

E. H. RYON.
WEFT REPLENISHING LOOM.
APPLICATION FILED JULY 15, 1908.

932,178.

Patented Aug. 24, 1909.

6 SHEETS—SHEET 1.

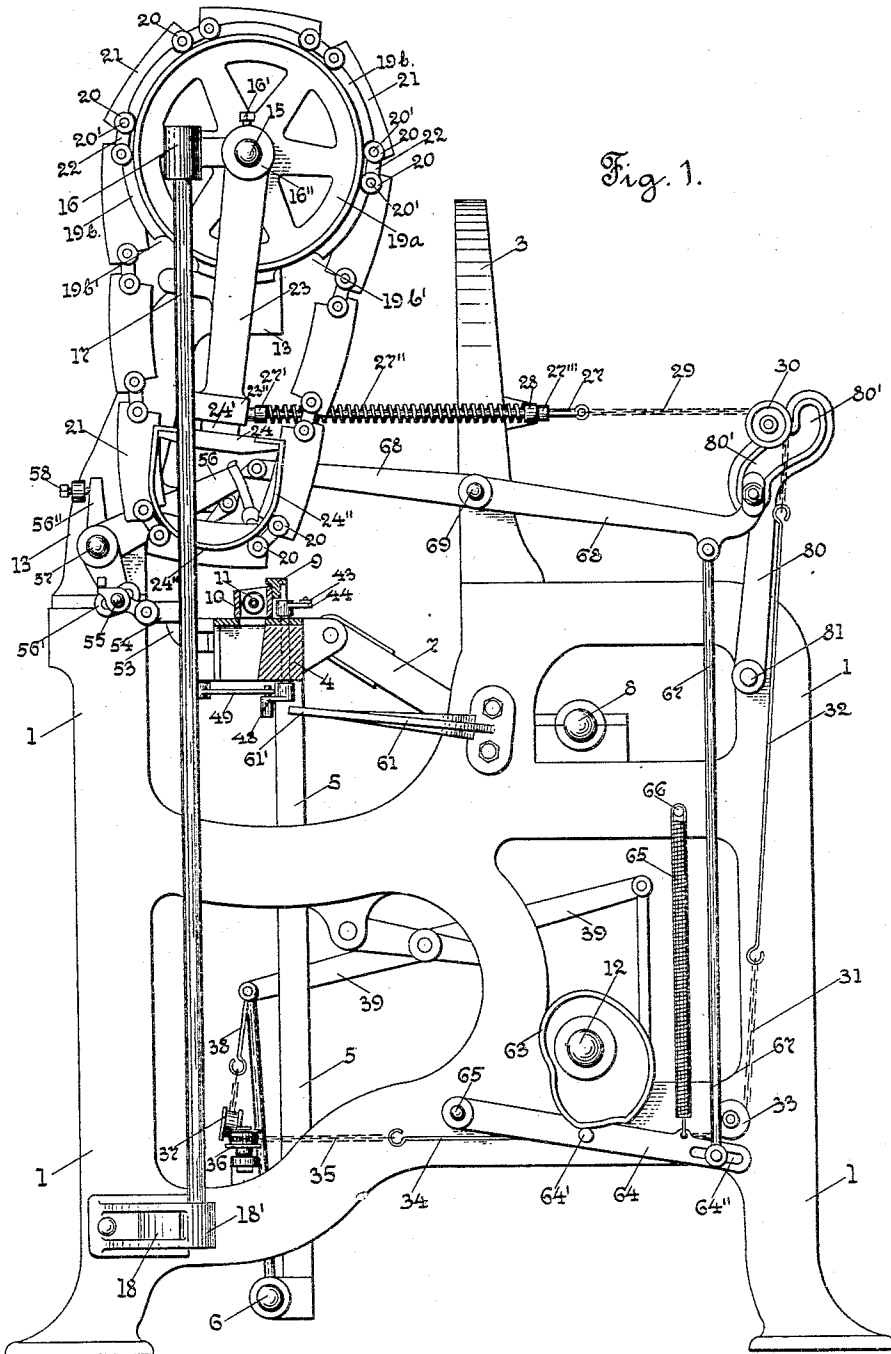


Fig. 1.

Witnesses
M. Bredt.
W. Haas

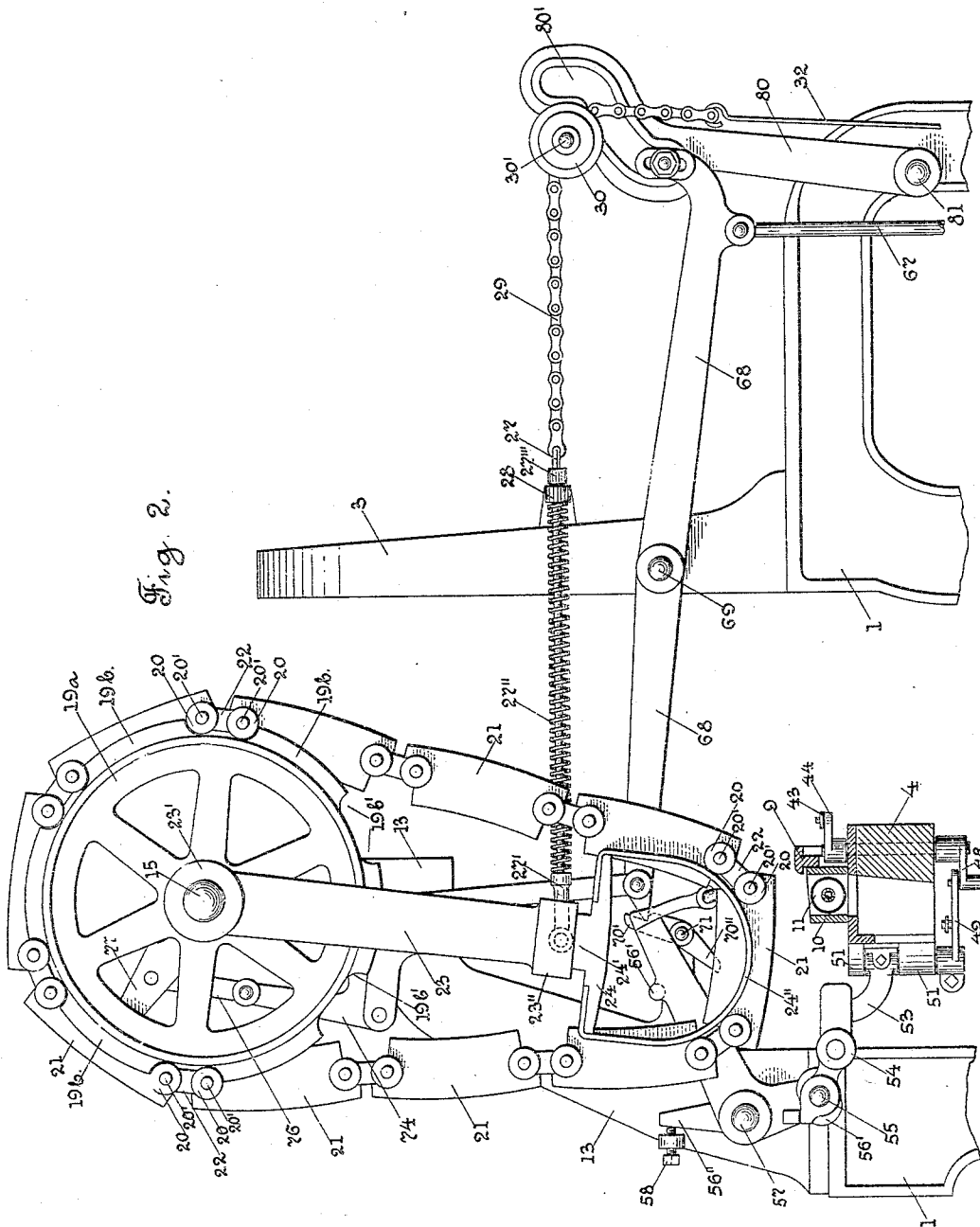
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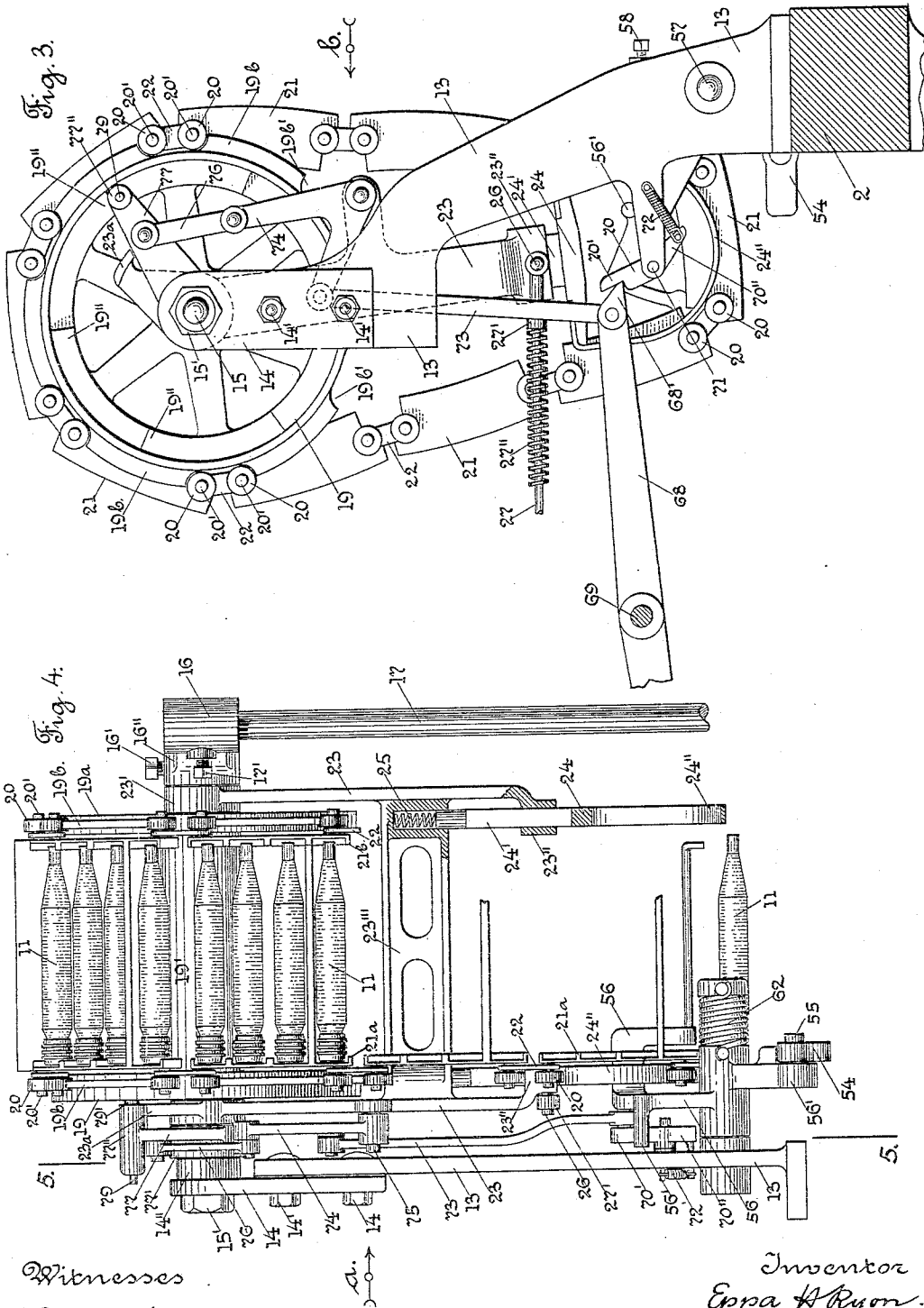
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Fig. 5.

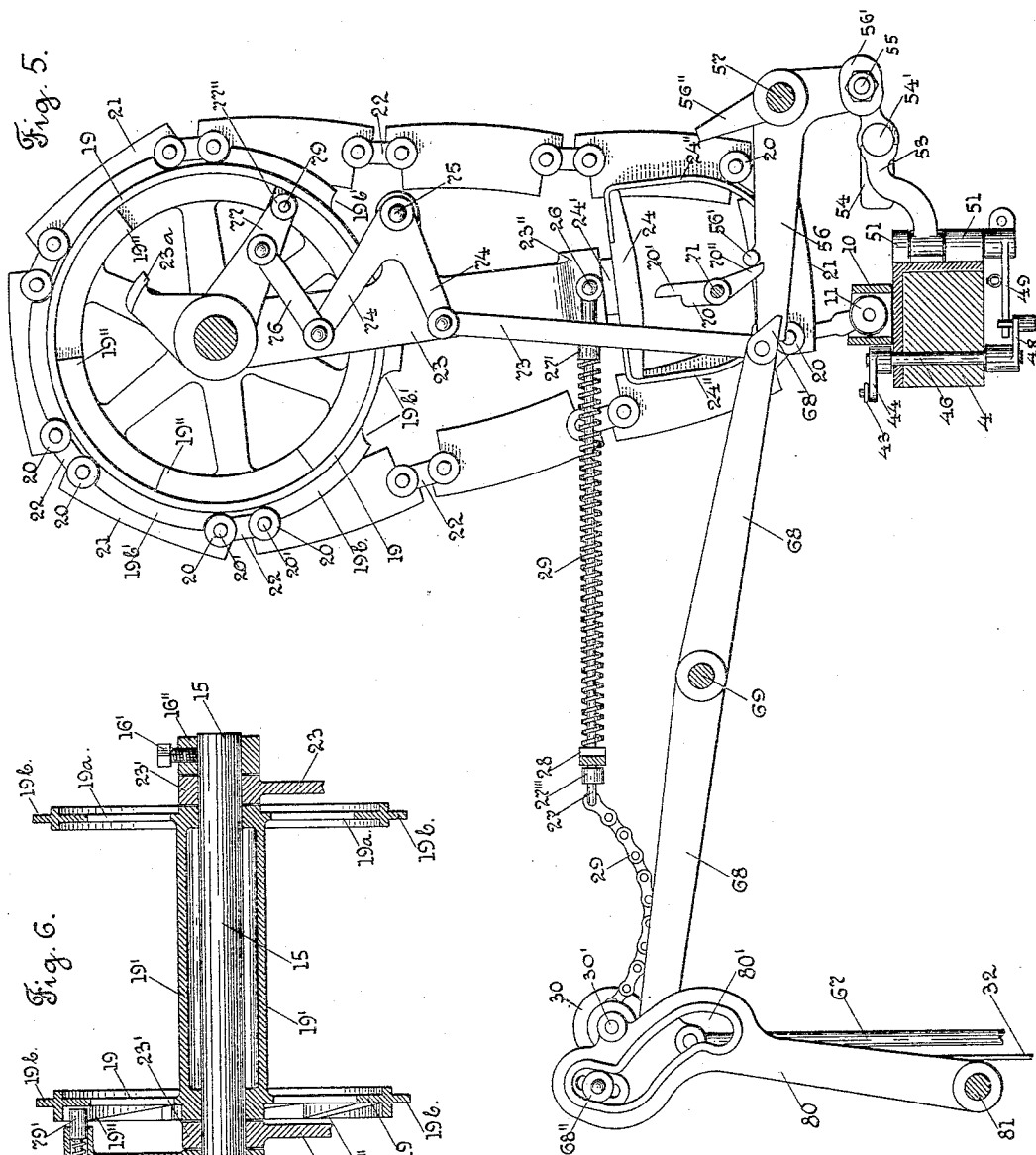
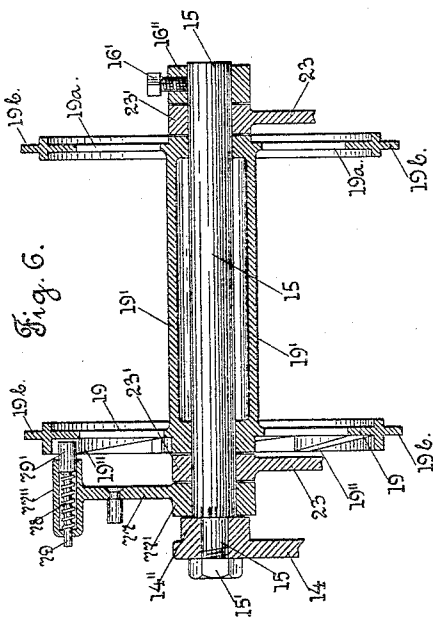


Fig. 6.



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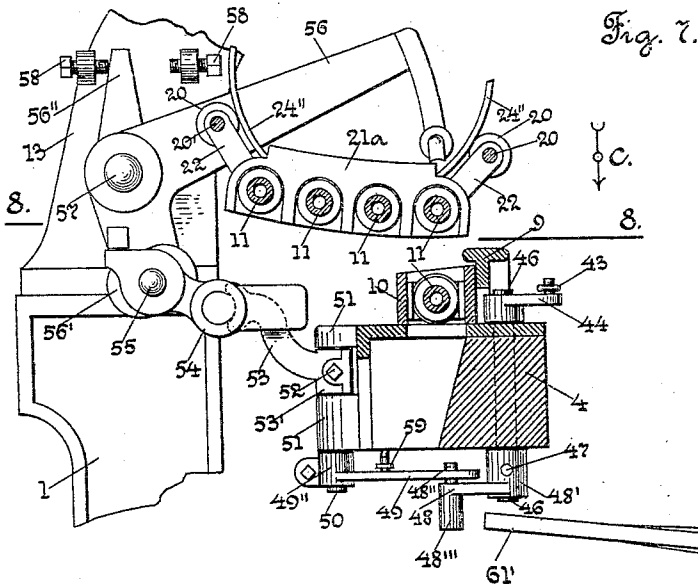


Fig. 7.

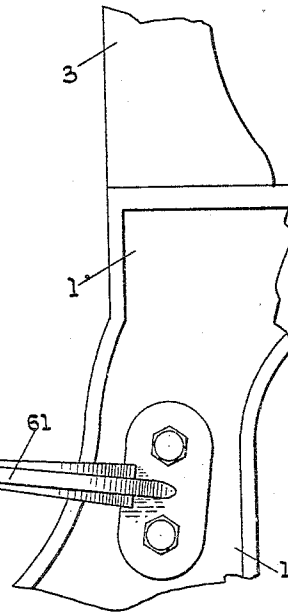


Fig. 8.

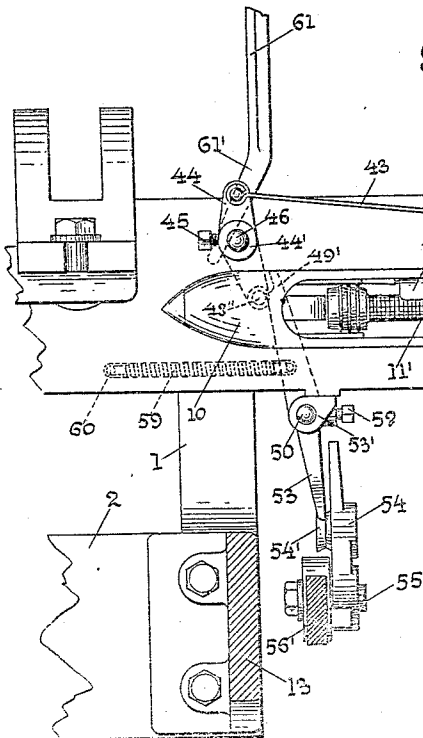


Fig. 9.

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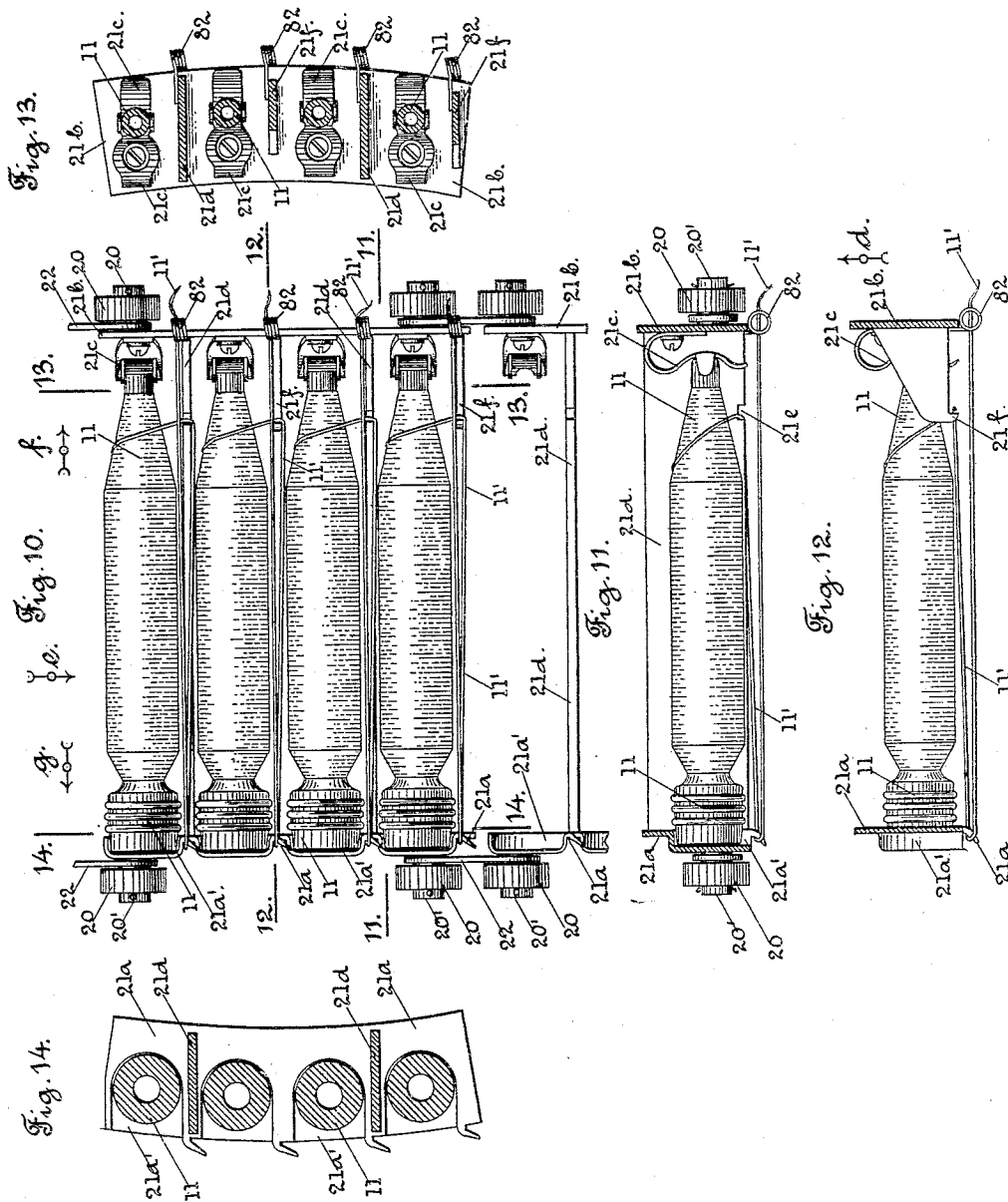
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M. O'Leary.

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Patented Aug. 24, 1909.
6 SHEETS—SHEET 6.



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UNITED STATES PATENT OFFICE.

EPPA H. RYON, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO CROMPTON & KNOWLES LOOM WORKS, A CORPORATION OF MASSACHUSETTS.

WEFT-REPLENISHING LOOM.

932,178.

Specification of Letters Patent.

Patented Aug. 24, 1909.

Application filed July 15, 1908. Serial No. 443,704.

To all whom it may concern:

Be it known that I, EPPA H. RYON, a citizen of the United States, residing at Worcester, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Weft-Replenishing Looms, of which the following is a specification.

My invention relates to weft replenishing looms, and particularly to that class of weft replenishing looms which have shifting or change shuttle boxes at one end of the loom, and a magazine for filling carriers of a different color or character at the other end of the loom, which filling carriers are automatically supplied to the shuttle at the magazine end of the loom on the substantial or practical exhaustion of the filling in the active shuttle.

The object of my invention is to improve upon the construction of the magazine, and the transferring mechanism in looms of the class referred to, and my invention consists in certain novel features of construction of my improvements as will be hereinafter fully described.

In my improved filling carrier magazine, which in this instance is made for a series of bobbins of four different colors or characters, I provide a series of bobbin cases, each of which cases is adapted to hold four bobbins and forms a link of the magazine chain. Said magazine chain is made up of a certain number of links, in the present case ten, which are carried around sprocket wheels which are loosely mounted on a horizontally extending shaft on a stand, which projects rearwardly from the breast beam above the path of the lay. The downwardly hanging portion of the magazine chain is preferably carried around a suitable guiding device just above the lay and the stationary shuttle box on the end of the lay, so that each of the four filling carriers or bobbins in the bobbin case may be directly transferred into the active shuttle on the substantial exhaustion of the filling therein. The downwardly hanging arms, on which the magazine chain is carried are loosely and pivotally mounted on the horizontally extending shaft of the sprocket wheels, and are adapted to swing above the lay, and means are provided to retain any one of the four bobbins in the bobbin case in position under the transfer arm, when a transfer of a bobbin or filling

carrier is to be made. After the bobbin is transferred, mechanism for revolving the sprocket wheels is put into operation to revolve said sprocket wheels one-sixth of their circumference to bring a new bobbin case into the transferring position, to remain there until the next filling carrier is supplied.

The detecting or transferring mechanism consists of a movable or swinging bunter pivoted in suitable bearings on the front of the lay, said bunter will be moved into an operative position through an indicator hammer or block in the active shuttle, when the substantial exhaustion of the filling in the active shuttle allows said hammer or block to drop in the path of an operating lever.

The shuttle which is shown in the drawings, and which is used in the present instance in connection with my present improvements is shown and described in my pending application for Letters Patent of the United States, No. 419,850.

I have shown in the drawings detached parts of a weft replenishing loom of the class referred to, with my improvements in magazine chain, and transferring means, combined therewith, sufficient to enable those skilled in the art to understand the construction and operation thereof.

Referring to the drawings:—Figure 1 is an end view of the magazine end of a weft replenishing loom of the class referred to, with my improvements combined therewith; the lay beam is shown in section. Fig. 2 shows, on an enlarged scale, the parts shown in the upper part of Fig. 1. Fig. 3 is an inner end view of the magazine, looking in the direction of arrow *a*, Fig. 4. Fig. 4 is a front side view of the magazine, partially furnished with bobbins, looking in the direction of arrow *b*, Fig. 3; some parts are shown in section, and other parts are left off. Fig. 5 is a section, on line 5, 5, Fig. 4, looking in the direction of arrow *a*, same figure, showing the operating levers in a different position, and also showing the transferring mechanism. Fig. 6 is a central section of the double sprocket wheel detached, and the operating lever therefor. Fig. 7 shows, on an enlarged scale, the lower part of the magazine chain, and the transferring mechanism, detached, and the lay and some parts thereon in section. Fig. 8 is a section, on line 8, 8, Fig. 7, looking in the direction of arrow *c*, same figure, showing the parts

turned one quarter way around, and also showing a full shuttle, and other parts not shown in Fig. 7. Fig. 9 shows the dagger and operating lever shown in Fig. 8, in a different position. Fig. 10 shows, on an enlarged scale, a bobbin case, looking in the direction of arrow *d*, Figs. 11, and 12. Fig. 11 is a section, on line 11, 11, Fig. 10, looking in the direction of arrow *e*, same figure. Fig. 12 is a section, on line 12, 12, Fig. 10, looking in the direction of arrow *e*, same figure. Fig. 13 is a section, on line 13, 13, Fig. 10, looking in the direction of arrow *f*, same figure. Fig. 14 is a section, on line 14, 14, Fig. 10, looking in the direction of arrow *g*, same figure.

In the accompanying drawings, 1 is the loom side or end frame, 2 is the breast beam, 3 the loom arch, 4 the lay carried on the lay sword 5, which is pivotally mounted at its lower end at 6 and operated through the connector 7 to the crank shaft 8, in the usual way.

9 is a single shuttle box, 10 a shuttle therein, and 11 the bobbin or filling carrier in said shuttle.

Extending upwardly from the breast beam and the lower loom side, and rigidly secured thereto, is a stand 13, the upper part of which is bent rearwardly above the path of the lay and has secured thereon by bolts 14', a plate 14, see Figs. 3, and 4. The plate 14 has a boss 14'' at its upper end, see Fig. 6, in which is rigidly secured by nut 15', the reduced threaded end of a rod 15 which extends horizontally. On the outer end of the rod 15 is rigidly secured by a set screw 16', the hub 16'' of a rod head 16, see Fig. 4. In the rod head 16 is secured, by a set screw 17', the upper end of the supporting rod 17. The lower end of the rod 17 is secured in a boss 18' on a stand 18, secured to the loom side.

On the rod 15 is loosely mounted a double, or a pair of sprocket wheels 19, and 19^a, having the central and connecting hub portion 19', see Fig. 6. The inner sprocket wheel 19 has in this instance, on the outer surface thereof, the ratchet tooth portion 19'', see Figs. 3 and 6, by means of which said sprocket wheel is revolved through an operating lever to be hereinafter described.

The periphery of the sprocket wheels 19 and 19^a have an outwardly extending fin or flange 19^b thereon, with recesses 19^{b'} therein to receive and hold the rolls 20 of the magazine chain. The magazine chain is made up of bobbin cases or holders 21, each of which in this instance contains and holds four bobbins or filling carriers 11, and forms one link of the chain. The several links of the chain are connected together by links or bolts 22, see Fig. 10. The rolls 20 are suitably supported on studs 20' secured to the ends of two contiguous links, see Fig. 10.

On the rod 15 are loosely mounted the

bosses 23' on the upper ends of two downwardly extending arms 23, see Fig. 4. The two arms 23 are in this instance connected below the magazine by a transverse bar 23'', which with the arms 23 forms a swinging frame 23, see Fig. 4. The lower end 23''' of each arm 23 is in this instance enlarged and bent inwardly and has an opening therethrough, see Fig. 4, to loosely receive the upwardly extending portion 24' on a guide frame 24. The guide 24 has the lower curved portion 24'', see Fig. 5, over which pass the rolls 20 of the bobbin case 21 for the magazine chain. The upper ends 24' of the guide 24 extend into recesses in the transverse bar 23''' of the swinging frame 23, and bear against a helically coiled compression spring 25, to yieldingly hold the guide portion 24 in its lower position and cause it to press against the rolls 20 of the lowest bobbin case, and hold said case securely in position above the stationary shuttle box 9, and adapted to be swung above said shuttle box 9, in a horizontal plane.

In order to retain each of the four bobbins 11, in the lowest bobbin case 21, in a position under the transferrer arm, to correspond with the bobbin in the active shuttle, the swinging frame 23 must be held in four positions by the action of the box operating lever. The inner swinging arm 23'' of the frame 23, has at its lower end a stud 26, see Fig. 5, to which is pivotally connected a rod head 27' on a horizontally extending rod 27. The rod 27 extends loosely through a boss on a bracket 28 on the loom arch, see Fig. 2, and its other end connected, through a chain 29, with a double sheave 30 loosely mounted on a stud 30' on an operating lever, to be hereinafter described. A second chain 31 is connected, in this instance by a link 32, to the first mentioned chain 29, and passes around a guide sheave 33, and in this instance is connected by a link 34 with a chain 35, which passes over guide sheaves 36, and a second guide sheave 37 at the opposite end of the loom, and is connected through a link 38 with the box operating lever 39, see Fig. 1, which is of the usual construction and operation.

The operation of the box lever 39 acts, through the chain connections to the swinging frame 23, to move said frame into four different positions, according to the movement of the shuttle boxes, to bring a bobbin under the transferrer arm to correspond with the bobbin in the active shuttle.

A helically coiled expansion spring 27'' encircles the rod 27, and bears at one end against the rod head 27', see Fig. 5, and at its other end against the bracket 28, and acts to move the swinging frame 23, against the action of the chain connection to said rod 27, when the box operating lever 39 is in its lowest position, shown in Fig. 1, and the

swinging frame 23 with the lowest bobbin case 21 will move toward the front of the loom, until the collar 27''' on the rod 27 engages the bracket 28, and stops the movement of said rod.

In Fig. 7 of the drawings, the bobbin 11 in the rear of the bobbin case 21, or the fourth bobbin, is shown in position under the transfer arm.

The filling detector shown in the drawings, Fig. 8, to detect the substantial exhaustion of filling in the active shuttle, corresponds to the filling detector shown and described in my pending application for Letters Patent of the United States, Serial No. 419,850.

The shuttle 10 may be a self-threading shuttle of any usual construction, and has combined therewith my filling detector mechanism, comprising a rocking shaft or rod 40, which extends in the direction of the length of the shuttle, and is located in suitable bearings along the back wall of the shuttle, at the rear of the bobbin 11. On the rod 40, near the bobbin head of the spindle, is secured a feeler pad or plate 40', to engage the filling 11' on the bobbin 11, and near the other end of said rod 40, at the bobbin tip end of the shuttle, is a block 40'', which may be termed an "actuator", and extends within an opening or recess 10' in the rear portion or wall of the shuttle 10. The opening or recess 10' in the rear wall of the shuttle 10 extends to the end portion of the shuttle, see Fig. 8. The pad 40' engages the filling 11' on the bobbin 11, and is yieldingly held in engagement therewith by the weight of the actuator 40''.

As the filling 11' is drawn off of the bobbin 11, and the bobbin is practically or substantially exhausted of filling, the pad 40' moves toward the bobbin, and the shaft or rod 40 is rocked, and the actuator 40'' is moved into its operative position in the path of the end of an arm 41, which in this instance is pivotally mounted on a stud 42 on the lay beam. The arm 41 is connected by a rod 43, with a lever 44, which has a hub 44', secured by a set screw 45 on the upper end of a vertically extending shaft 46 having bearings in the lay beam. On the lower end of the shaft 46, secured by a pin 47, is the hub 48' of a lever 48 carrying a pin 48'' thereon, which is adapted to engage the notched end 49' on a lever 49, having a hub 49'' secured on the lower end of a vertically extending shaft 50, mounted in suitable bearings 51 on the front of the lay beam. On the upper part of the shaft 50 is adjustably secured, by a set screw 52, the hub 53' of a bunter 53, which extends upwardly, see Fig. 7, with its upper end in the path of and adapted to engage the rounded grooved extension 54' on a latch 54, see Fig. 8, which latch is pivotally mounted on a stud 55 on

the downwardly extending arm 56' of the transfer arm 56, which is pivotally mounted on a stud 57 on the stand 13, see Fig. 7. An upward extension 56'' of the transfer arm 56, extends between two set screws 58, which may be adjusted as desired, and limit the rocking movement of the transfer arm 56. A helically coiled contraction spring 59 is attached at one end to the lever 49, and at its other end to a pin 60 on the lay, see Fig. 8. The spring 59 acts to yieldingly move the lever 49 toward the lever 48.

In Fig. 9, the lever 49 is shown in its locked position, by the engagement of the pin 48'' with the notched end 49' on said lever 49. In this position, the bunter 53 is held out of the path of the latch 54 of the transferring mechanism, as shown in Fig. 9, and the loom operates in the normal way; but when the filling 11' on the bobbin 11 is practically or substantially exhausted, as shown in Fig. 8, the engagement of the actuator 40'' of the filling detecting mechanism, with the lever 41, will, through link 43 and arm 44, move the lever 48 to disengage it from the notched end of the lever 49, and allow the helically coiled contraction spring 59 to operate to move the bunter 53 into the path of the latch 54 of the transfer mechanism, so that on the forward movement of the lay, the transfer arm 56 will be operated, to transfer a fresh bobbin from the magazine into the active shuttle, as shown in Fig. 8. On the next backward stroke of the lay a downwardly extending boss 48''' on the lever 48 will be engaged by the inclined or cam shaped end 61' of an arm 61, see Figs. 7 and 8, secured to and extending out from the loom side 1. The engagement of the boss 48''' with the cam shaped or inclined end of the arm 61, will move the lever 48 back to the position shown in Fig. 9, and cause the pin 48'' thereon to engage with the notched end 49' on the lever 49, and hold the bunter 53 in its inoperative position shown in Fig. 9.

After the bobbin 11 has been transferred, the transfer arm 56 will be moved to its inoperative position, through the action of the helically coiled torsion spring 62, see Fig. 4. The double sprocket wheels 19 and 19^a then have to be moved one-sixth of their revolution, to carry a new bobbin case 21 to its lowest position, see Figs. 1, 3, and 5. On the bottom shaft 12 is fast a cam 63, which is adapted to operate a lever 64, which is pivotally mounted on a stud 65 on the loom side 1, and has a pin 64' thereon which extends in the path of and is adapted to be engaged by the periphery of said cam 63. The lever 64 has attached thereto one end of a helically coiled contraction spring 65; the other end of said spring 65 is attached to a stud 66 on the loom side, see Fig. 1. The spring 65 acts to hold the stud 64' on the

lever 64 in engagement with the cam 63. The lever 64 has an elongated slot 64'' therein, in which is adjustably secured the lower end of a rod or connector 67; the upper end of the rod or connector 67 is pivotally connected with one arm of a lever 68, which is centrally and pivotally mounted on a stud 69 on the loom arch 3. The other arm of the lever 68 has a wedged shaped end 68' secured thereto, see Fig. 3, which is adapted to be engaged by the recessed end 70' on the latch 70, which is pivotally mounted on a stud 71 on the stand 13, to lock the lever 68, as shown in Fig. 3.

The downwardly extending extension 70'' on the latch 70, has one end of a helically coiled spring 72 attached thereto; the other end of said spring 72 is attached to the stand 13, see Fig. 3. The extension 70'' on the latch 70 extends in the path of and is adapted to be engaged by an extension 56' on the transferrer arm 56, see Fig. 5, to move said latch 70 away from the end 68' on the arm 68, against the action of the spring 72, on the downward movement of the transferrer arm, as shown in Fig. 5, and allow the lever 68 to be moved, through the cam 63, lever 64, and rod 67. To the lever 68 is attached the lower end of a link or connector 73; the upper end of said link or connector 73 is pivotally attached to one arm of an angle lever 74, see Fig. 5. The angle lever 74 is pivotally mounted on a stud 75 on the swinging frame 23, and the other arm of said angle lever 74 is connected by a link or connector 76 with a lever 77, which has a hub 77' loosely mounted on the stud 15. The lever 77 has an elongated head 77'', see Fig. 6, in which is yieldingly held, by a helically coiled expansion spring 78, a pin 79, the enlarged end 79' of which is adapted to engage the ratchet portion 19'' of the sprocket wheel 19, see Figs. 5 and 6, and cause the sprocket wheel 19, and the sprocket wheel 19', to rotate one-sixth of their revolution, when the lever 77 is to be moved from the position shown in Fig. 5, to the position shown in Fig. 3. An extension 23^a on the swinging frame 23 limits the upward movement of the lever 77, see Fig. 2.

The rearwardly extending arm of the lever 68 has attached thereto a roll 68'', see Fig. 5, which travels in a cam shaped slot 80' in the upper end of an upright lever 80, which is pivotally mounted at its lower end on a stud 81 on the loom frame, see Fig. 1, to move said lever toward the magazine. The lever 80 carries the sheave 30, over which the chain 29 passes, see Fig. 1, which chain acts to position the swinging frame 23, and the bobbin cases 21, as above described.

In rotating the sprocket wheels 19 and 19^a, and operating the magazine chain, it is desirable to have the swinging frame 23 moved to its extreme front position, in order

to clear the transferrer arm, and through the movement of the lever 80, carrying the guide sheave 30, the chain 29 is slackened, as shown in Fig. 5, to allow the swinging frame 23 to be moved to its extreme front position.

The bobbin or filling carrier cases 21, and the holding devices for the bobbins are shown in Figs. 10 to 14, inclusive. Each bobbin case 21 is preferably made out of pressed sheet metal, having the rear wall 21^a, see Fig. 12, and having the pockets or recessed portions 21^{a'} formed therein, for the heads of the bobbins 11, see Figs. 10 and 14. 21^b is the front wall of the case for the tips of the bobbins. The front wall 21^b has secured thereon the spring clips 21^c, to yieldingly hold the tips of the bobbins 11 in place. Two traverse plates 21^d are used in this instance, which plates are riveted in a suitable manner to the back and front walls of each bobbin case, to form rigid compartments for the bobbins. The ends of the filling 11' are preferably held or clamped in a coiled spring 82 at the front wall 21^b, from said spring 82 the filling thread passes around a hooked extension on the back wall 21^a, and then back to a notch 21^e, see Fig. 11, on the traverse plates 21^d, for one pair of bobbins in each case. For the other pair of bobbins in each case, the filling 11' passes over a hooked extension 21^f on the front wall 21^b, see Fig. 11.

It will be understood that the details of construction of my improvements may be varied if desired.

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

1. In a filling magazine for weft replenishing looms, a series of connected links, each adapted to retain a plurality of bobbins or cops, a wheel over which said links pass, a guide around which said links pass, and devices to rotate said wheel.

2. In a filling magazine for weft replenishing looms, a series of connected links, each link adapted to retain a plurality of bobbins or cops, a wheel over which said links pass, a guide around which said links pass and devices to rotate said wheel to move said links step by step.

3. In a filling magazine for weft replenishing looms, a series of connected links, each adapted to retain a plurality of bobbins or cops, a wheel over which said links pass, a guide around which said links pass, and devices to oscillate said guide.

4. In a weft replenishing loom, a filling magazine composed of a series of connected links, a bobbin transferrer, means to operate the same, a wheel around which said links pass, and a guide for the lowest link, and means to move said guide in unison with the shuttle boxes.

5. In a magazine loom, a series of con-

nected links, adapted to retain a plurality of bobbins or cops, a wheel over which said links pass, an axis for said wheel, a guide for said links connected with said axis and adapted to be swung about said axis in unison with the drop boxes, a transferer and devices to swing said guide, and bring any bobbin of a link under the transfer.

6. In a weft replenishing loom, a magazine, means to operate the same, said means consisting of a rocking lever, a cam on a moving shaft of the loom, a transferer, a latch pivoted adjacent the transferer, and adapted to hold said rocking lever in an operative position, a cam lever, and connections between said cam lever and one end of said rocking lever, connections between the other end of the said rocking lever and said wheel.

7. In a weft replenishing loom, a filling magazine, a transferer, a latch pivoted thereon, a lay, a swinging bunter pivoted thereon, and adapted to impinge against said latch, means to lock said swinging bunter in an inoperative position, a spring connected to said swinging bunter, and adapted to hold against said lock, combined with means to release said lock when the filling in the shuttle has been exhausted to a predetermined amount.

8. In a weft replenishing loom, a filling magazine, a transferer, a latch pivoted thereon, a lay, and swinging bunter pivoted thereon, and adapted to impinge against said latch, means to lock said swinging bunter in an inoperative position, a spring connected to said swinging bunter and adapted to hold against said lock, combined with means to release said lock.

9. In a weft replenishing loom, a filling magazine, a transferer, a latch pivoted thereon, a lay, and swinging bunter pivoted thereon, and adapted to impinge against said latch, means to lock said swinging bunter in an inoperative position, a shuttle, a spring connected to said swinging bunter and adapted to hold against said lock, combined with means in the shuttle to release said lock.

10. In a weft replenishing loom, a filling magazine, a transferer, a latch pivoted thereon, a lay, and swinging bunter pivoted thereon, and adapted to impinge against said latch, means to lock said swinging bunter in an inoperative position, a spring connected to said swinging bunter and adapted to hold against said lock, combined with means to re-set said lock.

11. In a weft replenishing loom, a filling

magazine, a lay, and a swinging bunter pivoted thereon, a transferer having a portion adapted to be moved by said swinging bunter, means, including a lever, a spring to lock said swinging bunter out of the path of said transferer portion, combined with devices to release said lock.

12. A weft replenishing loom, a filling magazine, a transferer having a portion adapted to be moved by a swinging bunter on the lay, a lay, and a swinging bunter pivoted thereon, means to lock said swinging bunter in an inoperative position, a shuttle, a spring connected to said swinging bunter and adapted to hold against said lock.

13. A magazine for bobbins and cops, consisting of a series of connected links, supports in said links for said bobbin, a hook near the tip of the bobbin, a hook adjacent the butt of the bobbin around which the filling thread from the bobbin is looped, and a holder for the end of the thread near the tip of said bobbin.

14. In a weft replenishing loom, a shuttle, a transferer to transfer the filling from the magazine to the shuttle, means to operate said transferer, a magazine to support a series of bobbins or cops, a hook or detent adjacent the tip of each bobbin, a hook or detent near the butt of each bobbin, and a holder for the end of each filling thread adjacent the tip of each bobbin, the filling thread being looped around the first named hook or detent, thence around the second hook or detent adjacent the butt of the bobbin and finally held by said holder.

15. A magazine for shuttle bobbins or cops, consisting of links fastened together to form an endless chain, each link consisting of a sheet metal portion formed to support the butts of a plurality of bobbins, a sheet metal portion to form a support for the tip of the bobbin and connecting strips between said sheet metal portions.

16. In a magazine for filling cops or bobbins, a revoluble wheel to support said bobbins, having a series of ratchet teeth in the side thereof, a support for said wheel, an oscillating arm having a hub thereon, a spring pressed plunger within said hub, said plunger adapted to cooperate with the teeth on the side of said ratchet, to turn said ratchet step by step, and connections, and means to operate said arm.

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