E. S. STIMPSON.

HOPPER MECHANISM FOR AUTOMATIC LOOMS.

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1,019,855.

Patented Mar. 12, 1912.

Fig. 1.

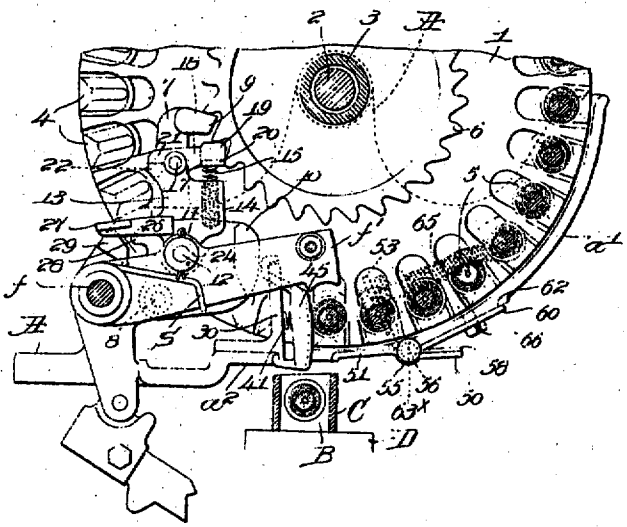


Fig. 2.

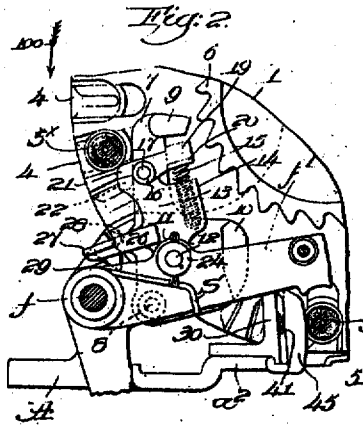


Fig. 3.

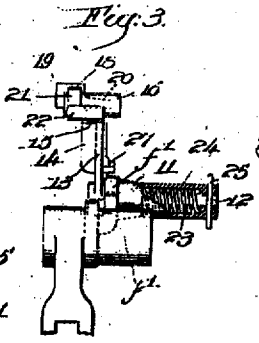


Fig. 4.

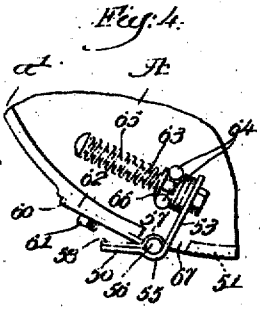


Fig. 5.

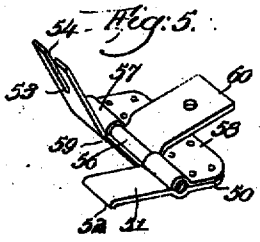
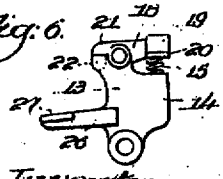


Fig. 6.



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UNITED STATES PATENT OFFICE.

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HOPPER MECHANISM FOR AUTOMATIC LOOMS.

1,019,855. Specification of Letters Patent. Patented Mar. 12, 1912.

Application filed April 6, 1911. Serial No. 619,063.

To all whom it may concern:

Be it known that I, EDWARD S. STIMPSON, a citizen of the United States, and resident of Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Hopper Mechanism for Automatic Looms, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

This invention has for its object the production of novel mechanism for actuating and controlling the movement of the feeder or hopper of an automatic loom of the type wherein the reserve filling-carriers or bobbins are mounted in an intermittingly movable hopper and are presented one by one in position to be transferred to the working shuttle. When filling such a hopper it is usually necessary to disengage it temporarily from the controlling devices in order that it may be turned backward, and in United States Patent No. 823,644 granted June 19, 1906 to me and another means are shown and described for effecting such temporary release of the hopper from mechanical control, the actuating mechanism shown in said patent also embodying certain desirable and novel features of construction. One objection to the patented structure is the restriction to retrograde rotation imposed by the detent pawl when it and the feed-pawl are disengaged from the hopper ratchet, such restriction necessitating several empty compartments which otherwise might be utilized for additional filling-carriers, and another objection is the liability of injuring the hand of the weaver if the released hopper is quickly turned backward. In my present invention I have obviated both of these objectionable features and I have so arranged the mechanism that if the hopper is turned backward rapidly the then leading filling-carrier therein cannot strike the hand of the weaver, but on the contrary will act to throw the detent-pawl automatically into engagement with the hopper ratchet. The hopper actuating mechanism also involves certain other novel features of construction and arrangement to be hereinafter explained in detail.

Heretofore the stop or abutment against which the leading filling-carrier moves toward the shuttle at the time of transfer has been rigidly mounted on the hopper stand in some cases, as in the patent referred to, with a yielding buffer or cushioning device at the back of the path of transfer, and in other cases the abutment or stop has been yieldingly sustained, while the opposite or rear side of the throat or transferring passage has been rigid as in my prior Patent No. 868,586 granted October 15, 1907. Both structures have their advantages, and some disadvantages, the latter due to the fact that, owing to its momentum and the relative looseness of its actuating devices, the lay cannot be in exactly the same position every time change of filling takes place. If the abutment is fixed and the lay is not in its theoretically proper position for transfer an undue strain is frequently exerted upon the yielding buffer, with the result that its supporting stud, projecting laterally from the flange of the hopper stand, is deflected sufficiently to break such flange and render the hopper worthless until a new stand can be provided. If the abutment is yieldingly mounted, as in the last mentioned patent, mis-positioning of the lay during transfer tends to cause breakage of the shuttle or the filling-carrier, and in some cases the fixed rear wall of the throat itself is broken.

In my present invention I provide a yieldingly mounted abutment, as in my last-mentioned patent, and I also use a yielding buffer to form the back of the throat, such buffer being so constructed and mounted that even if undue strain is exerted thereupon the hopper stand will not be damaged.

The various novel features of my 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 illustrated in the patents referred to, with one embodiment of my present invention shown in connection therewith, the parts being in normal position; Fig. 2 is a detail view of a portion of such mechanism showing the hopper disengaged from the control of its actuating means; Fig. 3 is a detail in front elevation and partial section of the feed-pawl and its rocking carrier; Fig. 4 is an

inner side view of a portion of the hopper stand and the yielding buffer mounted thereon and forming a part of the present invention; Fig. 5 is a perspective view of the buffer, detached, and viewed from the front; Fig. 6 is a detail in side elevation of the feed-pawl, and its carrier, detached from the other parts of the mechanism.

The hopper stand A having at the back of its lower part a curved flange a', the stud f fast on the stand and having mounted thereon the rocking transferrer f' to remove the filling-carriers one by one from the hopper to the working shuttle B when in the replenishing box C of the lay D, Fig. 1, said transferrer in practice having a retracting spring S and a usual tip-depressing member (not shown); the fixed seat 30 on the part a^2 of the hopper stand, the abutment 45 movably connected with the seat, and the spring 41, which yieldingly maintains the abutment in normal position, may be and are all substantially as in my Patent No. 868,586 above referred to.

The hopper, comprising two disk-like plates, one of which, as 1, is herein shown, is rotatably mounted on a horizontal stud 2, Fig. 1, fixedly secured to the stand A, the plates of the hopper being connected by a sleeve-like hub 3, the inner plate 1 having herein a series of circularly-arranged pockets or seats 4 for the butts of the filling-carriers 5, and said plate has on its outer face a ratchet 6 of usual construction, the teeth thereof corresponding in number and position with the number and position of the seats 4.

A detent-pawl 7 is pivoted at 8 on the stand A and has a tooth 9 to coöperate normally with the ratchet and thereby prevent retrograde rotation of the hopper, the weighted foot 10 of said pawl serving to maintain it in proper coöperation with the ratchet, as shown in Fig. 1.

In the present embodiment of my invention the transferrer f' has on its outer face a lateral hub 11 which forms a bearing for a pivot stud 12 fixedly secured to and extended horizontally from an upturned arm or pawl-carrier 13 located adjacent the inner face of the transferrer and provided at its rear edge with an upright tubular seat 14 for a coiled spring 15. At its upper end the pawl-carrier has a transverse hub 16 in which is pivoted a pin 17 secured to the rearwardly extending feed-pawl 18 having a laterally enlarged head 19 adapted to coöperate with the ratchet 6, said head at one side projecting laterally behind the detent pawl 7 and at its opposite side having a lateral ear 20 engaged by the free end of the spring 15, Figs. 1 and 2. The front end or tail 21 of the feed-pawl 18 is normally held by spring 15 upon a lateral stop 22 on the pawl-carrier 13, said stop thus limiting spring-induced movement of the feed-pawl relatively to the pawl-carrier 13.

Referring to Fig. 3, a spring 23 is coiled around the stud 12 and at its inner end is secured to the bearing hub 11, the outer end of said spring being secured to a sleeve 24 inclosing said spring and pinned to the stud at 25. The spring is so wound that it normally presses the pawl-carrier rearward to bring the head 19 of the feed-pawl into operative engagement with the ratchet 6, as shown in Fig. 1, the head clicking over the ratchet teeth when the downward stroke of the transferrer f' draws the pawl-carrier 13 down to position the feed-pawl for its feeding stroke.

After the endmost filling-carrier in the hopper has been transferred to the shuttle the transferrer rises, and as the pawl-carrier is lifted the spring 15 is first compressed, cushioning the blow of the head 19 upon the ratchet tooth next above it, and as the compression of the spring is continued the inertia of the hopper is overcome and the advance of the hopper is completed as the parts resume the position shown in Fig. 1, the feed being completed when the endmost filling-carrier in the series engages the abutment 45.

The pawl-carrier has a frontward extension 26 provided with a lateral enlargement or finger piece 27. When it is desired to disengage the hopper from the feed and detent pawls the weaver presses downward upon the finger piece, thereby retracting the pawl-carrier and feed-pawl to the position shown in Fig. 2, and as the head 19 is withdrawn from the ratchet 6 it engages the rear edge of the detent pawl 7 and retracts the tooth 9 thereof from the ratchet 6, so that the hopper can be rotated freely in one or the other direction. The retraction of the pawls is limited by the engagement of an enlargement 28 on the pawl 7 with a fixed stop 29 made as a lug on the hopper stand A.

Observing Fig. 2 it will be seen that when the pawls are retracted the tail 21 of the feed-pawl is positioned in the path of the butt of a filling-carrier if the hopper is turned backward, the top and outer end of the tail being convexed to form a cam surface. If, now, a filling-carrier, or several, be in the hopper when it is released from the control of the pawls and turned backward, in the direction of arrow 100, Fig. 2, the butt of the leading filling-carrier, as 5^x, will strike the pawl tail 21 and will either effect stoppage of the hopper, or it will slide past and push rearward the pawl tail and in so doing throw the pawls into engagement with the ratchet 6, to thereby stop the feeder. In either case the fingers or hand of the weaver, acting upon the finger piece 27, cannot be struck and injured by the advancing filling-carrier. Should the

retrograde movement of the hopper be quick and powerful, as by a sudden strong impulse imparted by the weaver, the cam action between the butt of the filling-carrier and the convex surface of the pawl tail will result, but if the motion of the hopper is less powerful and slow the pawl tail will of itself serve as a stop, as will be understood. The retraction of the pawls from the hopper ratchet is easily accomplished with one hand, as the spring 23 has no great tension, the other hand of the weaver being left free to manipulate the hopper.

The maximum number of filling-carriers can be loaded into the hopper, for they can extend from the abutment 45 in a series around to a point close to the retracting extension or lug 26.

I will now describe the yielding buffer which forms the back of the throat or passage through which the filling-carriers are transferred to the shuttle, referring principally to Figs. 4 and 5.

A yoke-shaped base 50 of sheet metal is frontwardly extended at one end, at 51, to constitute the buffer, preferably slightly downcurved at its front edge, as at 52, to facilitate the passage of the butt of the filling-carrier past it during transfer, the other end of the yoke being extended and bent upward at 53 and notched at 54, Fig. 5. A transverse depression or groove 55 at the junction of the base and said extensions 51, 53, receives a stout pin 56, held in place by the overlapping parts 57 of a cap-plate 58 riveted to the base 50. The exposed middle part of the pin 56 is supported in a transverse seat 59 formed in the end of a resilient but stiff metal plate 60 which is fixedly secured by a bolt 61 to flattened face 62 on the exterior of the flange a' on the hopper stand A, a transverse semi-cylindrical socket 63^x, see dotted lines Fig. 1, being formed in the stand for the middle part of pin 56 to rest in. The pin is thus attached to the stand by the plate 60, and the yoke-like base 50 and its extensions 51, 53 are pivotally mounted on said pin, with the extension or buffer 51 at the outer side of the stand adjacent the lower end of the flange a' and the extension 53 is upturned adjacent its inner side. A headed bolt 63 is fixedly mounted in the notch 54 of the extension 53, Fig. 4, and extends between two stop lugs 64 projecting from the stand A, while a spring 65 is coiled around said bolt between its head and a washer 66 resting upon said lugs, the spring acting to yieldingly maintain the buffer 51 in normal position, shown in Figs. 1 and 4. The inner side of the stand is recessed or cut away at 67 to permit the play of the extension 53 and to receive the adjacent part 57 of the cap-plate 58, as shown in Fig. 4.

When a filling-carrier is transferred from the hopper to the shuttle the buffer 51 is pushed downward, compressing spring 65, as the butt of the filling-carrier moves over it into the shuttle, the abutment 45 at the front of the throat yielding more or less as may be necessary. If the position of the lay demands it the buffer can dip somewhat into the shuttle, protecting the rear wall thereof as the filling-carrier is forced into place by the transferrer, while at other times the buffer will yield enough to direct the filling-carrier forward toward its proper place in the shuttle. Should any abnormal strain be exerted upon the buffer the connecting plate 60 can yield slightly without injury to itself or to the hopper stand, for it will be remembered that the fulcrum pin 56 on which the buffer swings is not fixed in the stand, but is held in its socket by the plate 60. Thus there is no chance of breaking the flanged part a' of the hopper stand even if the buffer is subjected to a very abnormal and severe strain.

By making both the front and rear sides of the transferring passage for the butts of the filling-carriers yieldable I obtain a very smooth action during transfer, reduce wear and tear, and obviate the tendency to breakage, particularly of the hopper stand, should any unusual strains be set up during the transferring operation, while the particular structure of the buffer and its adjuncts is simple, efficient, and easily made.

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

1. A rotatable hopper having an attached ratchet and adapted to hold a circularly-arranged series of filling-carriers, a transferrer having a lateral hub, a pawl-carrier having an attached pivot stud mounted to rock in the hub, a spring coiled about the stud within said hub and connected at its ends with the stud and hub, respectively, to swing the pawl-carrier rearward, a feed-pawl pivotally mounted on the pawl-carrier and having a head normally maintained by said spring in operative engagement with the ratchet, a cushioning spring interposed between the pawl head and the pawl-carrier, to prevent shock when movement of the transferrer to normal position acts through the pawl-carrier to effect the feed-stroke of said pawl to advance the hopper, and a stop on the pawl-carrier, laterally extended under and to coöperate with the tail of the feed-pawl to limit movement thereof due to the cushioning spring.

2. A step-by-step rotatable hopper to hold a circularly-arranged series of filling-carriers, a ratchet rotatable therewith, and a transferrer to remove the filling-carriers one by one, combined with a detent pawl to cooperate with the ratchet and prevent retrograde movement of the hopper, a stationary

fulcrum for said pawl, a feed-pawl having a ratchet-engaging head laterally extended behind the detent pawl, a pawl-carrier movable with and also relatively to the transferrer and on which carrier the feed-pawl is pivotally mounted, and a retracting extension on the pawl-carrier adapted to be manually engaged to retract said pawl-carrier and thereby disengage its head from the ratchet, the lateral extension of the head at such time cooperating with the detent pawl to disengage it from the ratchet.

3. A rotatable hopper adapted to hold a circularly-arranged series of filling-carriers, a transferrer, means mounted thereon to effect angular advance movement of the hopper after each operation of the transferrer, said means including a feed-pawl having a laterally extended head, a detent pawl for the hopper, mounted independently of the transferrer, the laterally extended head of the feed-pawl projecting behind the detent pawl, and a manually actuated device to retract and render inoperative the feed-pawl, the head thereof at such time engaging and rendering the detent pawl inoperative, the tail of the feed-pawl when retracted extending into the path of a filling-carrier in the hopper and serving to prevent contact with the hand of the operator when the hopper is turned backward.

4. A rotatable hopper adapted to hold a circularly-arranged series of filling-carriers, a transferrer, means mounted thereon to effect angular advance movement of the hopper after each operation of the transferrer, said means including a pawl-carrier having a frontwardly projecting retracting extension provided with a finger piece, a feed-pawl pivoted on the pawl-carrier and having a laterally extended head at its rear end and a tail at its front end having a cam surface, and a stop for the tail, on the pawl-carrier, a detent pawl for the hopper, mounted independently of the transferrer and located in front of the head of the feed-pawl, and a cushioning spring normally maintaining the pawl tail on the stop, manual depression of the retracting extension moving the pawl-carrier and feed-pawl bodily to render the head inoperative, the latter simultaneously engaging the detent pawl and rendering it inoperative, the cam surface of the pawl tail at such time being interposed in the path of a filling-carrier if the hopper is turned backward, engagement of such filling-carrier with the cam surface acting to stop movement of the hopper and to restore the feed and detent pawls to operative position.

5. A rotatable hopper having an attached ratchet and adapted to hold a circularly-arranged series of filling-carriers, a transferrer to remove them one by one, a pawl-carrier pivoted on the transferrer and movable with and also relatively to it, a feed-pawl fulcrumed on the pawl-carrier and normally coöperating with the ratchet to advance the hopper one step after each operation of said transferrer, an independently mounted detent pawl to coöperate with the ratchet and prevent retrograde rotation of the hopper, a manually operated member on the pawl-carrier to retract it and the feed-pawl and disengage the latter from the ratchet, means to disengage the detent pawl from said ratchet by retraction of the feed-pawl, and means to cause said pawls to reëngage the ratchet by coöperation with a filling-carrier in the hopper when the latter is turned backward, the manual retraction of the pawl-carrier placing said latter means in the path of such a filling-carrier.

6. A rotatable hopper having an attached ratchet and adapted to hold a circularly arranged series of filling-carriers, a transferrer to remove them one by one, an actuating instrumentality governed normally by said transferrer to advance the hopper one step after each operation of the transferrer, an independently acting detent to prevent retrograde rotation of the hopper, manually operated means to disengage the hopper from the control of said instrumentality and the detent, and a device operatively positioned at such time to be engaged by a filling-carrier in the hopper if the latter is turned backward, such engagement acting automatically to restore the hopper to the control of the detent and the actuating instrumentality and to prevent injury to the hand of the weaver.

7. In a loom, a rotatable hopper adapted to contain a circularly-arranged series of filling-carriers, an abutment against which rests the leading filling-carrier in position to be transferred, a stand on which said hopper is mounted, said stand having a transverse, downwardly open socket, a buffer to act upon the filling-carrier being transferred, a fulcrum pin for the buffer, seated in the open socket, a resilient plate attached to the stand and extended beneath and coöperating with the pin to maintain it seated in the socket, and a spring coöperating with the buffer and permitting yielding pivotal movement thereof when engaged by a filling-carrier during transfer of the same from the hopper, the buffer being pivotally mounted on the ends of the pin at each side of the pin-retaining plate.

8. In a loom, a rotatable hopper adapted to contain a circularly-arranged series of filling-carriers, a stop or abutment for the leading filling-carrier, a stand for the hopper, a spring-controlled buffer to coöperate with a filling-carrier during transfer thereof from the hopper, a pivot pin on the end portions of which the buffer is fulcrumed, and a resilient plate fixedly attached to the stand and having a transverse, open seat in

which the pivot pin is supported, between the parts of the pin on which the buffer is fulcrumed.

9. In a loom, a rotatable hopper adapted to contain a circularly-arranged series of filling-carriers, a stop or abutment for the leading filling-carrier, a stand for the hopper, a yoke-like base having at one end a frontward extension constituting a buffer and at its other end an upturned extension, a pivot pin connected with said base and exposed between the extensions thereof, a plate fixedly attached to the hopper stand and having a transverse, open seat for the exposed portion of the pivot pin, to hold the latter and the attached parts in operative position, and yielding means connecting the hopper stand and the upturned extension of the base to yieldingly maintain the buffer in operative position.

10. In a loom, a rotatable hopper adapted to contain a circularly-arranged series of filling carriers, feeding mechanism therefor, and means located outside of the circumference of the hopper beyond the path of movement of a filling-carrier, to release the hopper from control of its feeding means.

11. In a loom, a rotatable hopper adapted to contain a circularly-arranged series of filling carriers, feeding mechanism therefor, manually operated means to release the hopper from control of its feeding mechanism, and means adapted to be engaged by a filling-carrier in the hopper to cause the feeding mechanism to re-assume control of the hopper automatically when said hopper has been turned a predetermined distance in a retrograde direction, the releasing means being located beyond the path of movement of a filling-carrier and at a distance from the means adapted to be engaged by such carrier, to thereby prevent injury to the operator when manipulating the hopper.

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

EDWARD S. STIMPSON.

Witnesses:

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