No. 834,945.

PATENTED NOV. 6, 1906.

E. S. STIMPSON.

FILLING REPLENISHING MECHANISM FOR LOOMS.

APPLICATION FILED FEB. 8, 1906.

3 SHEETS—SHEET 1.

Fig: 3.

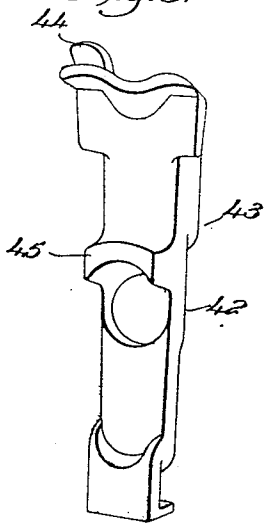


Fig: 1.

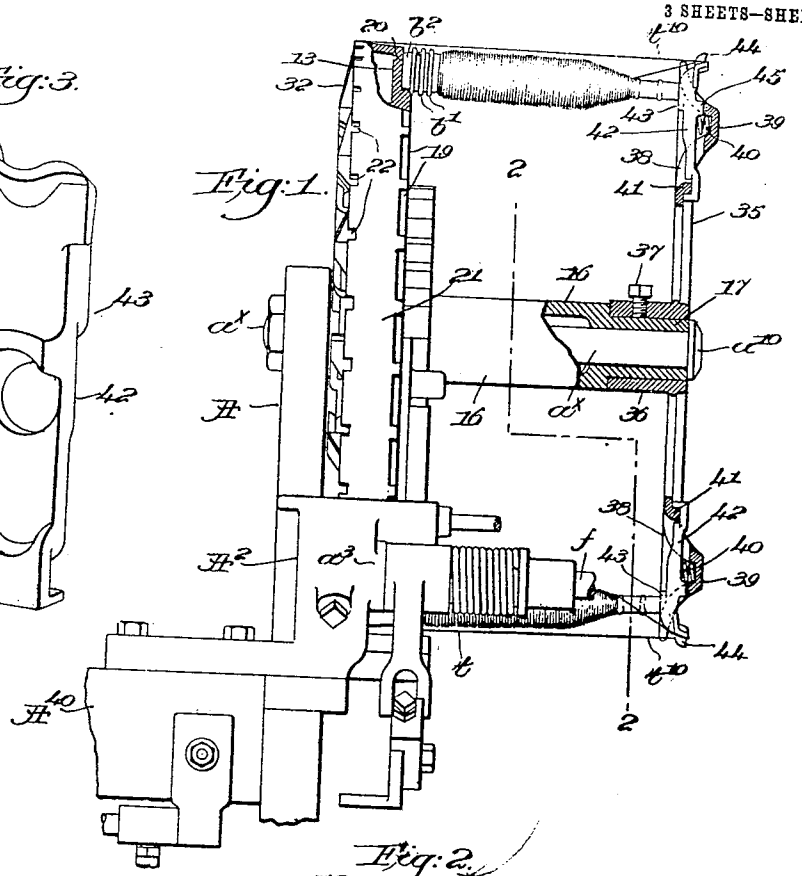
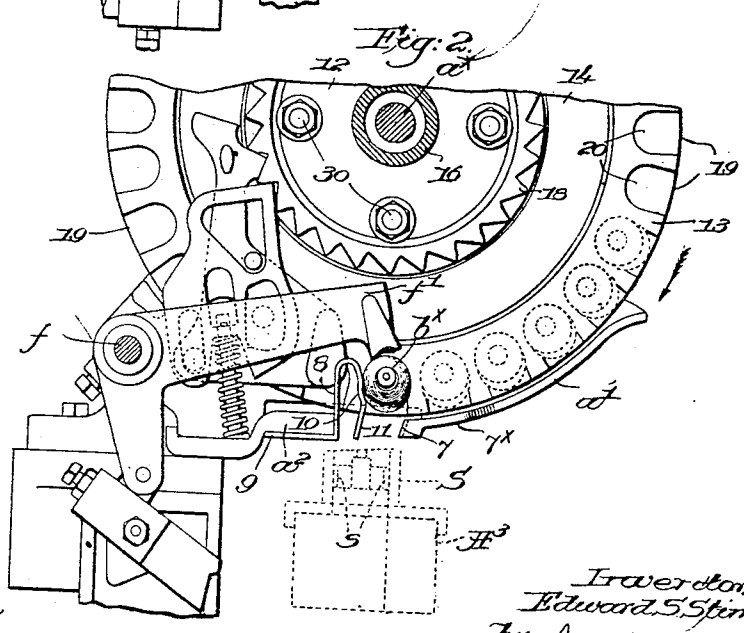


Fig: 2.



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3 SHEETS—SHEET 2.

Fig: 4.

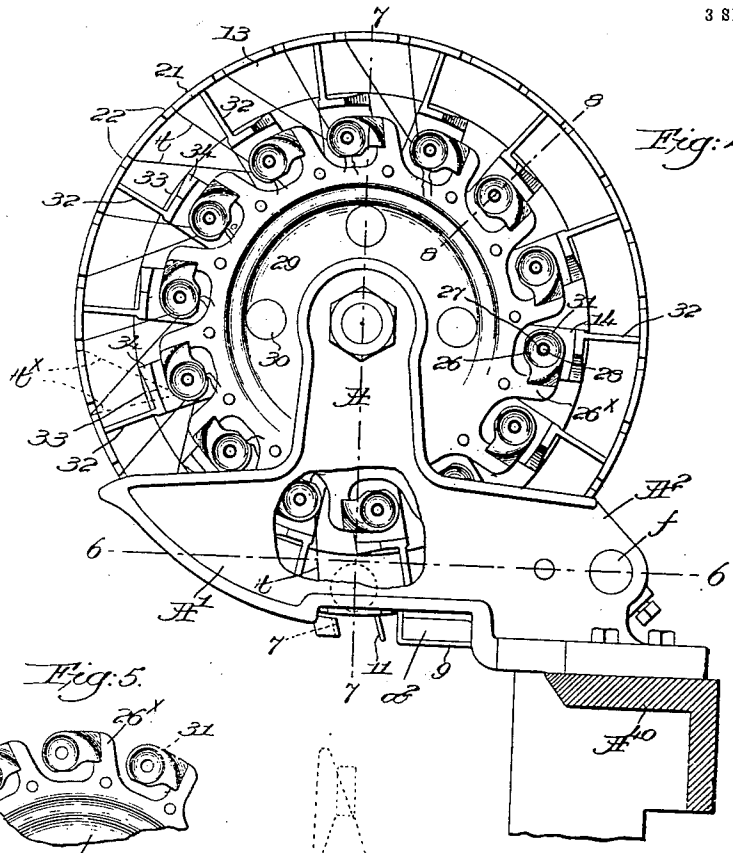


Fig: 5.

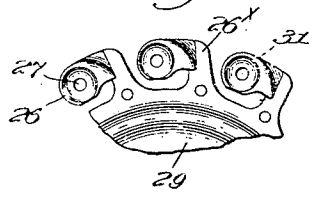
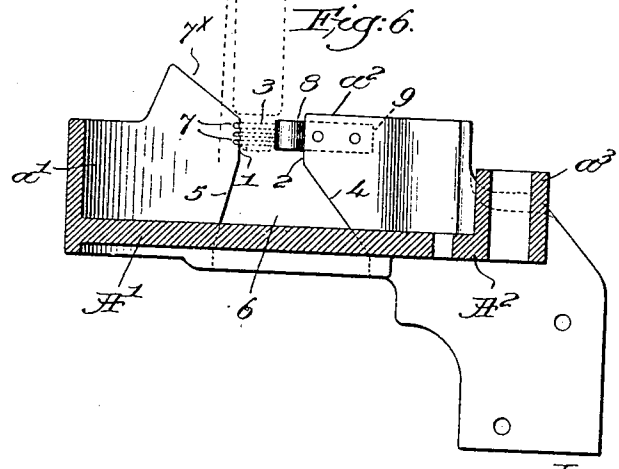


Fig: 6.



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APPLICATION FILED FEB. 8, 1906.

3 SHEETS—SHEET 3.

Fig. 7.

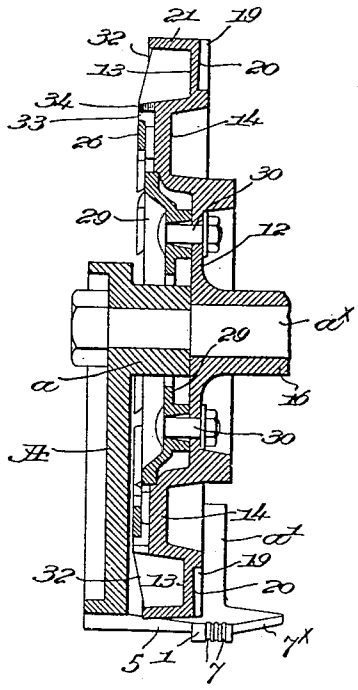


Fig. 8.

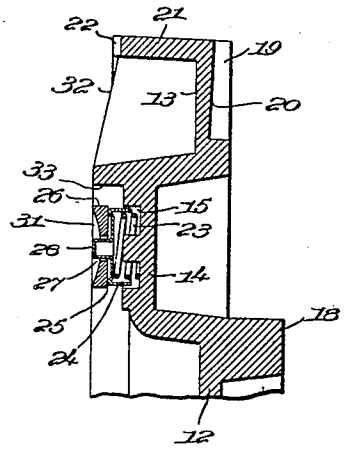
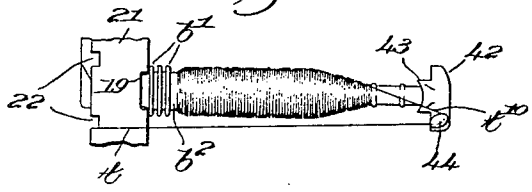


Fig. 9.



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UNITED STATES PATENT OFFICE.

EDWARD S. STIMPSON, OF HOPEDALE, MASSACHUSETTS, ASSIGNOR TO DRAPER COMPANY, OF HOPEDALE, MASSACHUSETTS, A CORPORATION OF MAINE.

FILLING-REPLENISHING MECHANISM FOR LOOMS.

No. 834,945. Specification of Letters Patent. Patented Nov. 6, 1906.

Application filed February 8, 1906. Serial No. 300,029.

To all whom it may concern:

Be it known that I, EDWARD S. STIMPSON, a citizen of the United States, residing in Hopedale, county of Worcester, and State of Massachusetts, have invented an Improvement in Filling-Replenishing Mechanism for 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 more particularly to the filling-replenishing mechanism of looms of the well-known Northrop type, as illustrated in United States Patent No. 529,940—for instance, wherein the running shuttle is automatically provided with fresh filling from a reserve-supply held in a filling feeder or hopper. Such reserve-supply is in practice a plurality of filling-carriers or bobbins suitably sustained in the feeder and removed therefrom one by one when called for and inserted in the running shuttle, the latter being provided with holding-jaws to yield and engage the head of the inserted filling-carrier. This removal is effected by a transferrer of well-known operation and construction, and the filling-carrier during transfer passes through a discharge-throat, the front side of which has heretofore been made as a rigid abutment engaging and guiding the front side of the carrier-head. At the back of the throat a yielding support or buffer has been provided to support and guide the back of the filling-carrier when transferred, one form of such support or buffer being shown in United States Patent No. 664,790, granted to me December 25, 1900. It will be understood by those skilled in the art that the head of the leading filling-carrier—*i. e.*, the one next to be transferred—rests against the fixed abutment, and the yielding support extends under the head, more or less, according to the particular form of support. Transfer takes place as the lay is moving forward, and in actual practice there has been at times a tendency to throw the bobbin-head forward against the front wall of the shuttle, often splintering it and sometimes resulting in imperfect transfer. Such forward throw of the bobbin-head appears to be due to the fact that as the bobbin is passing below the fixed abutment and from the end of the support to the jaws in the shuttle the spring controlling the said support or buffer acts to throw the bobbin-head forward against the shuttle-wall and out of the proper position to accurately enter the jaws.

One of the objects of my present invention is the production of means to obviate such action, whereby not only is the faulty action referred to obviated, but the structure of the apparatus is simplified and cheapened. Furthermore, by this part of my present invention the bobbin being transferred is controlled practically until the instant it is grasped by the spring-holding jaws in the shuttle, the construction being such that the bobbin-head is exactly positioned in the jaws, while provision is made for a slight yielding movement of the controlling device in the direction of lay movement. Perfect transfer is effected with absolute certainty and with much less expenditure of power than has been necessary heretofore.

Another part of my invention has to do with means for holding the filling ends of the several filling-carriers in the feeder, such filling ends being held between the cloth and the filling-carriers so that the length of waste filling is greatly reduced.

The broad invention for holding the filling ends between the cloth and the filling-carriers is not claimed by me; but the arrangement of the holding means and certain novel features of construction thereof are hereinafter described in detail and made the subject of claims.

When the filling ends are held at the inner end of the feeder, said ends tend to hang down after they have been severed by the usual temple thread-cutter, and are apt to be caught between the abutment or guide and the next filling-carrier to be transferred, and herein I have provided means to prevent such catching of loose-filling ends.

I have also provided novel means for securely holding the filling-carriers in the feeder in such manner that the guard-flange, heretofore employed to overhang the head of a large number of filling-carriers in the feeder, is much reduced in length, resulting in a saving in material and weight, such means for holding the filling-carriers also acting to restrain them from axial rotation when in transferring position.

The foregoing and other novel features of

my invention are all fully described in the subjoined specification and particularly pointed out in the following claims.

Figure 1 is a front elevation and partial section of filling-replenishing mechanism embodying my present invention, one filling-carrier being shown in position for transfer and another at the top of the feeder. Fig. 2 is a transverse sectional view thereof on the line 2 2, Fig. 1, showing the novel abutment and guide, with the leading filling-carrier of the feeder in engagement therewith, the dotted-line position of the lay showing the same approaching front center. Fig. 3 is an enlarged perspective view of one of the tip-holders shown in Fig. 1 to illustrate a feature thereof to be referred to hereinafter. Fig. 4 is an inner end view of the filling-feeder, showing the filling-end-holding means and the manner in which the the filling ends are guided and led, the peculiar shape of the stand on which the feeder is mounted being clearly illustrated. Fig. 5 is a detail of one of the fixed members of a filling-end holder or clamp to be referred to. Fig. 6 is a transverse sectional detail on the line 6 6, Fig. 4, showing the lower part of the stand, the discharge-opening for the transferred filling-carrier, and the yielding abutment and fixed guide at front and rear of said opening, respectively. Fig. 7 is a vertical section on the line 7 7, Fig. 4, taken through the head-sustaining plate of the feeder and the filling-end-holding means mounted on said plate. Fig. 8 is an enlarged section on the line 8 8, Fig. 4, showing the construction of one of the end-holding devices or clamps and also the structure of the pockets in the head-sustaining plate of the feeder; and Fig. 9 is a view showing the lead of the filling end of a filling-carrier positioned in the feeder, the bight or loop formed in such filling end adjacent the tip of the carrier being illustrated.

The breast-beam A^{40} has mounted upon it a stand of substantially inverted-T shape, the upright portion A having a hub *a*, Fig. 7, in which is secured a horizontal outwardly-extended stud $a^{\times}$, on which is rotatably mounted the filling-feeder or hopper, the peculiar shape of the stand exposing the greater portion of the adjacent end of the feeder, as shown in Fig. 4. On the lower rear edge of the base portion A′ of the stand I provide a short segmental flange or guard *a′*, (clearly shown in Fig. 2,) to be referred to hereinafter.

Opposite the lower end of the guard the base portion A^2 of the stand is provided with a laterally-extended and substantially horizontal shelf a^2, Fig. 6, the adjacent edges of the guard and shelf being parallel at 1 and 2 to form a discharge-opening 3, through which a filling-carrier passes when transferred from the feeder to the shuttle, the edges then diverging toward the stand, as at 4 and 5, Fig. 6, leaving a large opening 6, for a purpose to be described.

The part 1 of the edge of the guard is preferably grooved at 7 to coöperate with the usual rings on the bobbin-head when a change of filling is effected, the rings at the back of the head at such time being directed by the grooved part of the flange, such part thus constituting a rigid guide for the head of the filling-carrier during transfer thereof. When a filling-carrier is in position for transfer, its head is above the said guide (see Fig. 2) and ordinarily not in engagement therewith; but as soon as its transferring movement begins the guide acts and prevents longitudinal movement of the filling-carrier.

In accordance with my present invention I provide a yielding or yieldingly-movable stop or abutment against which bears the front of the head of the filling-carrier next to be transferred, such carrier being indicated at $b^{\times}$, Fig. 2.

The stop or abutment is preferably made of a piece of rather stiff spring metal bent into ∩ shape, one leg 8 thereof, Fig. 2, rising from the edge portion 2 of the shelf a^2 and being bent thereunder at 9 and fixedly attached in any suitable manner to the shelf. The other depending leg of the abutment is slightly concave to form a shallow seat 10, Fig. 2, and its free lower extremity 11 is shown as straight and slightly inclined forward, the extremity of such leg approaching as closely as is practicable the top of the shuttle-box at the replenishing end of the lay.

When the advance movement of the feeder moves the leading filling-carrier forward, its head abuts against the seat 10, as shown in Fig. 2, so that the abutment serves to position the carrier in position to be transferred, and by reason of the seat a slight vertical support is provided, so that there is no tendency of the carrier to move downward prematurely.

Transfer is effected in well-known manner by the transferrer *f′*, mounted to rock on a stud *f*, securely held in a hub a^3 on the part A^2 of the stand, the automatic actuation of the transferrer forming no part of my invention and being effected in a manner usual in Northrop looms—such, for instance, as shown in United States Patent No. 529,940, dated November 27, 1894.

In Fig. 2 the shuttle S (see dotted lines) is provided with spring holding-jaws *s*, substantially of the construction illustrated in United States Patent No. 538,507, granted April 30, 1895, to Draper, the jaws grasping the rings *b′* on the head b^2 of the filling-carrier (the rings being shown in Fig. 9) and holding the carrier in proper position in the shuttle. The transfer is effected as the lay A^3 is moving forward, and as the descending transferrer *f′* pushes the filling-carrier out of the feeder the guide 7 coöperates with the rings at the back

of the head, while the rings at the front slide down against the part 11 of the abutment, and as the guide 7 is perfectly rigid there is no tendency to throw the filling-carrier forward out of proper position relatively to the holding-jaws in the shuttle or against the front wall of the latter. The abutment and guide constitute front and back walls of a discharge-throat, the front wall or abutment yielding to permit the passage of the carrier-head, and just at the instant when the filling-carrier is controlled, partly by said stop or abutment and partly by the jaws, the abutment can yield slightly in the direction in which the lay is moving. By such construction the filling-carrier is transferred with great certainty and accuracy and with considerably less power than has been required before, the abutment yielding or moving forward slightly instead of presenting an unyielding surface. In other words, the abutment accommodates itself to the transferring movement of the filling-carrier, instead of compelling the latter to change its movement to accommodate itself to a rigid abutment, so that the power necessary to effect transfer is reduced and the diversion of the filling-carrier from its proper path is obviated.

The filling-feeder in general comprises two connected plates or disks rotatably mounted on the stud $a^{\times}$ to sustain, respectively, the heads and tips of a plurality of filling-carriers, said feeder being intermittingly moved to present them one by one into position to be transferred; but there are various novel features of construction embodied in the feeder, which will now be described.

The head-sustaining plate is a casting of peculiar shape, (best shown in Fig. 7,) the central portion 12 and concentric peripheral portion 13 being substantially in the same plane and connected by an annular portion 14, which latter has on its outer side a series of circularly-arranged seats 15, Fig. 8, a long sleeve-like hub 16 on the part 12 loosely embracing the stud $a^{\times}$ and being reduced at its outer end at 17, Fig. 1.

The ratchet 18 is shown as an integral part of the plate, and any suitable mechanism for effecting intermitting feed movement of the feeder can be employed, such mechanism forming no part of my present invention.

The outer side of the plate is provided with open-ended peripheral pockets 19 to receive the heads b^2 of the filling-carriers; but herein the bottom 20 of each pocket is in a plane not at right angles to the axis of rotation of the feeder, but inclined with relation thereto, to be exactly at right angles to the longitudinal axis of the filling-carrier the head of which is held in the pocket. This inclination of the pocket-bottoms is shown in Figs. 7 and 8, it being manifest that the inner end of the pocket is deeper than its outer end, the object of this construction being referred to hereinafter. Said pockets are formed in the portion 13 of the plate, and a wide peripheral flange 21 is made on such portion 13, the inner edge of the flange being notched at 22 to receive the filling ends t, led rearward from the filling-carriers and held by the end-holding means.

A coiled spring 23 is set in each seat 15, the free end of the spring entering a cup-shaped device 24, constituting the movable member of the end-holding device or clamp, the acting face of said member having a raised annular contact-lip 25, which is pressed by the spring against the flat face of the coöperating fixed member 26 of the clamp, the member 26 having an aperture 27, Fig. 5, through which loosely extends a projection or stud 28, secured to or forming a part of the movable member 24.

In the present embodiment of my invention I have arranged each clamp to hold the filling ends led from two adjacent filling-carriers, thus making the number of clamps equal to one-half the number of pockets 19 in the head-sustaining plate of the feeder; but my invention is not restricted to such relative number of clamps and pockets nor to the particular number of filling ends to be held by each holding device or clamp.

The fixed members 26 of the clamps are herein shown as formed by the outer ends of L-shaped projections 26 $26^{\times}$ on the edge of a disk 29, loosely surrounding the hub a of the stand and bolted at 30 to the inner side of the central part 12 of the head-sustaining plate.

The part $26^{\times}$ of each projection extends outward from the periphery of the disk, and the part 26 bends around to overhang the coöperating movable clamping member 24.

By pressing on the stud 28 the member 24 is pushed away from the face of the fixed member 26, compressing the controlling-spring 23, so that thereby the clamp is opened manually to either receive a filling end or to release an end clamped thereby.

By making an annular contact, as 25, on one of the clamping members a better grip on the filling end is insured, as there is less chance of lint or other foreign matter lodging between the clamping members and preventing their proper action.

I prefer to slightly concave the outer face of the fixed members 26, as at 31, to permit the finger of the operative to more readily operate the stud or release 28 to open the clamp.

Referring to Fig. 4, it will be seen that the filling ends t from two adjacent filling-carriers in the feeder are led over the flange 21, through the notches 22, and thence to one of the clamping devices, and owing to the peculiar shape of the feeder-stand the majority of the said devices are always exposed. This enables the operative to readily manipulate the filling ends when inserting filling-carriers in the feeder at the front or at the right hand,

viewing Fig. 4, it being manifest by inspecting Fig. 2 that the pocket 19 is the lowest one in which a filling-carrier may be inserted, as the position and operation of the transferrer require a part of the feeder to be empty.

In order to facilitate the lead of the groups of filling ends in a regular and proper manner to the several end-holding devices or clamps, I have provided the inner side of the head-sustaining plate with a series of divisional wings 32, Figs. 4, 7, and 8, extending inward from the flange 21 and projecting from the part 13 of the plate, each wing being set slightly forward of the nearest clamping device and terminating at the part 14 of the head-sustaining plate.

The inner end of each wing is turned substantially at right angles to form a guard 33 outside of and adjacent the corresponding holding device, the rear edge of the guard being beveled or sloping at 34 to the part 14.

As shown in Fig. 4, two notches 22 are included between each two divisional wings, and the filling ends led from the notches must be directed rearwardly to the holding device unprotected by the guard 33, for if led to the other holding device the ends would have to draw across its guard or the beveled edge 34 thereof, and that edge would tend to deflect at least one of the ends from the holding device. This will be clear from the dotted lines $t^{\times}$, Fig. 4, which indicate two improperly-led filling ends; but when the ends are led properly they pass through the clearance between the upright edge of one guard and the beveled edge of the one next in front. The arrangement described greatly facilitates the work of the operative in leading the filling ends to the proper holding devices, as will be manifest.

When a filling-carrier is transferred from the feeder to the shuttle, the filling end will pass from the holding device through the large recess or opening 6 and thence to the shuttle as it is thrown across the lay, and in automatic looms of the type referred to herein the filling end is cut close to the selvage of the cloth by a temple thread-cutter. The loose end hangs from the holding device and is held by the broad flange 21 well away from the abutment or stop hereinbefore referred to, so that it cannot be caught between the abutment and the next filling-carrier in the feeder as the latter advances to position such carrier in readiness for transfer. By providing the large recess 6 the hanging ends are given ample room and the diagonal edge 4 of the shelf a^2 serves to direct the ends away from the abutment toward the stand. Thus both the recess and the broad flange act to prevent fouling of the loose and hanging filling ends severed after transfer of their respective filling-carriers. The guard a' is made very short, as it is only advisable to cover the rear lower portion of the head-sustaining plate of the feeder thereby, the filling-carriers being held so securely in the feeder by the retaining devices that the guard is practically a precautionary or safety attachment for the heads of the carriers in the lower rear quarter of the feeder. The tip-sustaining plate 35 of the filling-feeder has a hub 36, which fits the reduced end 17 of the hub 16, Fig. 1, and is secured thereto by a set-screw 37, the head a^{10} of the stud $a^{\times}$ retaining the connected plates of the feeder upon the stud. Said plate 35 has a series of radial openings 38, crossed by bridge portions 39, which sustain springs 40, a ledge 41 at the inner end of each opening serving as a fulcrum for a tip-holder 42, (shown separately in Fig. 3,) one of such holders being inserted in each opening 38, the latter being located opposite the pockets 19.

The tip-holders and the plate on which they are mounted are substantially as in United States Patent No. 755,252, granted to me March 22, 1904, the spring 40, seated on each bridge 39, serving to press inward the outer end of the adjacent holder, the latter having on its inner face a seat 43 for the tip of the filling-carrier, as in said patent.

The tips of the carriers in the feeder are somewhat nearer the axis of the feeder than are the heads, so that the axes of said carriers converge slightly toward the outer end of the feeder; but each axis is exactly at right angles to the bottom 20 of its pocket 19 in the head-sustaining plate.

When a filling-carrier is inserted in the feeder, its head is slid into a pocket and then its tip is pushed into the seat 43 of the tip-holder, the latter yielding as its spring 40 is compressed, and the entire end of the carrier-head rests squarely upon the bottom of the pocket. Hence it is necessary to press outward slightly the tip-holder to remove the filling-carrier, and as some positive effort is required to do this the carrier remains securely in place in the feeder until acted upon by the feeder.

The vibration of the mechanism when the loom is running cannot dislodge the filling-carriers, and thus it will be plain why the guard a' is used only as a safety device.

Inasmuch as the entire end of the carrier-head engages the pocket-bottom, the friction prevents any axial rotation of the carrier when it is in position for transfer, with its head resting against the abutment or stop, the spring of the tip-holder pressing the end of the carrier-head against the bottom of the pocket.

The filling end t is led from the tip of the filling-carrier outward around a projection 44 on the outer end of the holder and laterally offset from its body and thence back over the flange 21, a loop or bight t^{10} being formed thereby, Figs. 1 and 9, to afford sufficient slack thread when transfer takes place.

Such lead of the filling end to form a loop or bight, however, is not of my invention, nor is the structure of the tip-holder to provide the same, nor do I claim the broad idea of holding the filling ends between the cloth and the feeder. I have, however, provided the tip-holder on its outer face with a stop 45 to engage the bridge 39 when the tip-holder is pushed outward a predetermined distance. The stop prevents sufficient outward movement of the tip-holder to permit the tip of the carrier to be pushed through or past the seat 43, as can be done by a careless operative when loading the feeder. The stop also prevents the operative from inserting a filling-carrier with the end of its head resting on the face of the head-sustaining plate between two pockets, for if a carrier is so placed the stop 45 will abut against the bridge before the tip of the carrier can be pushed inward into the seat 43. When the carrier-head is inserted in a pocket, however, the clearance between the stop and the coöperating part of the plate 35 is sufficient to allow outward movement of the tip-holder to seat the tip of the filling-carrier properly.

The filling end leads inward from the projection 44 on the tip-holder to a notch 22 in the position shown in dotted lines, Fig. 6, when a filling-carrier is in position for transfer, and when transfer takes place the said projection releases the loop or bight of the yarn. As the filling-carrier moves into the shuttle and then inward as the shuttle is thrown the rear side of the released loop might tend to catch on the segmental guard a'; but to obviate any such tendency the edge of the guard is inclined outwardly and rearwardly at $7^{\times}$ from the grooved guide 7 to direct the loop around and into the discharge-opening 3 without hindrance.

My invention is not restricted to the precise construction and arrangement of the various novel features herein shown and described, for I have illustrated but one practical embodiment of my invention, and various changes or modifications may be made by those skilled in the art 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. The combination, with a feeder to hold a plurality of filling-carriers and position them for removal, and a transferrer to remove the filling-carriers one by one from the feeder, of an abutment to engage and position for transfer the leading filling-carrier in the feeder and adapted to yieldingly guide such filling-carrier during transfer thereof to the shuttle.

2. The combination, with a filling-feeder, and a transferrer to remove filling-carriers therefrom one by one and insert them in the shuttle, of a yieldingly-controlled movable abutment in the path of and to engage the leading filling-carrier to position it for transfer and adapted to yield as it guides the filling-carrier during transfer.

3. The combination, in a loom, of a movable filling-feeder, a transferrer to remove filling-carriers singly therefrom and insert them in the shuttle, and a yieldingly-movable stop in the path of and to retain in transferring position the leading filling-carrier in the feeder and adapted to yield as such filling-carrier is moved along the stop during transfer from the feeder to the shuttle.

4. In a loom, a lay, a shuttle movable thereon and provided with holding-jaws, combined with a filling-feeder to present filling-carriers singly into transferring position, a transferrer to remove a filling-carrier from the feeder and insert it in the holding-jaws of the shuttle, and a guide to coöperate with the filling-carrier before and during transfer and adapted to yield in the direction of movement of the lay at the instant the filling-carrier is controlled partly by the holding-jaws and partly by the guide.

5. The combination, in a loom, of a lay, a movable filling-feeder, a transferrer to remove filling-carriers therefrom one by one and insert them in the shuttle, a yielding, combined front stop and guide to coöperate with the front of the leading filling-carrier in the feeder, and a rigid guide to act upon the back of such filling-carrier as it is transferred to the shuttle, the stop and guide yielding, when necessary, in the direction of movement of the lay as the filling-carrier enters the shuttle.

6. The combination, in a loom, of a reciprocating lay and a shuttle to travel thereon provided with holding-jaws, a feeder to contain a plurality of filling-carriers and present them into position to be transferred, a transferrer to remove a filling-carrier from the feeder and insert it in the jaws of the shuttle on the forward movement of the lay, and a guide to coöperate with the filling-carrier and capable of yielding in the direction of lay movement when such filling-carrier is controlled jointly by the holding-jaws and said guide.

7. The combination, in a loom, of a feeder to hold a plurality of filling-carriers, a transferrer to remove them and insert them singly in the running shuttle, and a resilient, substantially ∩-shaped abutment having one of its depending legs free and in the path of the leading filling-carrier in the feeder, said leg yielding in a forward direction as it guides the filling-carrier when removed from the feeder by the transferrer.

8. The combination, in a loom, of a lay and a shuttle movable thereon and provided with spring-jaws, an intermittingly-movable feeder to hold a plurality of filling-carriers in reserve, a transferrer to remove them and

place the same one by one in the grasp of the spring-jaws, an abutment having a part in the path of and to engage the head of the leading filling-carrier in the feeder, a yielding guide portion depending below such part to guide the front side of the head during transfer, and a rigid directing member to coöperate with and guide the back of the head as the filling-carrier leaves the feeder.

9. The combination, with a movable feeder to hold a plurality of filling-carriers, a transferrer to remove them one by one, and a discharge-throat through which passes the head of a filling-carrier when transferred, said throat having a fixed rear wall and a front wall adapted to yield as the filling-carrier is in engagement therewith when passing through the throat.

10. 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 connected with the head-sustaining plate to hold the filling ends, a yielding abutment and guide to coöperate with the filling-carrier next to be transferred, and means to prevent the filling ends of previously-transferred filling-carriers from being caught between the abutment and the leading filling-carrier in the feeder.

11. A filling-feeder comprising two connected and rotatably-mounted plates adapted to sustain respectively the heads and tips of a series of filling-carriers, the head-sustaining plate having a wide peripheral flange notched to guide the filling ends, means connected with said flanged plate to hold the filling ends passed over the flange, and an abutment to engage the leading filling-carrier in the feeder, the broad flange causing loose filling ends to hang away and clear of the abutment after the corresponding filling-carriers have been removed from the feeder.

12. 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 connected with said plates to hold the filling ends between the filling-carriers and the cloth, a guide to coöperate with and position the filling-carrier next to be removed from the feeder, and means to prevent loose filling ends of previously-removed filling-carriers from catching between the guide and the leading filling-carrier in the feeder.

13. 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 connected with said plates to hold the filling ends between the filling-carriers and the cloth, a guide to coöperate with and position the filling-carrier next to be removed from the feeder, and a stand on which the feeder is mounted, said stand having a large recess adjacent the guide and below the end-holding means, to allow the filling ends of previously-removed filling-carriers to drop at a distance from the abutment.

14. 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 connected with said plates to hold the filling ends between the filling-carriers and the cloth, a stand on which the feeder is mounted adjacent said end-holding means, said stand having a segmental guard and a shelf extending laterally below the head-sustaining plate and provided with a discharge-opening, and an abutment yieldingly mounted on the shelf at the front side of said opening, the latter being enlarged at its inner end to receive hanging filling ends and keep them away from the abutment.

15. A filling-feeder comprising two connected and rotatably-mounted plates adapted to sustain respectively the heads and tips of a series of filling-carriers, the head-sustaining plate having a wide peripheral flange notched to guide the filling ends, means connected with said plate to hold the guided filling ends between the filling-carriers and the cloth, a stand on which the feeder is mounted adjacent said means, said stand having a lateral shelf projecting beneath the flanged plate and provided with a discharge-opening enlarged at its inner end, and a yielding abutment on the front side of the discharge-opening, to engage the leading filling-carrier, the wide flange and the enlarged portion of the opening in the shelf serving to keep hanging filling ends of previously-removed filling-carriers from catching between the abutment and the leading filling-carrier when the feeder is advanced.

16. A filling-feeder comprising connected rotatable plates to sustain the heads and tips of a circularly-arranged series of filling-carriers, a series of filling-end holders mounted on the head-sustaining plate, to hold the filling ends between the feeder and the cloth, and a stand having a narrow upright central portion on which the feeder is mounted, to thereby facilitate the fastening of the filling ends when the feeder is loaded.

17. A filling-feeder comprising connected rotatable plates to sustain the heads and tips of a circularly-arranged series of filling-carriers, a similarly-arranged series of filling-end-holding devices on the head-sustaining plate to hold the filling ends between the cloth and the heads of the filling-carriers, and a ⊥-shaped stand on the upright portion of which the feeder is mounted to rotate, whereby the major portion of the holding devices are exposed to the operative.

18. A filling-feeder comprising connected

rotatable plates to sustain the heads and tips of a circularly-arranged series of filling-carriers, a guard-flange peripherally arranged on the head-sustaining plate, and a series of holding devices on said plate to retain the filling ends when led over the flange, each holding device comprising a fixed member and a spring-controlled member coöperating therewith, to clamp the filling end between them.

19. A filling-feeder comprising connected rotatable plates to sustain the heads and tips of a circularly-arranged series of filling-carriers, and a circularly-arranged series of holding devices on the inner side of the head-sustaining plate, each holding device comprising a fixed member, a coöperating spring-controlled member, to clamp a filling end between them, and a manually-operated release for each holding device.

20. The combination, with means to hold a plurality of filling-carriers, of attached end-holding devices each comprising coöperating fixed and spring-controlled clamping members, to clamp a filling end between them, and a manually-operated release for each holding device.

21. The combination, with means to hold a plurality of filling-carriers, of attached end-holding devices each comprising an apertured, fixed member, a coöperating spring-controlled movable member, to clamp a filling end between them, and a projection on the movable member extended loosely through the aperture in the fixed member, whereby pressure upon the projection will separate the clamping members.

22. The combination, with means to hold a plurality of filling-carriers, of attached end-holding devices each comprising an overhanging fixed member, a coöperating movable spring-controlled member beneath it, to clamp a filling end between them, and a projection on the movable member extended loosely through the fixed member, whereby pressure upon the projection will separate said members.

23. The combination, with means to hold a plurality of filling-carriers, of attached end-holding devices each comprising a fixed member having a flat face, a coöperating movable member having an annular contact-lip, a spring to press said members together, to clamp a filling end between them, and a projection on the movable member loosely extended through the fixed member, to move the spring-controlled member away from the fixed member.

24. A filling-feeder comprising connected rotatable plates to sustain the heads and tips of a circularly-arranged series of filling-carriers, a peripheral, notched guide-flange on the head-sustaining plate, a series of devices on said plate to hold the filling ends of a plurality of filling-carriers when said ends are led over the flange, and divisional wings on the plate to direct the filling ends to the proper holding devices.

25. A filling-feeder comprising connected rotatable plates to sustain the heads and tips of a circularly-arranged series of filling-carriers, a peripheral, notched guide-flange on the head-sustaining plate, a series of devices on said plate to hold the filling ends of a plurality of filling-carriers when said ends are led over the flange, divisional wings on the plate to separate the sets of filling ends, and a bevel-edged guard adjacent each holding device, to insure the proper filling ends being led thereto.

26. A filling-feeder comprising two connected and rotatably-mounted plates, a series of peripheral, open-ended pockets on one plate to receive the heads of the filling-carriers, and yielding tip-holders on the other plates to sustain the tips of the filling-carriers, the axes of the latter slightly converging toward the tip-sustaining plate, the bottom of each pocket in the head-sustaining plate being at right angles to the axis of the corresponding filling-carrier when in position, whereby the filling-carriers are securely held in place.

27. A filling-feeder comprising two connected and rotatably-mounted plates, one of said plates having a series of peripheral pockets open at their outer ends and deepest at their inner ends, and a series of correspondingly-arranged yielding tip-holders on the other plate, to sustain the tips of the filling-carriers, the heads of the latter entering the pockets and having their ends resting squarely on the pocket-bottoms, the latter being at right angles to the axes of their respective filling-carriers when in position, whereby the filling-carriers are securely held in place in the feeder and also prevented from axial rotation.

28. A filling-feeder comprising two connected and rotatably-mounted plates, a series of yielding tip-holders on one of said plates, to sustain the tips of the filling-carriers, pockets or seats on the other plate to receive and position the heads of the filling-carriers, and means on the said plate to engage the entire end of each head in a plane at right angles to the axis of the filling-carrier, the tips of the latter being nearer the axis of rotation of the feeder than are their heads, whereby the filling-carriers are held securely in place and prevented from axial rotation.

29. A filling-feeder comprising connected plates to sustain the heads and tips of a circularly-arranged series of filling-carriers, the head-holding plate having a circular series of seats in its inner side, a disk secured to said plate and having at its periphery a series of L-shaped apertured projections overhanging

said seats to form fixed clamping members, a cup-like movable clamping member to cooperate with the under face of each of said projections and provided with a stud loosely extended through the aperture thereof, and a spring seated in each seat and entering the corresponding cup-like clamping member, for the purpose set forth.

30. A rotatable filling-feeder comprising a plate having peripheral pockets to receive the heads of filling-carriers, a connected plate having yielding tip-holders thereon to sustain the tips of the filling-carriers, means on the first-named plate to bear firmly against the ends of the filling-carrier heads in planes at right angles to the axes of the respective filling-carriers, to retain the latter in place and prevent axial rotation thereof, a stand on which the feeder is mounted to rotate, and a short segmental guard on the stand to extend over the open ends of the pockets at the rear, lower portion of the head-sustaining plate.

31. A filling-feeder comprising connected plates one of which is provided with a series of radial pockets open at their outer ends, to receive the heads of filling-carriers, the other plate having radial openings therein, spring-controlled tip-holders fulcrumed on said plate in the openings, to receive the tips of the filling-carriers, a tip-holder being swung outward by insertion of a filling-carrier into position, and a stop on each tip-holder to engage the adjacent plate and limit outward movement of the holder, to prevent the movement of the filling-carrier past the holder.

32. A filling-feeder comprising connected plates one of which is provided with a series of radial pockets open at their outer ends to receive the heads of filling-carriers, a correspondingly-located series of yielding tip-holders pivotally mounted on the other plate, to sustain the tips of the filling-carriers, and means to prevent outward movement of a tip-holder sufficient to permit the insertion of a filling-carrier with the end of its head resting on the pocketed plate between two pockets.

33. A filling-feeder comprising connected plates one of which is provided with a series of radial pockets open at their outer ends to receive the heads of filling-carriers, an oppositely-located series of yielding tip-holders mounted on the other plate and each having a seat to receive the tip of a filling-carrier, and means to prevent outward movement of a tip-holder far enough to allow the tip of a filling-carrier to pass by the seat in the holder, or to permit the engagement with a filling-carrier unless its head is properly inserted in a pocket of the head-sustaining plate.

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

EDWARD S. STIMPSON.

Witnesses:
GEORGE OTIS DRAPER,
ERNEST W. WOOD.