supply of filling into the shuttle taken from a reserve held or contained in a suitable filling feeder or hopper. A typical example of such an apparatus is found in United States Patent to Northrop, No. 529,940, and other patents of later date show various mechanisms for effecting the intermittent or step-by-step rotation of the hopper in which a plurality of filling-carriers are held in a circularly-arranged series to bring one after another of the filling-carriers into position to be transferred from the hopper to the shuttle.

Our present invention deals particularly with movable hoppers in which the reserve filling-carriers are held, and it has particular reference to the mechanism for actuating the hopper to present the filling-carriers one by one into transferring position. We have devised novel, simple, and direct-acting means to accurately advance the hopper a predetermined distance after each transferring operation without undue shock or jar, and we have also provided means whereby the hopper can be manually released from the control of its actuating mechanism quickly and easily.

When a rotatable hopper of the Northrop type requires replenishment, it is a great convenience to the attendant to be able to move the hopper freely on its axis in one direction or the other, so that the filling-carriers may be readily placed in position therein. Before such freedom of movement can be secured it is necessary, however, to clear or free the hopper from the control of its actuating mechanism, and heretofore this has required the use of both hands, one to retract the feed-pawl, either directly or by depressing the

transferrer, (according to the particular construction handled,) and the other hand to retract the detent device or pawl which prevents retrogression of the hopper. Manifestly with such requirements the operative has but little use of his hands to fill up the hopper, and the operation is difficult and sometimes dangerous when the loom is in operation. With the mechanism embodying our present invention the operative is able with a single movement of one hand to entirely free or clear the hopper from the control of its actuating mechanism, so that the other hand may be used to move the hopper backward or forward, as the case may be, and to place the requisite filling-carriers therein. The freeing of the hopper is readily effected and without any danger of injury to the operative from moving parts of the loom while the latter is running.

These and other novel features of our invention will be fully described in the subjoined specification and particularly pointed out in the following claims.

Figure 1 is a transverse sectional view of the hopper of an automatic filling-replenishing loom of the Northrop type referred to with the transferrer and with one embodiment of our novel hopper mechanism applied thereto, the parts being in normal position. Fig. 2 is a similar view, but showing the relative position of the members of the hopper-actuating mechanism, the hopper, and the transferrer when the latter has completed its operative movement or stroke. Fig. 3 is a detail showing the manner in which the hopper is freed from the control of its actuating mechanism. Fig. 4 is a front elevation of the detent member of the actuating mechanism, and Fig. 5 is a side elevation thereof detached.

Inasmuch as the filling-replenishing mechanism and the means for operating it are not of our invention *per se* and the same are well known, it is sufficient to state that the hopper in practice comprises two connected disks or plates, one of which, as 1, is herein shown rotatably mounted on a stud 2, fixedly secured to a stand 3, mounted on the breast-beam 4 of the loom.

The filling-carriers or bobbins 5 are, as usual, held by their butts and tips by and between the two disks of the hopper in a circu-

larly-arranged series (see Fig. 1) and are brought one by one into position against a stop 6 in the path of the transferrer 7 of well-known construction and operation to be transferred thereby one by one from the hopper to the running shuttle to replenish the filling therein. The transferrer is mounted to rock on a horizontal stud 8 on the stand 3 and is lifted by a spring (not shown) and positively depressed on its operative stroke or movement by well-known mechanism.

A ratchet, herein shown as a toothed disk or circular plate 9, is secured to the hopper to rotate therewith, the ratchet in usual practice being secured to or formed on the outer face of the hopper-disk 1, its teeth corresponding to the number of holding devices for the filling-carriers 5.

In order to prevent retrograde movement of the hopper under normal conditions—i. e., oppositely to the arrow 10, Fig. 1—a detaining device or detent-pawl is provided, shown as a plate 11 of substantially triangular shape herein, fulcrumed at its lower outer corner on a fixed pin or stud 12, projecting from the hopper-stand 3.

At its inner corner the pawl has an enlargement or weighted portion 13, and an upright prolongation of the plate 11 is shaped to present a tooth 14, which is adapted to enter between two teeth of the ratchet 9, as clearly shown in Fig. 1, the weight 13 causing the tooth to remain in coöperation with the ratchet under normal conditions, while permitting said tooth to click over the ratchet when the hopper is advanced.

A lateral lug 15 on the upright portion of the pawl near the tooth 14 constitutes a finger-piece by which the detent-pawl may be manually retracted, swinging on its fulcrum 12 to disengage its tooth from the ratchet, as shown in Fig. 3. A pin 16 also projects laterally from the pawl on the same side as the lug 15 for a purpose to be described, the pawl in practice rocking in a path adjacent and parallel to the outer face of the disk 1 of the hopper.

In a socket 17^x on the base portion 17 of the hopper-stand 3 we mount an elongated upright supporting-pin 18 for the feed-pawl to be described, the fulcrum pin or stud 12 also being made long enough to coöperate with and guide the feed-pawl, as will be explained, said supporting-pin having a slight rocking movement in its socket 17^x. Said feed-pawl is herein shown as a plate 19 of a peculiar shape, (best shown in Fig. 3,) wherein the transferrer is broken off to more clearly show the parts beyond it, the feed-pawl being cut away or bifurcated at its lower end to leave a bridge 20, having an aperture 21, through which the pin 18 is loosely extended. Above the bridge the plate is cut out to allow the sliding movement on the pin when the pawl is moved longitudinally or slightly

rocked. The guide-pin 12 enters an elongated slot 22 in the feed-pawl, and the front edge of the latter is shaped to present two faces 23 24 at an obtuse angle, and which coöperate with a fixed abutment 25 on the hopper-stand.

At its upper end the feed-pawl is preferably thickened to form a tooth 26 (see dotted lines, Figs. 1, 2, and 3) to coöperate with the teeth of the ratchet 9, and a large opening 27 is made in the pawl, having a diagonal edge or cam 28, with which coöperates the pin 16 when the detent-pawl 11 is manually retracted.

A laterally-extended lug or pin 29 projects from the inner side of the transferrer and enters a wide and elongated aperture 30 in the feed-pawl, the length and relative position of such aperture being such that the pin 29 will not engage the bottom of such aperture until the transferrer has completed a portion of its transferring or operative stroke. By means of the pin and aperture a positive connection is thus provided at times between the feed-pawl and transferrer, yet with a lost-motion operation such slot-and-pin connection serving to positively set or move the feed-pawl into position in readiness to advance the hopper one step after each transferring operation.

An actuating-spring 31 is coiled about the pin 18 between the base 17 and the bridge 20, and a cotter-pin or other stop 32 on the upper end of the pin 18 limits upward or actuating movement of the feed-pawl. Normally the tension of the spring lifts the pawl 19 into the position shown in Fig. 1, with its tooth 26 in close and operative engagement with the ratchet 9, retaining the endmost filling-carrier of the series in transferring position against the stop 6, the face 23 of the feed-pawl resting against the abutment 25. At such time the relative position of the pin 29 on the transferrer is shown by dotted lines, Fig. 1, at some distance above the bottom of the aperture 30 in the feed-pawl, the pin or lug 16 on the detent-pawl 11 then being at or near the bottom of the opening 27.

When the transferrer is moved downward to transfer a filling-carrier from the hopper to the shuttle, the first part of such movement carries the pin 29 down without affecting the feed-pawl until said pin strikes the bottom of aperture 30, and thereafter the pawl is positively moved down along the supporting-pin 18, compressing the spring 31, the extreme depression of the pawl terminating as the transferrer completes its operative stroke. As the pawl moves down it is guided at first by the coöperation of the guide-pin 12 and slot 22 and by the abutment 25, past which the edge 23 of the pawl wipes, until it is necessary to allow the pawl to rock slightly in order to pass by the point of the tooth of the ratchet next to be engaged by the pawl-

tooth 26. At this instant the diagonal face 24 of said pawl is brought opposite the abutment, and the pawl then rocks slightly, the forward end with the slot 22 dipping enough to let the tooth 26 click past the proper tooth on the ratchet, and then the spring 31 acts to throw the pawl-tooth 26 inward or toward the ratchet. (See Fig. 2.) The feed-pawl is now set or positioned in readiness to advance the hopper, and this advance is effected as the transferer returns to normal position, the rise of the pin 29 permitting the spring 31 to expand, and thereby lift the feed-pawl, the latter sliding along the supporting pin or rod 18 and being guided by the abutment and the cooperating portion of the pawl and by the slot 22 and pin 12, the rod 18 rocking as may be necessary. The completion of the advance of the hopper is effected as soon as the feed-pawl returns to the position shown in Fig. 1, and the pin 29 reaches its normal position as the transferer arrives at its normal position.

It will be seen that the transferer has no connection or engagement with the hopper and that the advance of the latter is effected wholly by or through the actuating-spring 31, which is only strong enough to effect the hopper movement and overcome any friction of the parts.

The advance of the hopper is of course determined by the engagement of the next filling-carrier of the series with the stop 6; but if such filling-carrier should be absent, as will sometimes occur by carelessness or oversight on the part of the attendant when filling the hopper, the latter will not overrun. This is due to the fact that any tendency of the hopper to overrun would be transmitted to the upright edge of the pawl-tooth 26 by the inclined face of the adjacent tooth of the ratchet tending to rock the feed-pawl; but this pressure is resisted by the abutment 25 and the guide pin or stud 12 acting, respectively, against the pawl edge 23 and the inner or rear side of the slot 22, so that the hopper cannot advance more than one step.

When the feed-pawl is set, its tooth 26 is in position to act immediately upon the ratchet without lost motion, so that the hopper advance is smooth and even without any shock or jump due to sudden impact of the feed-pawl and ratchet.

If the operative wishes to free the hopper from the control of its actuating mechanism in order to turn it freely for the purpose of inserting filling-carriers, he grasps the finger-piece 15 and pulls the detent-pawl 11 forward, disengaging its tooth from the ratchet. Such movement of the detent-pawl causes the pin 16 to wipe over the cam edge 28 of the opening 27 and simultaneously rocks and partially depresses the feed-pawl, drawing its tooth 26 away from the ratchet, as shown in Fig. 3, the depression of the feed-pawl per-

mitting its rocking movement as the inclined edge 24 is brought against the abutment 25. The hopper is now freed from control of its actuating mechanism, and while the detent-pawl is held with one hand in manually-retracted position the operative can with the other hand rotate the hopper toward the front of the loom, or reversely, and put in as many filling-carriers as may be necessary.

When the hopper is loaded or filled, the detent-pawl is released and returns to position, cooperating with the ratchet, and the spring 31 expands again to lift and turn rearward the feed-pawl into complete reengagement with the ratchet, the spring acting to firmly hold the endmost filling-carrier against the guide or stop 6. It is also to be observed that during a transferring operation when the transferer has descended far enough for the feed-pawl to swing into engagement with the next tooth of the ratchet the spring 31 presses the pawl against said tooth to resist any tendency of the hopper to turn and bring forward another filling-carrier prematurely. This provides a very efficient control of the hopper during transfer.

Our invention is not restricted to the precise construction and arrangement herein shown and described, as the same may be varied or modified in different particulars by those skilled in the art without departing from the spirit and scope of our invention.

Having fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. A movable hopper to hold a series of filling-carriers, a ratchet movable therewith, a transferer, a spring-actuated feed-pawl to cooperate with the ratchet, means to positively set the pawl by or through operative movement of the transferer, the pawl acting to advance the hopper on the return movement of the transferer, a detent for the ratchet, and means to disengage the feed-pawl and ratchet by retraction of the detent.

2. A movable hopper to hold a series of filling-carriers, a ratchet movable therewith, a transferer, feed and detent pawls cooperating with the ratchet, means to set the feed-pawl by or through operative movement of the transferer, to advance the hopper on the return of the transferer to normal position, and means to disengage both pawls from the ratchet by or through manual retraction of the detent-pawl.

3. A movable hopper to hold a series of filling-carriers, a ratchet movable therewith, a transferer, feed and detent pawls cooperating with the ratchet, a spring to actuate the feed-pawl, means to set the latter positively by or through operative movement of the transferer, the spring acting through said feed-pawl to advance the hopper on the return of the transferer, and a normally passive connection between the pawls whereby

manual retraction of the detent-pawl disengages the feed-pawl and the ratchet.

4. A movable hopper to hold a series of filling-carriers, a ratchet movable therewith, a transferer, a spring-actuated feed-pawl and a gravity detent-pawl, both coöperating with the ratchet, means to set the feed-pawl by operative movement of the transferer, the spring acting through said pawl to advance the hopper on the return movement of the transferer, and a connection between said pawls whereby both may be disengaged from the ratchet by manual retraction of the detent-pawl.

5. A movable hopper to hold a series of filling-carriers, a ratchet movable therewith, feed and detent pawls coöperating with the ratchet, means to control the operation of the feed-pawl to effect the advance of the hopper upon each operation of the transferer, a connection between the pawls whereby both may be disengaged from the ratchet by manual retraction of the detent-pawl, and a transferer.

6. A movable hopper to hold a plurality of filling-carriers, a transferer to remove the latter one by one, means to advance the hopper step by step, a device to prevent retrograde movement of the hopper, and means to free the hopper from the control of said advancing means by or through manual movement of said device into inoperative position.

7. A movable hopper to hold a plurality of filling-carriers, a transferer to remove the latter one by one, spring-actuated means to advance the hopper step by step, a detent to prevent retrograde movement of the hopper, and a connection between said means and the detent to free the hopper from the control of such means by movement of the detent into inoperative position.

8. A movable hopper to hold a plurality of filling-carriers, a transferer to remove the latter one by one, and hopper-controlling means, including a device to prevent retrograde movement of the hopper, manual retraction of the said device automatically releasing the hopper from coöperation with said means and permitting hopper movement by hand in either direction.

9. A rotatable hopper to hold a circularly-arranged series of filling-carriers, a transferer to remove the latter one by one, means to advance automatically the hopper step by step, a device to prevent retrograde rotation of said hopper, and means to free the hopper from the control of its advancing means by or through manual movement of said device into inoperative position.

10. A movable hopper to hold a series of filling-carriers, a ratchet movable therewith, a transferer, a spring-actuated feed-pawl to coöperate with the ratchet, a lost-motion connection between said pawl and transferer to set the former by operative movement of the

latter, a device to prevent retrograde movement of the ratchet, and means to disengage the pawl and ratchet by or through manual retraction of the said device.

11. A movable hopper to hold a series of filling-carriers, a ratchet movable therewith, a transferer, a spring-actuated feed-pawl to coöperate with the ratchet, a slot-and-pin connection between the pawl and transferer, to set the former as the latter completes its operative movement, the pawl advancing the hopper on the return movement of the transferer, a detent for the hopper, and a connection between said detent and pawl whereby the latter is disengaged from the ratchet by manual movement of the detent into inoperative position.

12. A rotatable hopper to contain a plurality of filling-carriers, a transferer to remove the latter one by one, spring acting means to advance the hopper step by step, a connection between said means and the transferer to set the former by operative movement of the latter, a hopper-detent, and means to free the hopper from control of the advancing means when the detent is rendered inoperative manually.

13. A rotatable hopper to contain a plurality of filling-carriers, a transferer to remove the latter one by one, hopper-advancing means, comprehending a ratchet movable with the hopper, a coöperating feed-pawl, an operating-spring therefor, and a connection between the pawl and transferer to set the former by movement of the latter to remove a filling-carrier, a detent normally coöperating with the ratchet, and a connection between said detent and pawl whereby both are disengaged from the ratchet by manual retraction of the detent.

14. A movable hopper to hold a plurality of filling-carriers, a transferer to remove the latter one by one, a ratchet movable with the hopper, a spring-actuated, sliding and rocking feed-pawl to coöperate with the ratchet, and a lost-motion connection between the pawl and transferer to set the former by or through operative movement of the latter, the spring-actuated pawl advancing the hopper as the transferer returns to normal position.

15. A movable hopper to hold a plurality of filling-carriers, a ratchet movable with the hopper, a coöperating feed-pawl, a transferer, one having a slot and the other provided with a pin entering the slot, constituting a positive, lost-motion connection between the pawl and transferer, operative movement of the latter acting through such connection to set the pawl as a filling-carrier is transferred from the hopper, a spring to actuate the feed-pawl and advance the hopper while the transferer returns to normal position, and a pawl-support independent of the transferer.

16. A movable hopper to hold a plurality

of filling-carriers, a ratchet movable with the hopper, a cooperating sliding and rocking feed-pawl, a transferer, one having a slot and the other provided with a pin entering the slot, whereby the transferer and pawl are capable of limited relative movement, said parts moving in unison to set the pawl as the transferer completes its operative stroke, and a spring to actuate the feed-pawl and advance the hopper as the transferer returns to its normal position.

17. A movable hopper to hold a plurality of filling-carriers, a transferer to remove the latter one by one, a ratchet movable with the hopper, a spring-actuated feed-pawl to cooperate with the ratchet, said pawl having a sliding setting and advancing movement, and also a rocking movement, to pass over the teeth of the ratchet in setting, and means to set the pawl by or through operative movement of the transferer, the spring actuating the pawl to advance the hopper on the return movement of the transferer.

18. A rotatable hopper adapted to hold a circularly-arranged series of filling-carriers, a transferer, spring acting means set by operative movement of the transferer to effect a predetermined angular advance of the hopper after each transferer operation, a hopper-detent, and means to automatically release the hopper from the control of said spring acting means when the detent is rendered inoperative manually.

19. A rotatable hopper adapted to hold a circularly-arranged series of filling-carriers, a ratchet-disk movable therewith, a transferer, a slidably-movable spring-actuated feed-pawl to cooperate with said disk, and effect a predetermined angular advance of the hopper after each transferer operation, and means to effect positive cooperation of the transferer and feed-pawl on the operative movement of the former, to operatively position the latter for the next advance of the hopper.

20. A rotatable hopper adapted to hold a circularly-arranged series of filling-carriers, a ratchet-disk movable therewith, a rocking transferer having a lateral pin thereon, a feed-pawl having an elongated opening into which the pin projects and also having a guide-slot, a fixed guide-pin extended through said slot, an upturned rod on which the pawl is loosely mounted to slide, an actuating-spring to lift the pawl and thereby cause it to cooperate with the ratchet-disk and advance the hopper, the operative movement of the transferer causing the pin thereon to act upon the bottom of the opening in and depress the pawl to set it, thereby compressing the spring, and a fixed abutment, said abutment and guide-pin directing the setting movement of the pawl and permitting it to rock slightly to pass over the next tooth of the disk to be engaged.

21. A rotatable hopper adapted to hold a circularly-arranged series of filling-carriers, a ratchet-disk movable therewith, a rocking transferer having a lateral pin thereon, a feed-pawl having an elongated opening into which the pin projects and in which it has lost motion, a fixed guide-pin and an abutment, both cooperating with the pawl to control its sliding and rocking movement, a rod on which the pawl is loosely mounted to slide, and an actuating-spring to lift the pawl and by cooperation with the disk advance the hopper, the pin on the transferer acting to depress and set the pawl on the latter part of the operative transferer-stroke, compressing the spring, the pawl rocking slightly during the setting movement to pass over the next tooth of the disk to be engaged.

22. A rotatable hopper adapted to hold a circularly-arranged series of filling-carriers, a ratchet-disk movable therewith, a transferer, a slidably-movable spring-actuated feed-pawl to cooperate with said disk and effect a predetermined angular advance of the hopper after each transferer operation, a pin-and-slot connection between the pawl and transferer, to operatively position the pawl for the next advance of the hopper as operative movement of the transferer is effected, a detent mounted on a fixed fulcrum and normally cooperating with the ratchet-disk, a projection on said detent, and a cam on the feed-pawl with which said projection is adapted to cooperate, to disengage the pawl and ratchet-disk when the detent is manually disengaged from the latter.

23. A rotatable hopper adapted to hold a circularly-arranged series of filling-carriers, a ratchet-disk movable therewith, a rocking transferer having a lateral pin thereon, a feed-pawl having an elongated opening into which the pin projects and in which it has lost motion, a fixed guide-pin and an abutment, both cooperating with the pawl to control its sliding and rocking movement, a rod on which the pawl is loosely mounted to slide, and an actuating-spring to lift the pawl and by cooperation with the disk advance the hopper, the pin on the transferer acting to depress and set the pawl on the latter part of the operative transferer-stroke, compressing the spring, the pawl rocking slightly during the setting movement to pass over the next tooth of the disk to be engaged, combined with a detent-pawl mounted on a fixed fulcrum and normally cooperating with the ratchet-disk, a projection on the detent-pawl, and a cam on the feed-pawl, manual disengagement of the detent-pawl from the ratchet causing cooperation of the projection and cam to also disengage the feed-pawl and thereby release the hopper.

24. A rotatable hopper to hold a circularly-arranged series of filling-carriers and having an attached ratchet, a transferer, a

spring-actuated feed-pawl to cooperate with the ratchet, and means to positively set the feed-pawl by or through operative movement of the transferrer, the pawl then cooperating with the ratchet to prevent premature advance of the hopper during transfer, the feed-pawl acting to advance the hopper on the return movement of the transferrer.

25. A rotatable hopper to hold a circularly-arranged series of filling-carriers and having an attached ratchet, a transferrer, a feed-pawl to cooperate with the ratchet, means to positively set the feed-pawl by or through operative movement of the transferrer, and means to cause said pawl to cooperate with the ratchet and prevent premature advance of the hopper during transfer and thereafter to cause the pawl to advance the hopper on the return movement of the transferrer.

26. A rotatable hopper to hold a circularly-arranged series of filling-carriers and having an attached ratchet, a transferrer, a

spring-actuated feed-pawl to cooperate with the ratchet, means to positively set the feed-pawl by or through operative movement of the transferrer, said pawl acting to advance the hopper on the return movement of the transferrer, a detent-pawl cooperating with the ratchet, means to disengage both pawls from the ratchet by manual retraction of the feed-pawl, and a fixed guide or stop for the endmost filling-carrier of the series, the feed-pawl, upon return from such manually-effected disengagement, acting immediately through the ratchet to hold the endmost filling-carrier firmly against the said guide or stop.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

EDWARD S. STIMPSON.
WILLIAM S. SOUTHWICK.

Witnesses:

CLARE H. DRAPER,
E. D. BANCROFT.