No. 843,169. PATENTED FEB. 5, 1907.

J. NORTHROP & W. F. ROPER.

FILLING REPLENISHING MECHANISM FOR AUTOMATIC LOOMS.

APPLICATION FILED JAN. 26, 1906.

2 SHEETS—SHEET 1.

Fig. 1.

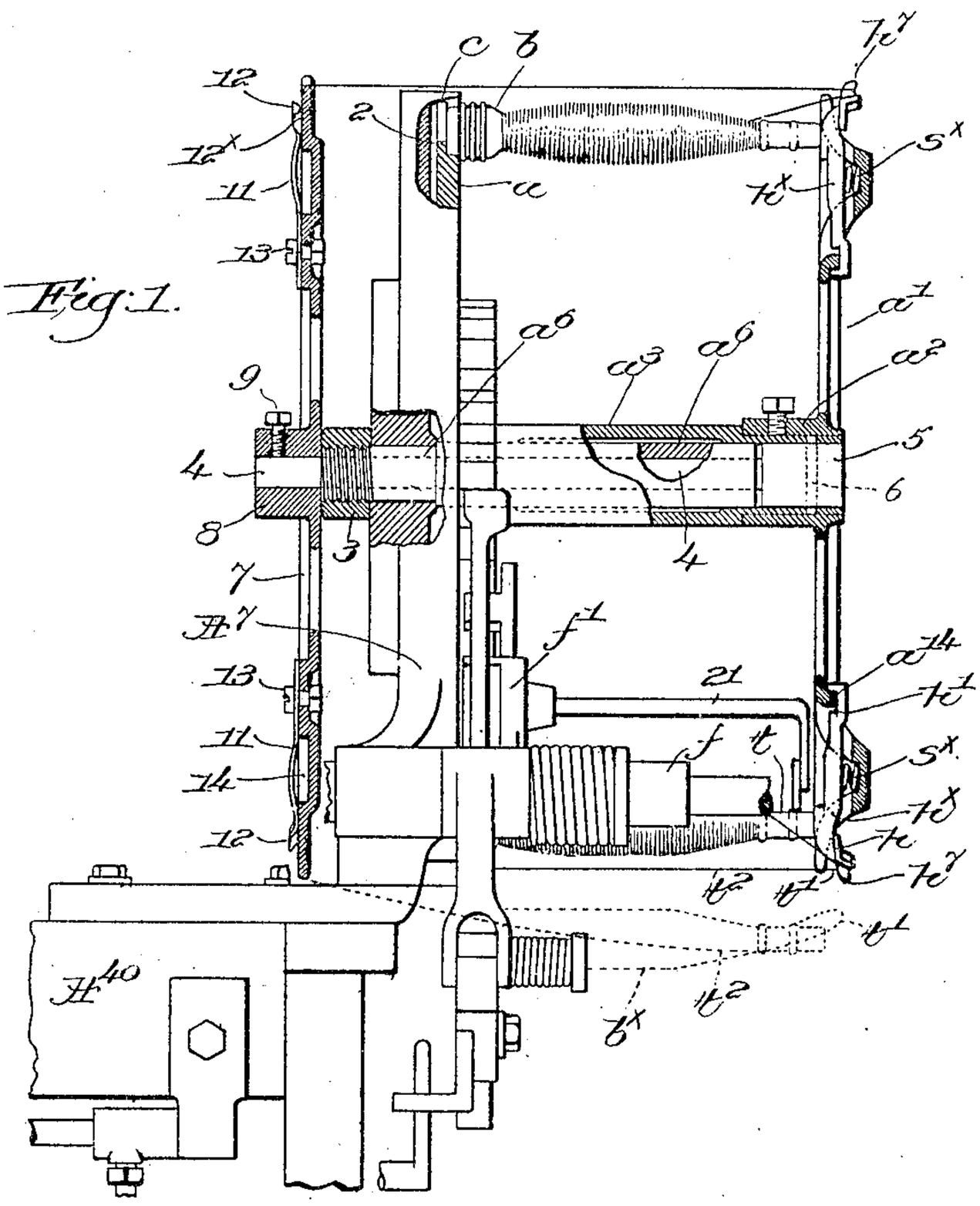
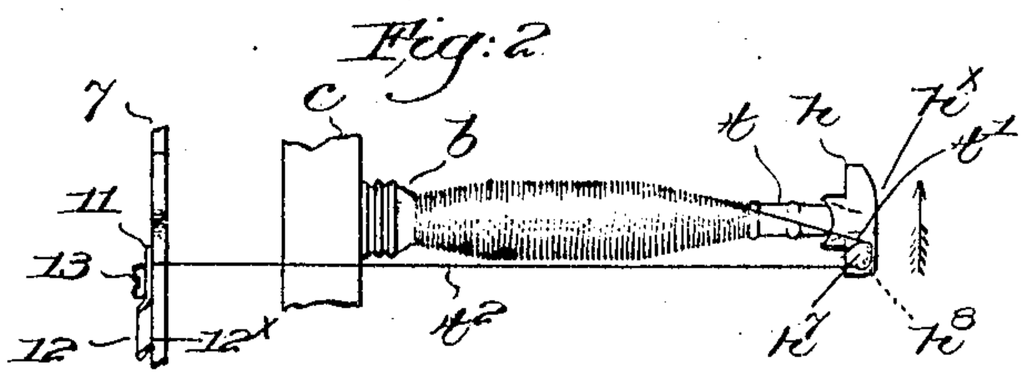


Fig. 2.



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2 SHEETS—SHEET 2.

Fig: 3.

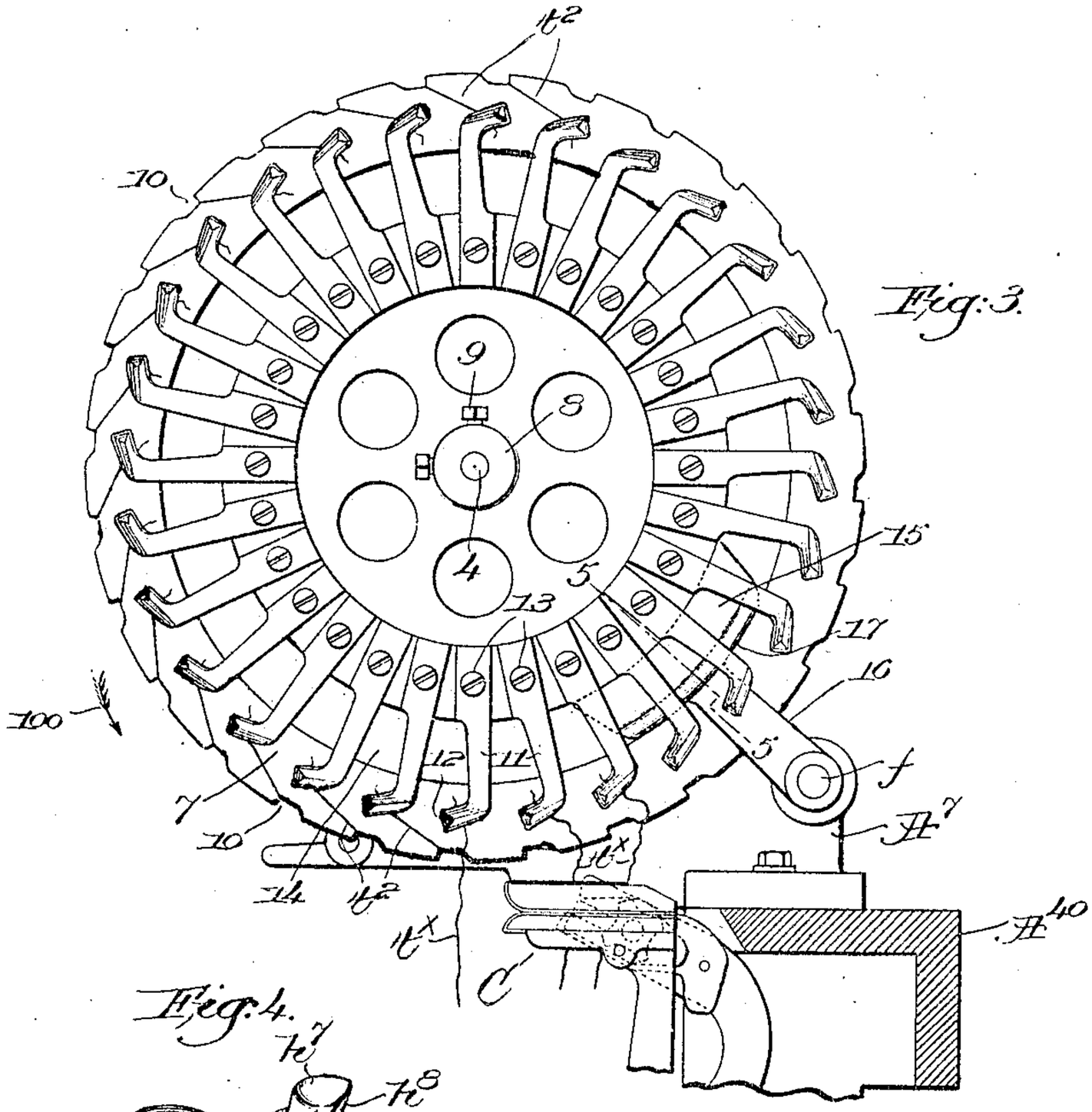


Fig: 4.

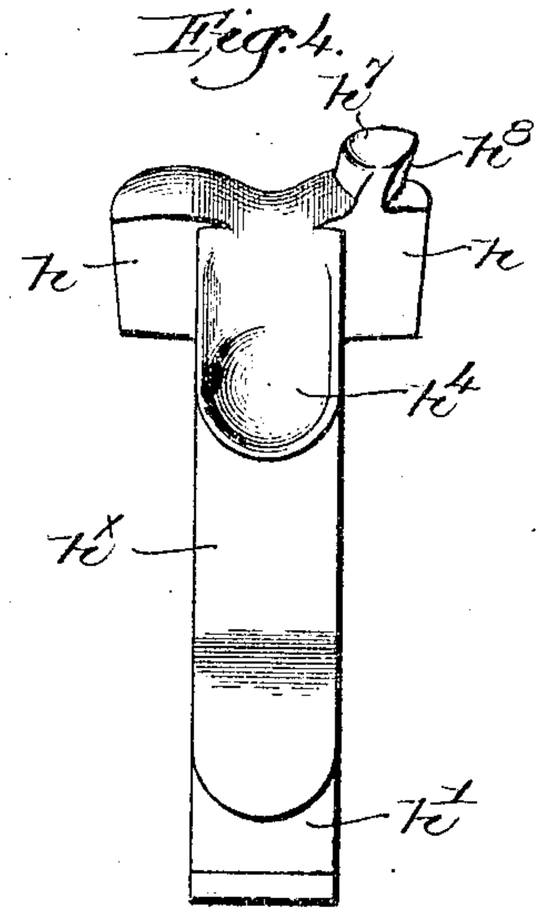
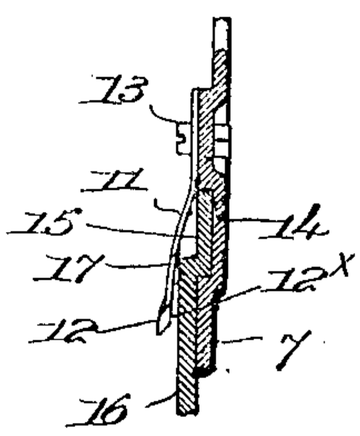


Fig: 5.



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UNITED STATES PATENT OFFICE.

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FILLING-REPLENISHING MECHANISM FOR AUTOMATIC LOOMS.

No. 843,169. Specification of Letters Patent. Patented Feb. 5, 1907.

Application filed January 26, 1906. Serial No. 298,004.

To all whom it may concern:

Be it known that we, JONAS NORTHROP and WALTER F. ROPER, citizens of the United States, and residents of Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Filling-Replenishing Mechanism for Automatic Looms, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to automatic looms, wherein the running filling is replenished from time to time when necessary, and more particularly to the replenishing mechanism of such looms.

In the Northrop type of loom, an illustration of which is found in United States Patent No. 529,940, a reserve of filling supplies in the form of a series of filling carriers or bobbins is sustained in an intermittingly-movable feeder, hopper, or magazine, from which feeder a fresh filling-supply is removed to the running shuttle at each replenishing operation. The end of filling from the newly-inserted supply must be held as the shuttle makes its first shot across the lay from the replenishing side of the loom in order that the automatic threading of the shuttle may be effected, such filling end being thereafter severed by suitable means adjacent the selvage of the cloth.

Heretofore the several filling ends have been led outward from the tip ends of the filling-carriers in the feeder and over the periphery of a disk attached to the outer end of and movable in unison with the feeder, the extremities of such filling ends being suitably held fast. When a filling-carrier is transferred to the shuttle, its filling end extends to this fastening device, the latter and the disk being technically termed a "filling-end holder," and it will be manifest that the length of filling between the holder and the cloth is considerable. Such length is substantially equal to the distance from the selvage to the periphery of the disk, plus the length of filling from the periphery to the fastening device, and as in practice the disk is some distance from the outer end of the feeder (to give the requisite slackness upon transfer) it will be manifest that this entire length of filling end becomes waste when severed adjacent the selvage. This is not so objectionable as to be of great importance when using cheap filling, but with high-grade and expensive woolen or other yarns it is an item af considerable moment, and the waste from such a source must be reckoned with.

Our present invention has for its object the production of means whereby this waste is very materially reduced in practice by more than one-half, the length of filling end severed at the selvage of the cloth being less than the distance from the edge of the cloth to the inner or adjacent end of the feeder. By thus minimizing the waste due to filling ends automatic filling-replenishing mechanism can be operated with great economy when using the most expensive filling.

The various 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 front elevation and partial section of the filling-replenishing mechanism of a Northrop loom with one embodiment of our present invention applied thereto, the position of a filling-carrier at the instant it is inserted in the running shuttle being shown in dotted lines. Fig. 2 is a top plan view of the topmost filling-carrier in the feeder to show the lead of the filling end and the bight or loop formed therein adjacent the tip of the carrier. Fig. 3 is an inner side elevation of the filling-end holder, a part of the stand for the filling-feeder being shown, and the device for parting the filing end adjacent the selvage. Fig. 4 is an enlarged face view of one of the tip-holders, showing the device for sustaining the loop or bight in the filling end, and Fig. 5 is a sectional detail on the line 5 5, Fig. 3.

Referring to Fig. 1, the end plate *a* of the filling-feeder, having peripheral pockets 2 to receive the heads of the filling-carriers *b*, the stand A^7, mounted on the breast-beam A^{40} and having a circular flange *c* overhanging the periphery of plate *a*, the hub a^3 of the latter secured to the hub a^2 of the plate a', so that the two plates will rotate in unison, the transferrer f', mounted to rock on the stud *f*. and the tip-depressing arm 21 may be and are all substantially as in Northrop looms,

such as before referred to. In our present invention, however, the horizontal stud a^6, rigidly secured to the stand A^7 by a nut 3, is made hollow or sleeve-like, as shown in Fig. 1, to receive rotatably within it a long shaft or spindle 4, headed at its outer end at 5 to snugly enter the extremity of the hub a^3, to which it is secured by a pin 6. The connected hubs a^3 a^2 rotate on the stud a^6 as the feeder is advanced step by step in well-known manner, and the spindle 4 rotates in unison with the feeder, the inner end of said spindle projecting beyond the nut 3 for a purpose to be described. The plate a' of the feeder is provided with a series of tip-holders $h^\times$, having lateral lugs or ears h, Fig. 4, to engage the outer face of the plate, the latter having an annular rib or flange a^{14} to receive the transverse grooves h' at the inner ends of the holders, the latter rocking on said flange as a fulcrum and being pressed inward by springs $s^\times$, Fig. 1, all substantially as in United States patent to Stimpson, No. 755,252, dated March 22, 1904. A socket h^4 in the face of each holder receives the tip of the filling-carrier b, the spring $s^\times$ then acting by endwise pressure on the filling-carrier to retain it in the feeder until transferred, as in the patent just referred to.

Referring to Fig. 4, it will be seen that one of the lugs h of the tip-holder is provided with a projection h^7 on the end of the lug, laterally offset from the body of the holder and slightly undercut on its outer face, as at h^8. As the direction of rotation of the feeder is in the direction of arrow 100, Fig. 3, the projection h^7 will be on the "follow" side of each tip-holder as it is advanced by movement of the feeder, this being also evident from an inspection of Fig. 2.

When a filling-carrier is placed in the feeder, the spring of the tip-holder is compressed, swinging the holder outward, as in Fig. 1, and the filling end t is led over the end of the holder and around the projection h^7, forming a bight or loop t', and thence the end is led at t^2 to the end-holding means located adjacent the inner end of the feeder and now to be described.

A circular plate or disk 7, Figs. 1 and 3, is provided with a central hub 8, fixedly secured by one or more set-screws 9 to the projecting inner end of the spindle 4, as shown clearly in Fig. 1, the said disk being thus attached coaxially to the feeder adjacent its inner end, the disk abutting against the face of the nut 3. The periphery of the disk is notched at 10, one notch for each of the filling-carrier-sustaining means on the feeder, the filling end at t^2 being led from the projection h^7 into the next notch 10 following the particular filling-carrier, (the notches being set behind the pockets 2 in the plate a,) so as to clear the body of filling on the carrier, as shown in Fig. 2. On the inner face of the disk (that one nearer the center of the loom) we have mounted a series of end-holding devices, herein shown as substantially L-shaped members 11 12, made of spring metal, the longer arm 11 of each being radially disposed on the disk and secured thereto by a screw-bolt 13 at its inner end.

Referring to Figs. 1, 3, and 5, it will be seen that the disk is provided with a circular recess 14, across which the arms 11 extend, the short arm 12 of each holding member being substantially V-shaped in cross-section so that the apex edge normally rests on the surface of the disk outside the recess, and the arms 11 are also slightly bowed, as shown in Figs. 1 and 5, across the recess.

The free ends of the arms 12 are bent so that their tips are turned out from the surface of the disk in order that the operative can readily insert the extremity of each filling end under an arm, as shown in Fig. 3, after the end has been carried over the edge of the disk in one of the notches 10.

As will be seen from an inspection of Fig. 3, each filling end is drawn against the shouldered or square side of the notch 10 and over to the holding device or spring-clip substantially opposite the following notch, giving a firm grip or hold on the extremity of the filling end. The apex edge $12^\times$ of the arm 12 impinges upon the filling end and presses it firmly against the disk, so that while the grip is secure so long as the clip is in normal position it will readily free the filling end when moved into abnormal position.

From the foregoing it will be manifest that the filling ends from the circularly-arranged series of filling-carriers in the feeder are held by the end-holding means or at near the inner end of the feeder and between the latter and the edge of the cloth, the stand A^7 being interposed between the feeder and the end-holding means. Also it will be clear that a bight, as t', is formed in each filling end near the tip of its filling-carrier, the projections h^7 sustaining the bights, and by slightly undercutting or beveling the projections at h^8 a slight slackness in a filling end will not cause the bight to drop off the projection as it reaches the lower portion of its circular path of movement.

When the transferrer operates to transfer the leading and lowermost filling-carrier of the series to the running shuttle, the particular tip-holder instantly moves inward, when the tip of the filling-carrier releases it, and this slight movement of the tip-holder is sufficient to cause the projection h^7 to shed the bight t' in the filling end.

In Fig. 1 the dotted-line filling-carrier $b^\times$ is in position in the shuttle, and we have shown the bight t' as freed from its holding projection, it being remembered that the extremity of the filling end is clamped to the disk 7, as explained. The shuttle is now picked to the

left, viewing Fig. 1, and passes through the shed, the slack provided by the bight t' and part t^2 of the filling end preventing any sudden breaking strain on the filling when the shuttle is picked, and the filling end stretches from the disk 7 to the nearer edge of the cloth as the shuttle lays the filling in the shed. As is usual in looms of the type herein illustrated, this filling end is severed by a temple thread-cutter close to the selvage after the newly-laid pick is beaten in, and a thread-parting device for the outgoing filling is indicated at C, Fig. 3, but forming no part of our present invention.

When the temple thread-cutter has severed the filling end, the piece of thread or yarn between the cutter and the filling-end holder hangs from the clip, as at $t^\times$, Fig. 3, and to get rid of these pieces of filling we mount a segmental plate 15 on an arm 16, Fig. 3, rigidly attached to the stud f. The plate 15 fits easily in the recess 14 of the disk 7 (see Figs. 3 and 5) and is provided with a raised cam-rib 17, rounded off at its ends, as shown in Fig. 3, and so located that as one after another of the clips reach the cam-rib their arms 11 will ride up thereon, lifting the short arms 12 clear of the disk 7, (see Fig. 5,) and thereby releasing the hanging ends $t^\times$ of filling, the latter dropping to the floor. By making the impinging portion of each arm 12 as a substantial V edge, as at $12^\times$, the release of the piece of filling is facilitated, as there is so small a portion of the clip in engagement therewith. The clearing away of these pieces of filling is further facilitated by making the cam-rib 17 long enough to hold up several of the clips, so that the vibration of the loom will act for some time upon every clip held in released position. As the feeder advances the clips slide off the cam-rib and resume their normal operative position with relation to the disk 7.

It will be seen that the length of the filling end which is cut off at the cloth selvage is very much reduced by our invention, it being just long enough to reach from the cloth to the clip on the disk 7, whereas heretofore the length has been more than doubled, owing to the location of the end-holding means at the outer end of the filling-feeder. Such a great reduction in these waste pieces of filling means a corresponding reduction in the percentage of waste, a matter of importance when using expensive filling.

The particular structure of the filling-feeder is not material so far as concerns our present invention, for any suitable form of rotatable feeder may be employed. So far as we are aware, however, it is broadly new to hold the filling ends at or near the inner end of a rotatable feeder in a filling-replenishing loom between the feeder and the cloth, and accordingly our invention is not restricted to the precise construction and arrangement herein shown, as the same may be varied or rearranged in various 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. The combination, in a loom, of an intermittingly-rotatable feeder to sustain the heads and tips of a series of filling-carriers as a reserve supply, a transferrer to transfer the filling-carriers singly to the running shuttle, and means rotatable with and at the inner end of the feeder to hold the filling ends leading from said filling-carriers.

2. A filling-feeder comprising a plate to sustain the heads of a circularly-arranged series of filling-carriers, a connected plate, yielding tip-holders thereon to sustain the tips of the filling-carriers, each tip-holder having a projection thereon, and a filling-end holder located adjacent the inner end of the feeder and connected therewith, the several ends of filling passing from their respective filling-carriers around the projections on the tip-holders and thence back to the filling-end holder.

3. A filling-feeder comprising two connected and rotatably-mounted plates adapted to sustain respectively the heads and tips of a series of filling-carriers, means adjacent to and connected with the head-sustaining plate to hold the filling ends, and means on the tip-sustaining plate to support a bight in each filling end while the corresponding filling-carrier is in the feeder.

4. A filling-feeder comprising two connected and rotatably-mounted plates adapted to sustain respectively the heads and tips of a series of filling-carriers, means adjacent to and connected with the head-sustaining plate to hold the filling ends, and yieldingly-mounted means on the tip-sustaining plate to temporarily support a bight or loop in each filling end until the corresponding carrier is removed from the feeder.

5. The combination, in a loom, of an intermittingly-rotatable feeder to sustain the heads and tips of a series of filling-carriers as a reserve supply, a transferrer to transfer the filling-carriers singly to the running shuttle, a filling-end holder at the inner end of and rotatable in unison with the feeder, and means on the outer end of the latter to support a bight of each filling end adjacent the tip of the corresponding filling-carrier.

6. The combination, in a loom, of a rotatable filling-feeder to sustain the heads and tips of a series of filling-carriers, a disk rotatable with and adjacent the head-sustaining end of the feeder, devices thereon to hold the extremities of the filling ends leading from the several filling-carriers, and means on the other end of the feeder to support a bight or loop in each filling end.

7. The combination, in a loom, of intermittingly-movable means adapted to sustain a series of filling-carriers and present them singly into position to be transferred to the running shuttle, a transferrer, a filling-end holder movable with said sustaining means and adjacent the heads of the filling-carriers, and means to automatically release the severed filling ends from the holder.

8. The combination, in a loom, of intermittingly-movable means adapted to sustain a series of filling-carriers and present them singly into position to be transferred to the running shuttle, a transferrer, a filling-end holder movable with and at the inner end of said sustaining means, and automatic means to cause the holder to release the filling ends at a predetermined point in its movement.

9. The combination, in a loom, of a rotatable feeder, adapted to contain a plurality of filling-supplies, means to transfer the supplies singly to the running shuttle, and filling-end-holding means located adjacent the inner end of the feeder.

10. The combination, in a loom, of a filling-feeder at one side thereof to sustain a circularly-arranged series of filling-carriers, means to transfer them one by one to the running shuttle, and means intermediate the feeder and the cloth to hold the filling ends of the filling-carriers.

11. The combination, in a loom, of a rotatable feeder to sustain the heads and tips of a series of filling-carriers, a transferrer to remove the latter singly to the running shuttle, means to form a loop in each filling end adjacent the tip of its filling-carrier, to provide requisite slackness when transferred and to direct the filling end, and a filling-end holder adjacent the head-supporting end of the feeder.

12. In a loom, a fixed stand, a filling-feeder rotatably mounted thereon at its outer side and comprising connected plates to respectively sustain the heads and tips of a series of filling-carriers, a peripherally-notched disk at the opposite side of the stand, coaxially connected with the feeder, end-holding clips on the disk, to engage and hold the filling ends, and means on the feeder to temporarily support an outwardly-extended loop in each filling end, the filling ends leading from the filling-carriers around said means and back over the notched disk to the clips.

13. The combination, in a loom, of two connected plates to sustain the heads and tips of a series of filling-carriers, a fixed support on which said plates are rotatably mounted, a peripherally-notched guide-disk coaxially connected with said plates, individual holding devices on said disk to engage and hold the filling ends, means on the tip-sustaining plate to form a bight or loop in each filling end, and means to temporarily render inoperative each holding device after the corresponding filling-carrier has been removed to the running shuttle.

14. The combination, in a loom, of a rotatable feeder to sustain a series of filling-carriers, a stand on which the feeder is mounted, a transferrer to remove the filling-carriers singly from the feeder to the running shuttle, a filling-end holder connected with the feeder adjacent its inner end and located between the stand and the cloth, and means to cause the filling ends one after another to be released from the holder after their respective filling-carriers have been transferred.

15. In a loom, means to automatically replenish the running filling, including a rotatable feeder for reserve supplies of filling, and a filling-end holder between said feeder and the cloth.

16. In a loom, means to automatically replenish the running filling, including a rotatable feeder for reserve supplies of filling, a filling-end holder connected with the feeder adjacent its inner end, and means to form a loop in each filling end at the outer end of the feeder.

17. A filling-feeder comprising a plate adapted to sustain the heads of a series of filling-carriers, a connected plate, a corresponding series of spring-controlled tip-holders mounted thereon and each provided with a lug, combined with a filling-end holder connected with the inner end of the feeder and comprising a peripherally-notched disk and a series of holding devices thereon, the filling ends being led around the lugs and inward over the edge of the disk to the holding devices.

18. A filling-feeder comprising two connected, rotatably-mounted plates adapted to sustain the heads and tips of a series of filling-carriers, combined with a filling-end holder comprising a disk coaxially connected with the feeder, end-holding devices thereon, and means to automatically render said devices inoperative one after another, to release the filling ends after removal of the carriers from the feeder.

19. A filling-feeder comprising two connected, rotatably-mounted plates adapted to sustain the heads and tips of a series of filling-carriers, combined with a filling-end holder comprising a disk coaxially connected with the feeder, spring-clips thereon to hold fast the filling ends, and a fixed cam to act upon one after another of the clips, and cause each to release its filling end after the corresponding filling-carrier has been removed from the feeder.

20. The combination, in a loom, of a rotatable filling-feeder to sustain a series of filling-carriers, a transferrer to remove the latter one by one to the running shuttle, a filling-end holder coaxially connected with the feeder at its inner end, comprising a peripherally-

notched guide-disk and holding devices on the inner faces thereof to secure the extremities of the filling ends, and means to support an outwardly-extended loop or bight in each filling end near the tip of the filling-carrier from which it leads.

21. The combination, in a loom, of a feeder to removably sustain a circularly-arranged series of filling-carriers, filling-end-holding means located between the filling-carriers and the cloth, and means to provide slack in each filling end when its carrier is removed from the feeder.

22. The combination, in a loom, of a rotatable feeder to removably sustain a series of filling-carriers, a transferrer to remove the latter and insert the same in the running shuttle, filling-end-holding means rotatable with the feeder and located at the inner end thereof, and means to slacken each filling end as its carrier is transferred.

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

JONAS NORTHROP.
WALTER F. ROPER.

Witnesses:
GEORGE OTIS DRAPER,
ERNEST W. WOOD.