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J. C. EDWARDS.

FILLING FEEDER MECHANISM FOR AUTOMATIC LOOMS.

APPLICATION FILED OCT. 23, 1903.

NO MODEL.

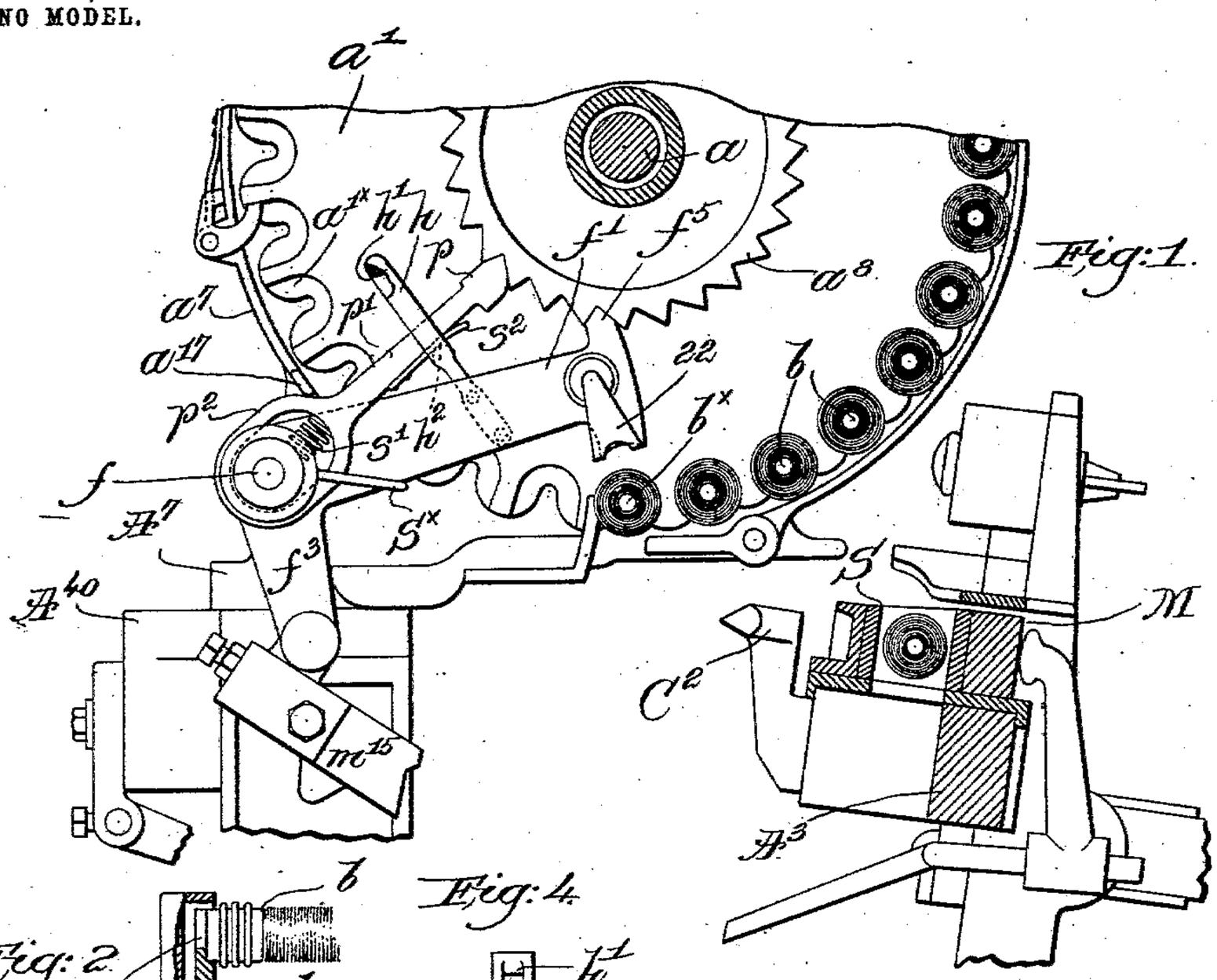

Fig: 1.

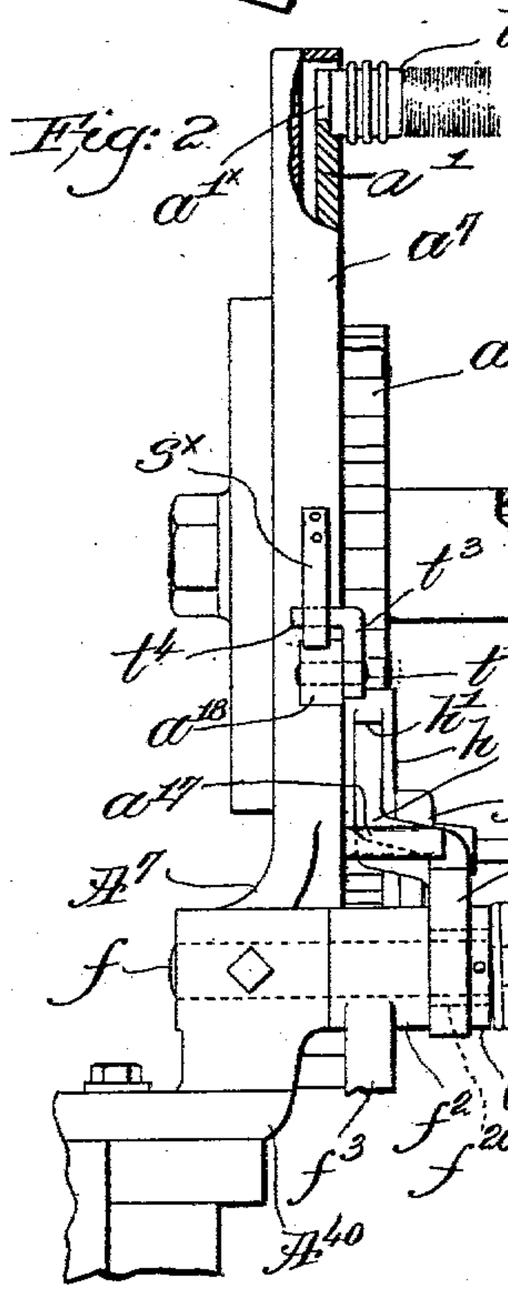

Fig: 2.

Fig: 4.

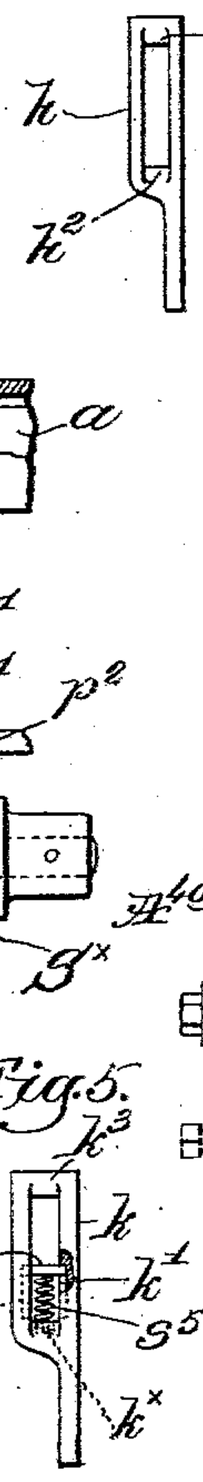

Fig: 3.

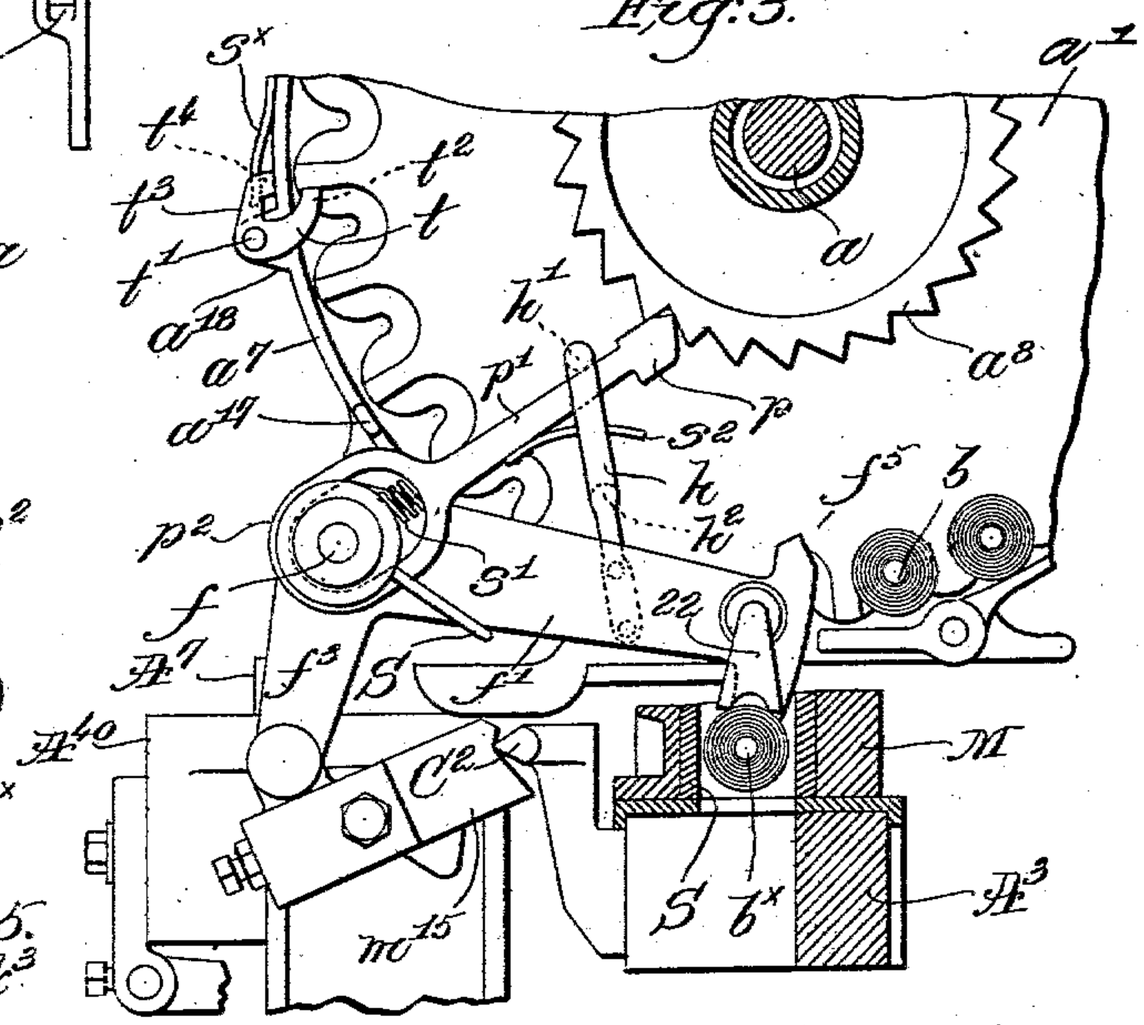

Fig: 5.

Witnesses,
Edward G. Allen.
Thomas J. Drummond.

Inventor:
John C. Edwards,
by Crosby Gregory
Atty's.

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UNITED STATES PATENT OFFICE.

JOHN C. EDWARDS, OF BROOKLINE, MASSACHUSETTS, ASSIGNOR TO DRAPER COMPANY, OF HOPEDALE, MASSACHUSETTS, A CORPORATION OF MAINE.

FILLING-FEEDER MECHANISM FOR AUTOMATIC LOOMS.

SPECIFICATION forming part of Letters Patent No. 753,054, dated February 23, 1904.

Application filed October 23, 1903. Serial No. 178,269. (No model.)

To all whom it may concern:

Be it known that I, JOHN C. EDWARDS, a citizen of the United States, residing at Brookline, Massachusetts, have invented an Improvement in Filling-Feeder Mechanism for Automatic Looms, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to automatic filling-replenishing looms of the Northrop type, of which the loom forming the subject-matter of United States Patent No. 529,940 is an example.

My invention particularly relates to the filling-feeder mechanism of such looms; and it has for its object the production of novel and simple means for effecting the intermittent or step-by-step movement of the feeder to thereby place the filling-carriers into position one after another to be transferred.

In the present embodiment of my invention the advance or feeding movement of the feeder is effected by or through the return of the transferrer to normal position and in such a manner that the advance is effected without objectionable shock or jar to the feeder or the filling-carriers held therein. I have also provided means to stop the advance of the filling-feeder when the same has been moved ahead a predetermined amount independently of the filling-carriers therein, such predetermined movement accompanying each complete operation of the transferrer.

The various novel features of my invention and the mode of operation thereof will be fully described in the subjoined specification and particularly pointed out in the following claims.

Figure 1 is a transverse section of a portion of an automatic filling-replenishing loom, taken at right angles to the axis of and between the ends of the filling-feeder, with one practical embodiment of my invention applied thereto, the parts being shown in normal position with the feeder locked from movement. Fig. 2 is a partial elevation thereof, the guard being broken out and one of the ends or disks of the feeder being shown in section. Fig. 3 is a view similar to Fig. 1, but showing the transferrer at the end of its operative movement and having just inserted a filling-carrier in the shuttle. Fig. 4 is a front elevation of the pawl-setter or connection between the transferrer and the actuating-pawl of the feeder, and Fig. 5 is a similar view of a modified form of such connection or pawl-setter to be described.

In the present embodiment of my invention the transferrer and the actuating device or pawl for the feeder are coaxially mounted; but the transferrer has an angular movement independent of such device during a portion of the transferring stroke or movement, the latter part of such movement acting, through means to be described, to positively set or position such device. On the return movement of the transferrer a spring is caused to act upon the actuating device and operate the same in a yielding manner to advance the feeder without shock or jar, such movement of the actuating device being positively terminated by a fixed abutment or stop, so that overrunning or racing of the feeder is eliminated.

As will appear hereinafter, the actuating device and a device on the transferrer both act to lock the feeder from forward movement during the normal operation of the loom.

Referring to Figs. 1 and 3, the lay A^3, slotted below the replenishing shuttle-box M and having a bunter C^2, the shuttle S, constructed and arranged to automatically thread itself when a fresh supply of filling is inserted therein, the stand A^7, mounted on the breast-beam A^{40} and having secured to it a fixed horizontal stud *a*, on which the filling-feeder is rotatably mounted, and the substantially circular guard or flange a^7 on the stand A^7 may be and are of well-known construction.

The filling-feeder comprises two disks, only one of which, as a', is shown, supports the filling-carriers or bobbins *b*, the disk a' being peripherally notched at $a'^{\times}$ to receive the heads of the filling-carriers, the feeder rotating on the stud *a* and having an attached toothed

disk or ratchet a^8, its teeth corresponding in number to the notches $a'^{\times}$, as in Patent No. 664,790, to which reference may be had. The circularly-arranged filling-carriers are removed one by one from the feeder by the transferrer f', its hub f^2 being mounted to rock on a stud f, rigidly secured to the stand, and herein I have shown the stud reduced in diameter at its outer end at f^{20} (see dotted lines, Fig. 2) for a purpose to be described. The retracting-spring $S^{\times}$ for the transferrer, the tip-engaging arm 22, the notched dog m^{15}, pivotally mounted on the depending end f^3 of the transferrer, and the means for bringing said dog into the path of the bunter C^2 to operate the transferrer may be and are all of well-known construction. A locking finger or prong f^5 is formed on the transferrer to engage the ratchet a^8 when the transferrer is in normal position, Fig. 1, to lock the feeder from movement, operative movement of the transferrer withdrawing the finger and unlocking the feeder, reëngagement of said finger and ratchet occurring when the transferrer returns to normal position and when the advance movement of the feeder is completed.

I have herein shown the actuating device for the feeder as a pawl p, shaped to engage and coöperate with the ratchet a^8, the shank p' of the pawl being enlarged at its forward end to form an elongated loop p^2, mounted to slide longitudinally and also rock on the reduced end f^{20} of the transferrer-hub. A washer 6, pinned to the end f^{20}, maintains the pawl in proper position on the hub, and by reference to Fig. 2 it will be seen that the pawl-shank is bent laterally to bring the pawl into proper position with relation to the ratchet.

As shown in Figs. 1 and 3, a spring s' is interposed between the hub and the rear end of the loop p^2, said spring acting to press the pawl toward and into engagement with the ratchet, while permitting the necessary longitudinal movement of the pawl over a ratchet-tooth as it is set or placed in operative position.

I have provided means to positively set the pawl or actuating device by or through operative movement of the transferrer and to operate the pawl in a yielding manner on the return of the transferrer to thereby effect the advance of the feeder. To this end an elongated yoke h (shown separately in Fig. 4) is rigidly secured to and projects above the transferrer, the shank p' of the pawl passing loosely through the yoke, the upper end h' thereof being considerably above the shank under normal conditions, so that the transferrer has a limited angular movement independent of the pawl and its shank. A leaf-spring s^2, Figs. 1 and 3, is herein shown as interposed between the lower end h^2 of the yoke and the shank p', said spring being rigidly secured at one end to the under side of the shank, the free end of the spring projecting through the yoke. When the transferrer is elevated, as in Fig. 1, the part h^2 is in engagement with and flexes the spring, maintaining the actuating device in the position shown and against a fixed abutment or stop a^{17} on the stand A^7, the abutment positively stopping further upward swing of said actuating device. At such time said device also acts as a lock for the feeder, as any tendency to move it forward would have to overcome the combined action of springs s' and s^2, as well as the stress of the transferrer-spring $S^{\times}$. Thus a double lock is provided for the feeder entirely independent of the filling-carriers therein, and it will also be observed by inspection of Fig. 1 that when the actuating device engages the abutment a^{17} the said device and through it the feeder is brought to a stop instantly and positively.

With the parts in the position shown in Fig. 1 let it be supposed that filling replenishment is called for. The transferrer is moved down on its operating stroke and engages the endmost filling-carrier $b^{\times}$ of the series and transfers it to the shuttle, and during the first part of such movement the finger f^5 unlocks the feeder; but the actuating device still acts as a lock. During the latter part of the operative movement of the transferrer the head h' of the yoke h engages the pawl-shank p' and swings the same down on the hub f^2 as a center, thereby positively setting or placing the actuating device in operative position, the spring s' permitting the pawl to click over one tooth of the ratchet a^8 and then expanding. The parts thus assume the position shown in Fig. 3 as the transferrer completes its operative movement, and the pawl p is in engagement with a fresh tooth of the ratchet. It should be noted that as the transferrer begins its downward swing the foot h^2 of the yoke moves away from and permits the spring s^2 to expand, its fully-expanded position being shown in Fig. 3, and then there is some clearance between the spring and the foot h^2. Having inserted the filling-carrier in the shuttle, the latter moves back and the transferrer begins its return movement to normal position, and when the foot of the yoke again engages the spring s^2 it flexes it, and thereby yieldingly starts the upward swing of the actuating device. The latter in turn then starts, without shock or jar, the advance or feed movement of the feeder to position the next filling-carrier, and as the transferrer reaches its normal position the spring s^2 is practically forced against the shank of the pawl, so that final movement of the latter is positive. This continues until the actuating device engages the abutment a^{17}, whereupon the advance of the feeder is instantly terminated, the transferrer simultaneously coming to rest with the finger f^5 in locking engagement with the ratchet. Should one or more filling-carriers be absent, the feeder cannot

overrun, as will be obvious, and for every operation of the transferrer the feeder will be advanced a predetermined distance and no more. This is an important feature, as overrunning of the feeder is objectionable for various practical reasons.

While retrograde movement of the feeder when unlocked is resisted by the preponderance of weight of the filling-carriers behind the center of rotation of the feeder, I prefer to employ a detent-pawl to positively prevent such retrogression. For this purpose a detent-pawl t is fulcrumed at t' on an ear a^{18}, formed on the guide a^7, the pawl having a laterally-extended tip t^2 to coöperate with the upper sides of the notches $a'^{\times}$ of the disk a'. The tail t^3 of the pawl is upturned and bent inward in front of the guide and pressed against it by a spring $s^{\times}$, the latter yielding as the pawl clicks past the part of the disk between two notches when the feeder is advanced. As the end t^4 of the tail engages the guide, it will be seen that retrogression of the feeder cannot take place at any time.

In Fig. 5 I have shown a modification of the connection between the transferrer and feeder-actuating device using a coiled spring, the yoke-like connection k having a socket $k^{\times}$ in its lower end to receive one end of the coiled spring s^5. The inner faces of the sides of said connection are recessed, as at k', (see dotted lines,) to receive a slide-block k^2, against which the free end of the spring bears. The pawl-shank p' passes through the yoke above the block k^2 and under the yoke-head k^3, and the operation of the device is substantially as hereinbefore described.

My invention is not restricted to the precise construction and arrangement herein shown and described nor to the exact construction of various details thereof, as the same may be modified or changed in different particulars without departing from the spirit and scope of my invention.

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

1. A movable filling-feeder to hold a series of filling-carriers, an actuating device therefor, a transferrer having a movement independent of said device, and means operated by transferring movement of said transferrer to positively set the actuating device, return movement of the transferrer acting through said means and the actuating device to yieldingly start and complete the movement of the feeder.

2. A movable filling-feeder to hold a series of filling-carriers, an actuating device therefor, a transferrer, and means operated thereby during the latter part of its transferring movement to positively set the actuating device, and to operate the same and advance the feeder during the latter part of the return movement of the transferrer to normal position.

3. A movable filling-feeder to hold a series of filling-carriers, an actuating device therefor, a transferrer, and a connection between them having a limited movement relative to said device, transferring movement of the transferrer acting through said connection to positively move and set the actuating device, the latter acting to yieldingly start and positively complete feeder movement on the return movement of the transferrer.

4. A rotatable filling-feeder to hold a series of circularly-arranged filling-carriers, an actuating device for the feeder, a fixed support for said device, a transferrer, and means operated by transferring movement thereof to positively set the actuating device, return movement of said transferrer acting through said means to first yieldingly and then positively operate said device to effect movement of the feeder.

5. A rotatable filling-feeder to hold a series of circularly-arranged filling-carriers, an actuating device for the feeder, a transferrer, a common fixed support on which the actuating device and transferrer are movably mounted, and means intermediate the transferrer and actuating device to positively position the latter by or through operative movement of the transferrer, and to operate said actuating device by return movement of the transferrer, and thereby advance the feeder.

6. A movable filling-feeder to hold a series of filling-carriers, an actuating device therefor, a transferrer, and means to positively move and set the actuating device by transferring movement of the transferrer, said means including a spring, return movement of the transferrer acting through the spring to yieldingly start and then positively complete operative movement of the actuating device to thereby advance the feeder.

7. A movable filling-feeder to hold a series of filling-carriers, means independent of the filling-carriers to normally lock the feeder, a transferrer, operative movement thereof releasing the feeder from the locking means, and means positively moved by the transferrer into position to start the feeder, said means thereafter acting to move said feeder forward during the latter part of the return of the transferrer to normal position.

8. A rotatable filling-feeder to hold a series of circularly-arranged filling-carriers, a rocking transferrer, an actuating device adapted to rock coaxially with the transferrer, and means operatively connecting the transferrer and actuating device and having limited lost motion relative to the latter, each complete operation of the transferrer acting through said means to positively set, and thereafter operate the actuating device to effect advance of the feeder.

9. A rotatable filling-feeder to hold a series of circularly-arranged filling-carriers, an actuating device therefor, a transferrer having an angular movement independent of said device, and means intermediate the actuating device and transferrer to positively position the former by operative movement of the latter, and to operate the actuating device and thereby advance the feeder by return movement of the transferrer to normal position.

10. A rotatable filling-feeder to hold a series of circularly-arranged filling-carriers, an actuating device therefor, a transferrer having an angular movement independent of said device, and means, including a spring, intermediate said actuating device and transferrer, operative movement of the latter acting positively through said means to set the actuating device, return movement of the transferrer acting, by or through the spring, to cause said means to yieldingly start the operative movement of the actuating device.

11. A rotatable filling-feeder to hold a series of circularly-arranged filling-carriers, a transferrer, means movable therewith to normally lock the feeder, a device to start and effect advance movement of the feeder, and means, including a spring, intermediate said device and the transferrer, operative movement of the latter unlocking the feeder and thereafter positively moving the said device into starting position, return movement of the transferrer acting to compress the spring and through said means operate the said device to effect advance of the feeder without shock.

12. A rotatable filling-feeder to hold a series of circularly-arranged filling-carriers, an attached ratchet, a coöperating pawl, a transferrer having an angular movement independent of the pawl, a connection between the latter and the transferrer to positively set the pawl by operative movement of the transferrer, and a spring between said pawl and connection to yieldingly move the pawl and advance the feeder by return movement of the transferrer.

13. A rotatable filling-feeder to hold a series of circularly-arranged filling-carriers, an attached ratchet, a rocking and longitudinally-movable coöperating pawl, a transferrer having an angular movement independent of the pawl, means to positively rock and set the pawl by or through the operative movement of the transferrer, and a spring intermediate said pawl and transferrer to yieldingly operate the pawl on return of the transferrer to normal position.

14. A rotatable filling-feeder to hold a series of circularly-arranged filling-carriers, an attached ratchet, a transferrer, a longitudinally-movable, spring-controlled pawl mounted coaxially with the transferrer and coöperating with the ratchet, a pawl-setter carried by the transferrer and acting to positively set the pawl by operative movement of the transferrer, and a spring interposed between the pawl and transferrer to operatively move the pawl and advance the feeder by or through return movement of the transferrer, said pawl moving longitudinally to click over the ratchet during setting movement.

15. A rotatable filling-feeder to hold a series of circularly-arranged filling-carriers, an attached ratchet, a transferrer, a longitudinally-movable pawl fulcrumed coaxially with the transferrer, a spring to maintain the pawl in coöperative relation with the ratchet, a pawl-setter movable with the transferrer and acting to positively set the pawl by or through operative movement of the transferrer, and a spring interposed between the transferrer and pawl and compressed by return movement of the transferrer to operatively move the pawl in a yielding manner and thereby advance the feeder without shock.

16. A movable filling-feeder, a transferrer, means to move the feeder said means including a pawl, a spring interposed between the pawl and transferrer, and a positively-acting pawl-setter, operative movement of the transferrer operating the pawl-setter, and return movement of said transferrer compressing the spring and acting through it upon the pawl to effect movement of the feeder.

17. A rotatable filling-feeder including a peripherally-notched end member, a detent coöperating therewith to prevent retrograde movement of the feeder, a transferrer, means to move the feeder, said means including a pawl, a spring interposed between it and the transferrer, and a yoke-like member rigidly mounted on said transferrer, operative movement of the latter positively engaging and setting the pawl, return movement of the transferrer compressing the spring and acting through it upon the pawl to effect advance movement of the feeder.

18. A rotatable filling-feeder, an attached ratchet, an actuating-pawl to coöperate therewith and advance the feeder, a transferrer, a pawl-setter rigidly mounted thereon to engage and positively set the pawl by operative movement of the transferrer, a spring interposed between the pawl and transferrer, return movement of the latter compressing the spring and yieldingly moving the pawl to advance the feeder, and a fixed stop for and to positively limit such movement of the pawl.

19. A rotatable filling-feeder, an attached ratchet, an actuating-pawl to coöperate therewith and advance the feeder, a transferrer, a pawl-setter rigidly mounted thereon to engage and positively set the pawl by operative movement of the transferrer, a spring interposed between the pawl and transferrer, return movement of the latter compressing the spring and yieldingly moving the pawl to advance the feeder, a fixed stop for and to limit such movement of the pawl, and a locking-finger on the transferrer, to normally engage

the ratchet and lock the feeder, the pawl and its stop also coöperating to lock the feeder when the transferrer is at rest.

20. A rotatable filling-feeder, an attached ratchet, an actuating-pawl to coöperate therewith and advance the feeder, a transferrer having a rigid arm overhanging and normally disengaged from the pawl, operative movement of the transferrer causing said arm to engage and positively set the pawl, a spring interposed between the pawl and transferrer and compressed by return movement of the latter, to thereby yieldingly operate the pawl and advance the feeder, and a fixed abutment to engage and stop the pawl when the feeder has been advanced a predetermined amount.

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

JOHN C. EDWARDS.

Witnesses:
ELIZABETH R. MORRISON,
EMILY C. HODGES.