

**No. 671,202.**

**Patented Apr. 2, 1901.**

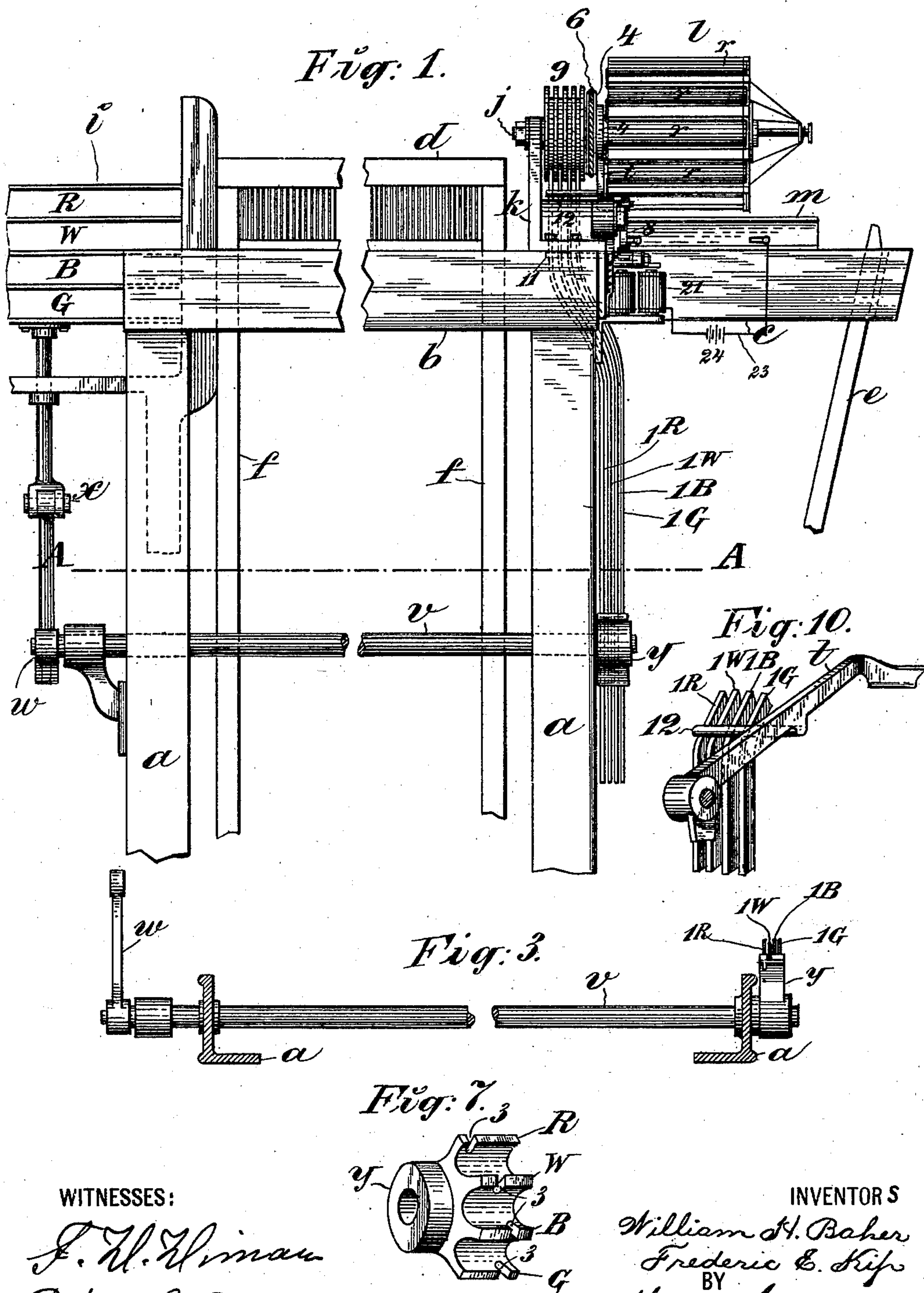
**W. H. BAKER & F. E. KIP.**

## WEFT REPLENISHING MECHANISM FOR LOOMS.

(Application filed Feb. 6, 1900.)

(No Model.)

**4 Sheets—Sheet 1.**



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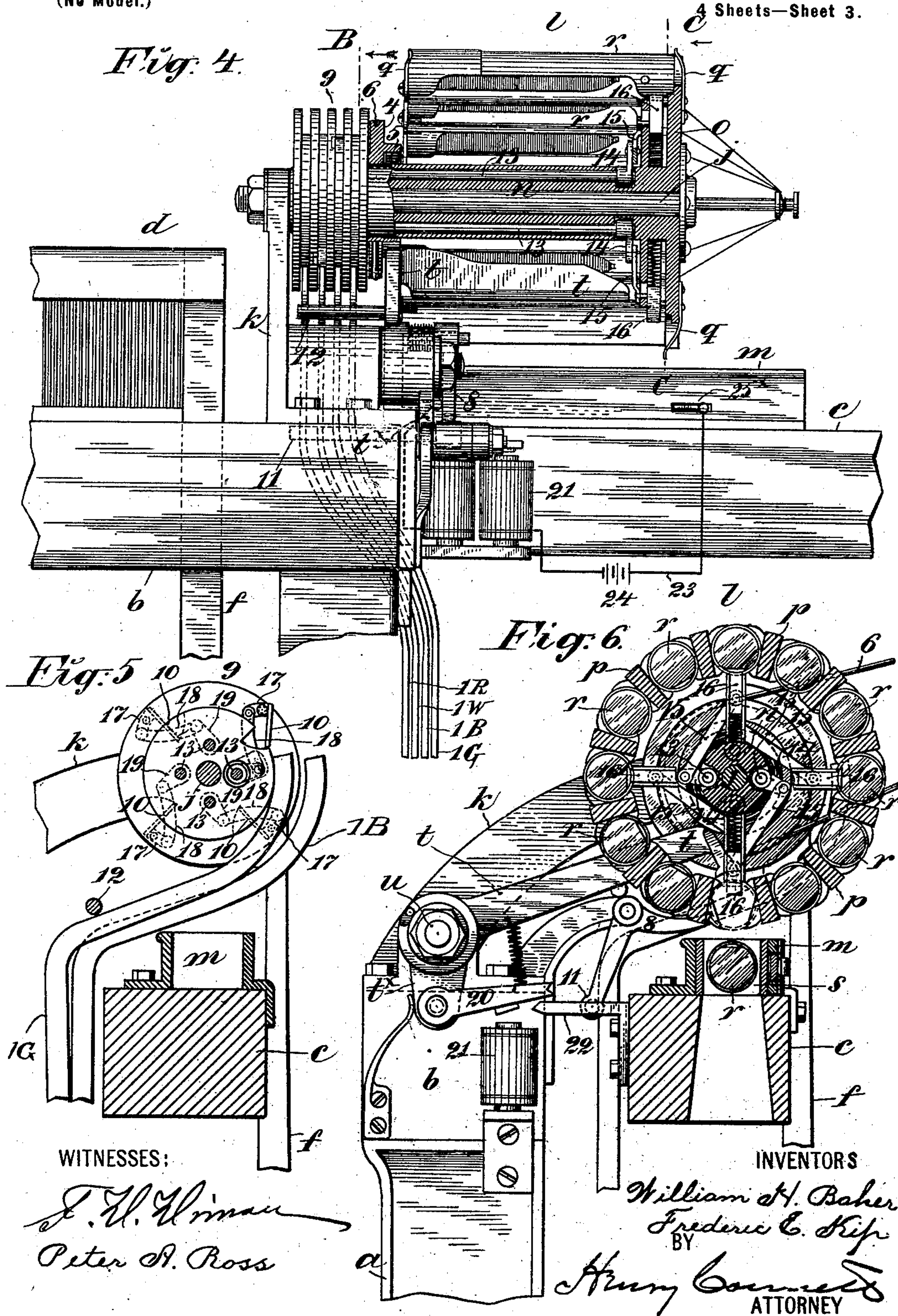
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4 Sheets—Sheet 4.

Fig. 11.

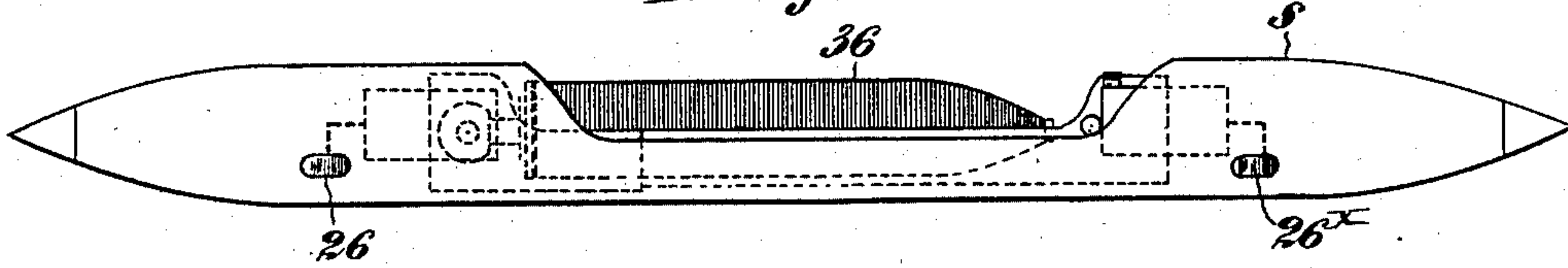


Fig. 12.

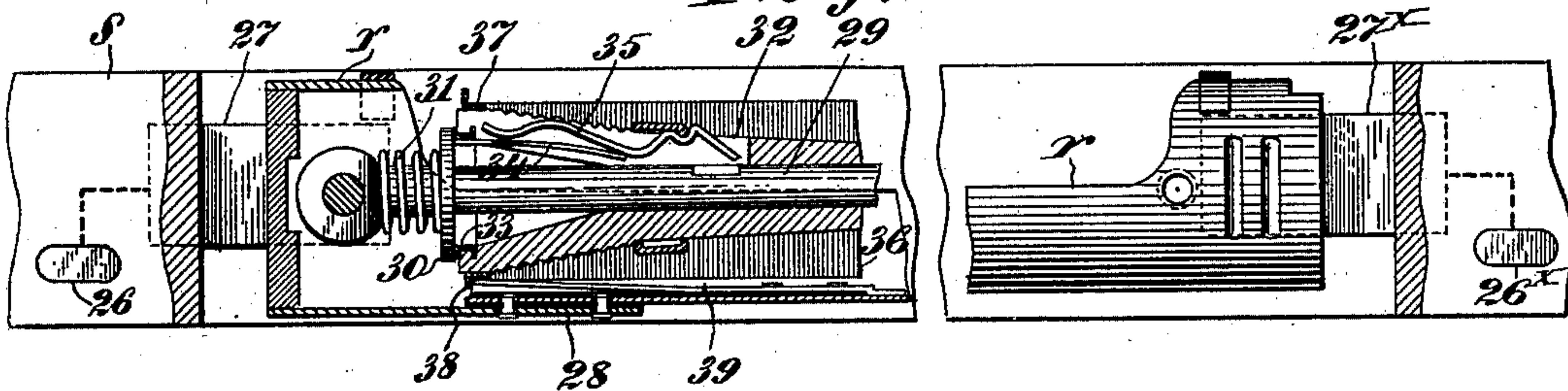


Fig. 13.

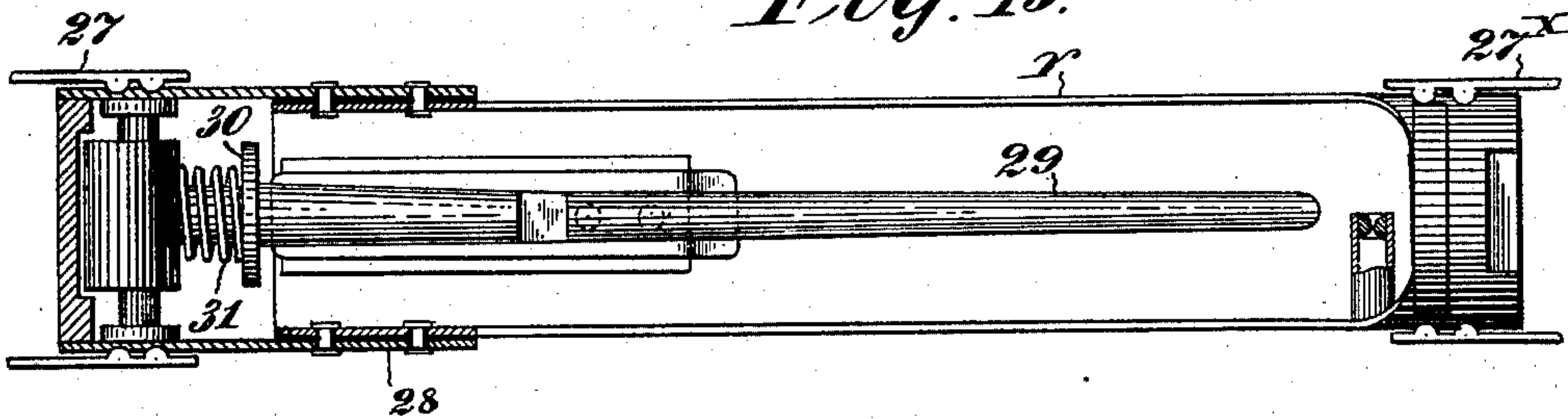
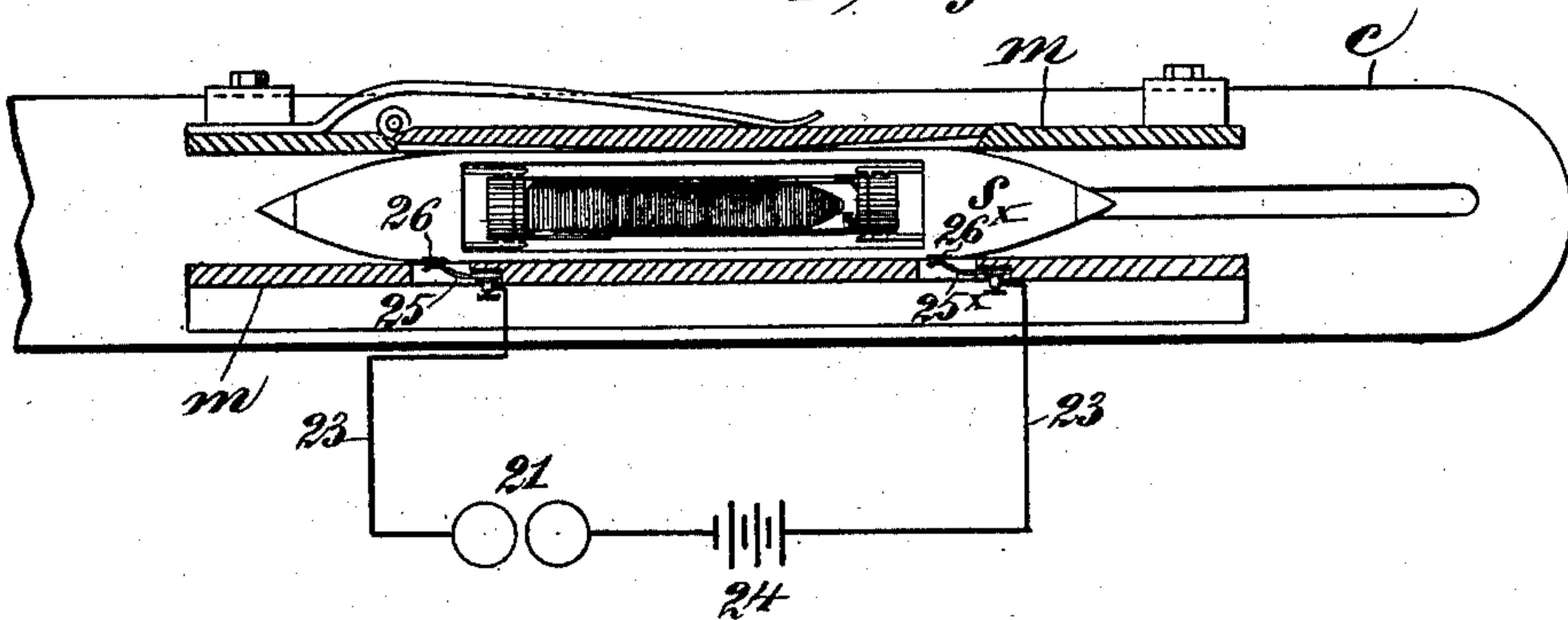


Fig. 14.



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# UNITED STATES PATENT OFFICE.

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## WEFT-REPLENISHING MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 671,202, dated April 2, 1901.

Application filed February 6, 1900. Serial No. 4,220. (No model.)

*To all whom it may concern:*

Be it known that we, WILLIAM H. BAKER, residing at Central Falls, Providence county, Rhode Island, and FREDERIC E. KIP, residing at Montclair, Essex county, New Jersey, citizens of the United States, have invented certain new and useful Improvements in Weft-Replenishing Mechanisms for Looms, of which the following is a specification.

10 This invention relates to multiple-color or "box" looms, so called, and the principal object of the invention is to provide an automatic mechanism for supplying weft or filling to such a loom of the kind or color required. In  
15 a former patent granted to us August 7, 1900, No. 655,643, we show a weft-supplying mechanism for this class of looms wherein electrical selecting devices are employed; but in the present case the selecting devices are me-  
20 chanical, although the supplying or changing mechanism is electrically controlled.

In the accompanying drawings, which illustrate the invention, Figure 1 is a somewhat diagrammatic front elevation of a loom, illustrating the connection between the supply-  
25 ing mechanism and the box motion. Fig. 2 is an elevation of the right-hand side of the loom, and Fig. 3 is a horizontal section or sectional plan taken in the plane indicated  
30 by A A in Fig. 1. Fig. 4 is a front view, on a larger scale than Fig. 2, showing the rotary magazine and adjacent parts in axial section. Fig. 5 is a transverse sectional view of the detent-drum and adjacent parts, taken sub-  
35 stantially in the plane indicated by B in Fig. 4. Fig. 6 is a vertical transverse section through the magazine and adjacent parts, taken substantially in the plane indicated by C C in Fig. 4. Fig. 7 is an enlarged perspec-  
40 tive view of the selecting-cam *y* detached. Fig. 8 is a perspective view of the normal detent-lever detached, showing its spring and limiting-stop. Fig. 9 is a fragmentary per-  
45 spective view of the shifting radial detent on the detent-drum, and Fig. 10 is a fragmentary perspective view showing the manner in which the driver acts on the detent-arms. Fig. 11 is a side view of the shuttle *s* with the bobbin-case therein. Fig. 12 is a sec-  
50 tional view, on a larger scale, of the bobbin-case and shuttle, illustrating the electrical

devices. Fig. 13 is a sectional plan view of the bobbin-case and spindle detached and on the same scale as Fig. 12. Fig. 14 is a plan of the shuttle-box and shuttle, showing the  
55 electric circuit diagrammatically.

In the class of looms to which this invention appertains there is at one side of the loom (the left side as herein shown) a box-  
60 motion. This is a well-known device and has been illustrated somewhat diagrammatically in Fig. 1. It will suffice here to say that it comprises a vertically-shiftable carrier having in it a plurality of superposed shuttle-  
65 boxes—usually four, as herein shown—either of which may be brought into line with the raceway at will by automatic means. These boxes contain or are intended to furnish shut-  
70 tles carrying weft or filling of different kinds or colors for weaving patterns or checks. The automatic means or mechanisms for shifting the box are well known and need not be here-  
in described. When the weft or filling in any one of the different shuttles is exhausted and requires replenishing, it is desirable that  
75 this shall be effected automatically, and it is the object of the present invention to do this.

The principal novel feature of the invention is the magazine constructed to hold weft or filling of the different kinds or colors de-  
80 sired and the mechanical means for selecting the color or kind of weft or filling to be supplied, this selecting means being controlled by the box-motion.

*a* is the loom-frame, *b* the breast-beam 85 forming a part thereof, *c* is the lay, *d* is the reed carried thereby, *e* is the picker-stick, *f* the lay-swords, *g* the crank-shaft from which the lay receives its vibratory motions through the medium of a connecting-rod *h*, and *i* is  
90 the box-motion. All of these parts are common in looms in some form.

The mechanism for moving the box up and down is not illustrated, as it is well known to those skilled in this art, and it forms no part  
95 of this invention.

Mounted rotatively on a spindle *j*, fixed in a bracket *k*, is a magazine *l*, so situated as to be directly over the shuttle-box *m* on the lay at the right-hand side of the loom (oppo-  
100 site to the box-motion) when the lay is in the beat-up position seen, for example, in Fig. 2.



This magazine, which in its general construction and form is somewhat like that seen in a former patent, No. 655,645, dated August 7, 1900, comprises a boss *n*, a disk-like head or end *o*, bars *p*, extending from said head parallel with the axis of the magazine, and spring-clips *q* to hold in place bobbin-cases *r*, with which the magazine is filled. Each bobbin-case contains a full bobbin or weft-holder, and the magazine may be constructed to hold as many cases as desired within practicable limits, this being merely a matter of size. As herein shown the magazine is adapted to hold twelve bobbin-cases. The bobbin-cases and bobbins will be hereinafter minutely described in connection with the shuttle in order to explain the electrical control of the weft or filling supplying mechanism. It will suffice here to say that the bobbin-case *r* will be by preference cylindrical in form, or nearly so, and that it will be held detachably in place in the magazine by the spring-clips *q*, so that the lowermost bobbin-case in the magazine, which is directly over the shuttle *s* in the shuttle-box *m*, may be driven down into the shuttle by a driver *t*, pivotally mounted on the loom at *u*, the incoming bobbin-case driving out that one in the shuttle and taking its place.

Now in a loom having a box-motion it is of course essential that when weft is supplied to a shuttle it shall be of the proper color or kind. For example, in the present case we will suppose the four shuttles of the box-motion to carry, respectively, red, white, blue, and green weft or filling, as indicated by the letters R, W, B, and G in the drawings, and that the magazine *l* is divided into four quadrants or sections, each of which is supplied with bobbin-cases carrying weft of one of these colors. To bring the quadrant, with the proper color, to the delivery-point, mechanical devices controlled by the box-motion are employed, and these will now be described.

In the frame of the loom is mounted a rock-shaft *v*, provided with an arm *w*, coupled by a link *x* to the box-motion or box *i*, so that as the latter is shifted up or down, as required to bring the shuttle, with the proper color, into line with the raceway, the shaft *v* will be rocked to a corresponding extent. On the shaft *v* is fixed a selecting-cam *y*. (Seen detached in Fig. 7.) This cam may be made in various ways; but the form shown is simple and efficient. It is composed of a boss with four radial flanges corresponding to the respective colors R, W, B, and G, and the said cam is so set that the flange corresponding to the particular color at the raceway or "in play" will project out horizontally to the front. As shown in Figs. 1, 2, and 3, it is W. This cam *y* acts on four detent-arms hinged on the loom-frame at *z* and designated by  $1^R$ ,  $1^W$ ,  $1^B$ , and  $1^G$ , the letter merely signifying the color of weft to which they relate. They are held up to the cam by springs 2 of any kind. Each of the four

flanges on the cam *y* has in it a recess (3 in Fig. 7) so placed that when said flange is in the horizontal position the recess will be opposite to or register with the proper detent-arm and allow the spring 2 of said arm to bring or draw it forward into its operative position, while the cam holds the other three arms pressed back out of operation. Thus the cam is a selector and its movements are controlled by the box-motion.

The several detent-arms extend up to the magazine *l*, and their function is to so control the rotation of the magazine as to insure the section or quadrant thereof carrying weft of the proper color to be presented at the delivery-point or point of supply. It may be well here to explain how the magazine is operated to bring the concentrically-arranged bobbin-cases therein one by one under the driver.

On the sleeve-like boss of the magazine is loosely mounted a sheave 4, and within the boss of this sheave is a volute spring 5, Fig. 4, one end of which is secured to the boss of the magazine and the other to the boss of the sheave. If the magazine be held against rotation by a detent and the sheave 4 be rotated, the spring 5 will be wound up. On the sheave is a slip-belt 6, which is driven from a sheave 7 on the crank-shaft *g*. The belt is continuously driven by the sheave 7 and drives the sheave 4 until the tension of the spring 5 overcomes the driving friction when the belt slips. Now if the detent which holds the magazine be removed the latter will be instantly and positively rotated by the spring 5. The magazine is provided with a normal detent-lever 8, pivotally mounted on the loom-frame or the bracket thereon and adapted to be held up into engagement with the bobbin-case at the delivery-point by a light spring. This normal detent-lever 8 is for the purpose of insuring the detention of the bobbin-case at the delivery-point when neither of the detent-arms is in action or engaged. This detent-lever is shown detached in Fig. 8, which also shows the spring  $8^a$  and the limiting-stop, comprising a pin  $8^b$ , operating similar to the stop-pin on a gas-cock.

The detent-arms are situated side by side or abreast and are alike. They extend up and are so curved back as to pass under and about the back of the detent-drum 9, which is fixed on and rotates with the boss of the magazine and has circumferential flanges which form circumferential groove-like guideways to receive the upper free ends of the respective detent-arms. In each of the guideways in the drum is a radial detent 10 to catch or impinge on the upper end of that detent-arm which is in play, or which is not pressed back by the selecting-cam *y*. The other detent-arms will be pressed back by the cam, so as to be clear of their respective detents, which latter will be placed at ninety degrees apart about the drum—that is, if we suppose the arm  $1^R$  to be engaging its detent



and the magazine be thus held stationary then the detent for arm  $1^W$  will be in the next adjacent guideway, but ninety degrees about the drum, and the detent for arm  $1^B$  will be in the next guideway and ninety degrees farther about the drum. Thus these detents are spirally arranged about the drum. Also when the detent-arm  $1^R$ , for example, is engaging its detent the first bobbin-case in the quadrant of the magazine devoted to "red" weft will be at the delivery-point or under the driver.

Now in order that the normal detent-lever 8 may not interfere with the detent-arms, and thus prevent the proper color of weft from being brought to the delivery-point, said normal detent-lever has a short arm below its pivotal axis, and from this arm a bar 11, Figs. 4, 6, and 8, projects laterally across in front of the detent-arms, so that any one of these latter which may for the time be drawn into engagement by its spring with its detent on the detent-drum will act, through the bar 11, to depress the normal detent-lever out of the path of the bobbin-cases. Only one detent device must be in action at the same time.

It will be well to explain the operation of the mechanism described before proceeding further. Therefore let us suppose that the loom is using "white" weft, and that the magazine is full of bobbin-cases, except as to the vacancy caused by the delivery of the first white bobbin-case of the series to the shuttle in play. The detent-arm  $1^W$  is held pressed back by its detent 10, which is now below its extremity and under said arm, and the other detent-arms are pressed back by the cam  $\gamma$ . Consequently the normal detent-lever 8 is free to act and is in operative position bearing on the white bobbin-case at the delivery-point. Now if the filling on the bobbin in play becomes exhausted and the exigencies of the pattern still calls for white filling the entry of the exhausted shuttle into the shuttle-box  $m$  will, through electrically-controlled means to be hereinafter described, cause the driver to drive the bobbin-case beneath it into the shuttle, and when the driver recedes the spring 5 will instantly rotate the magazine until the next white bobbin-case (the third of the series) comes to the normal detent-lever 8. Now let us suppose that before the exhaustion of this fresh supply of white weft the exigencies of the pattern require, say, "green" weft or filling. The box-motion brings the green shuttle into line with the raceway, and in doing so it rocks the selecting-cam  $\gamma$  so as to press back all of the detent-arms except  $1^G$ , which latter, being drawn up to the detent-drum 9 by its spring, trips the normal detent-lever 8 and allows the magazine to rotate until that detent 10 on the drum 9 which is in the guideway belonging to the detent-arm  $1^G$  impinges on the latter, when the magazine will cease to rotate with the first bobbin-case of the series containing green filling at the delivery-point under the driver  $t$ . The

normal detent-lever 8 will now be depressed and the magazine is held by the detent-arm  $1^G$ . Now if a fresh supply of green weft be needed and the driver  $t$  descends (as before described) and drives out the bobbin-case beneath it into the shuttle a bar 12 on the driver, which extends laterally across the detent-arms 1 and in front of them, will impinge upon the detent-arm  $1^G$  and force it back, thus freeing the magazine, which will rotate a little until the next succeeding bobbin-case in the magazine comes to bear on the head of the driver and until the detent 10 of the detent-arm  $1^G$  shall have advanced far enough to take in front of the free end of said arm  $1^G$ . Thus all of the detent-arms will be held pressed back, and when the driver withdraws the normal detent-lever 8 will stop the rotation of the magazine. Now let us suppose that the pattern next requires white weft again. The box-motion shifts and sets the selecting-cam in such a position that the detent-arms  $1^R$ ,  $1^B$ , and  $1^G$  are pressed back, but the spring 2 of the arm  $1^W$  is permitted to press it forward against the drum 9. This causes the said arm  $1^W$  to trip the normal detent-lever 8 and allow the magazine to rotate; but the first two bobbin-cases of the white series have been removed, and we will suppose that by oversight or carelessness their places in the magazine have not been filled with fresh ones by the attendant. Consequently if no means were employed to prevent it the magazine would rotate until the detent 10 of the drum 9, which belongs to the detent-arm  $1^W$ , impinges on the latter, when the rotation of the magazine would be arrested with the blank space at the beginning of the white series under the driver. In order to avoid this and to permit the magazine to continue its rotation until the first white bobbin-case of those left in the magazine impinges on the normal detent-lever 8 and is thus brought to the delivery-point, the mechanism now to be described is employed. It may be premised that this mechanism is of a precautionary character, and therefore not absolutely essential, and that it comprises a spring-detector adapted to bear on the first bobbin-case of a series and by impingement thereon to hold the detent 10 of that series in operative position; but if this first bobbin-case be gone the spring of the detector displaces said detent, so that it will only act to take in front of and press the detent-arm back, thus allowing the magazine to continue its rotation. Of course there are four of these devices, one for each detent 10; but as they are alike a minute description of one will suffice, the same reference-numerals being employed on like parts of each device.

Extending lengthwise through the sleeve-boss  $n$  of the magazine is a rock-shaft 13, which carries at its outer end, Figs. 4 and 6, a crank 14, coupled by a link 15 to a sliding radial bolt-like spring-detector 16, mounted in a guideway in the head  $o$  of the magazine.



This detector, which is backed by a light spring, is situated so that the first bobbin-case of the series to which the detector belongs presses the latter back, and when this bobbin-case is removed the spring of the detector protrudes or presses the latter outward. These movements rock the shaft 13. The shafts 13 extend at their other ends into the drum 9, one stopping in the plane of the first guideway therein, the next extends to the second guideway, and so on to the fourth and last guideway, and they are coupled to and operate the respective detents 10 in the several guideways.

Each detent 10 consists of a flap which is pivotally mounted on the side wall of the guideway through an arm 17, which latter is coupled by a link 18 with a crank 19 on the shaft 13. When in its operative position, the flap detent 10 swings down into a recess in the face of the drum 9, so as to occupy a radial or nearly radial position, and this is the position it occupies when the detector 16 is pressed in by a bobbin-case; but when there is no bobbin-case to press back the detector the latter is protruded by its spring and rocks the shaft 13, and the latter acts, through the crank 19 and link 18, to swing the detent 10 into an inclined position, so that as the magazine rotates it will pass down in front of and press backward the detent-arm. As the first bobbin-case of a series and the detent 10 of that series are or may be situated about ninety degrees apart, measured about the periphery of the magazine, the links 15 will be somewhat oblique.

The electrical controlling devices for setting in motion the weft or filling-supplying mechanism will now be described, premising that in their general construction they are or may be like those described in our before-mentioned patent, No. 655,645, and therefore will only require a brief description.

On the driver  $t$  is a short arm  $t^x$ , Figs. 2 and 6, to which is pivotally attached an armature-lever 20, carrying the armature of an electromagnet 21, mounted on the loom-frame. When this magnet is excited, it draws down the armature-lever 20 into the path of a dagger or tappet 22 on the lay, so that when the lay beats up at the last part of its movement this tappet impinges on the armature-lever and through it brings down the driver  $t$  on the bobbin-case in the magazine beneath it.

Referring now particularly to Figs. 11 to 14, an electric circuit 23, having in it the magnet 21 and any generator 24, has spring-terminals at 25 and 25<sup>x</sup> on the shuttle-box  $m$ , and when a shuttle  $s$  enters the box these terminals are put in contact, respectively, with two plates 26 and 26<sup>x</sup> on the shuttle. (See Figs. 11, 12, and 14.) At the respective ends of the shuttle are pairs of metal spring-jaws 27 and 27<sup>x</sup>, which are connected electrically with the respective plates 26 and 26<sup>x</sup>. These spring-jaws grip and hold the metal bobbin-case  $r$  at its ends and include it in the circuit.

The bobbin-case is, however, made in two sections insulated from each other at 28. On the spindle 29 of the bobbin-case is a metal washer 30, backed by a spring 31, which puts said washer in electrical connection with the left-hand end or section of the bobbin-case and through it and the jaws 27 with the plate 26 on the shuttle. The bobbin or weft-holder 32 is slipped onto the spindle, and a metal ring 33 on its enlarged end is pressed into contact with the washer 30, which puts this ring and a spring 34 secured to it in the circuit, as well as a metal contact-lever 35, mounted in a slot in the bobbin and backed by said spring. The weft or filling 36 on the bobbin overwraps the curved contact-lever 35 and keeps its free end out of contact with an outer metal ring 37 on the bobbin. This latter ring is a contact-terminal of the circuit, being in electrical contact at 38 in Fig. 12 with a metal plate or spring 39, attached to the right-hand section of the bobbin-case. When the filling is nearly exhausted from the bobbin, the spring 34 presses the lever 35 into contact with the ring 37 and closes the circuit, which is completed through the operating-electromagnet when the shuttle enters the box  $m$ .

As the above-described exhaustion-indicating mechanism is illustrated in our Patent No. 655,645, dated August 7, 1900, it is not specifically claimed herein, nor is this invention limited to it. Other known devices for setting in operation the supplying mechanism when the weft or filling is nearly or quite exhausted may be employed as well.

By "weft-holder" as herein used is meant any receptacle holding weft or filling, such as a weft-case or bobbin-case containing weft or filling, or a bobbin, a cop, a butt-cop, or the like containing weft or filling.

By the term "weft-case" or "bobbin-case" as herein used is meant any receptacle for weft or filling adapted to go into a shuttle.

We are the first, as we believe, to have invented a magazine or holder to contain weft or filling of different kinds or colors having segments or portions each containing a plurality of weft-holders arranged in succession and bearing weft or filling of the same kind or color and automatic means for feeding therefrom to the shuttle in play that particular kind or color required. We therefore claim this invention broadly and do not limit ourselves to any specific means for accomplishing the result.

By the phrases "presence or substantial absence" and "exhaustion or substantial exhaustion" of the weft or filling in the weft-carrier as herein used is meant such degree of denudation of the weft or filling as will allow the indicator device to perform its functions.

The means employed herein are "electromechanical," and by this phrase we mean any device wherein electricity is employed in any form to control the time of operation of the weft-supplying mechanism.



Having thus described our invention, we claim—

1. A box-motion loom having the following instrumentalities, namely, means for supplying weft or filling of different kinds or colors to the loom, said means comprising a magazine having the weft of each kind or color grouped together and on a plurality of weft-holders, selecting-detents, one for each kind or color of weft, said detents controlling the movements of the magazine for selecting, and a normal detent for arresting the selected weft-holder at the delivery-point, mechanism for transferring the weft-holders from the magazine to the shuttles, and means for setting in motion said magazine, said transferring mechanism being controlled by the presence or absence of weft in the weft-carrier, and mechanical selecting means controlled by the box-motion of the loom, through which the box-motion, in shifting, acts upon the selecting-detents and determines the kind or color of weft or filling to be supplied.

2. A box-motion loom having the following instrumentalities, namely, means for supplying weft or filling of different kinds or colors to the loom, said means comprising a magazine having the weft of each kind or color grouped together and on a plurality of weft-holders, selecting-detents, one for each kind or color of weft, said detents controlling the movements of the magazine for selecting, and a normal detent for arresting the selected weft-holder at the delivery-point, mechanism for transferring the weft-holders from the magazine to the shuttles, and electrical means for setting in motion said transferring mechanism, said means being controlled by the presence or absence of weft in the weft-carrier, and mechanical selecting means controlled by the box-motion of the loom, through which the box-motion, in shifting, acts upon the selecting-detents and determines the kind or color of weft or filling to be supplied.

3. In a loom, the combination with a rotatable magazine carrying weft-holders with weft of different kinds or colors, the weft of each kind or color being on holders grouped together in the magazine, selecting-detents, one for each color or kind of weft, and a normal detent which arrests the selected weft-holder at the delivery-point, of means for driving the weft-holder at this point into the shuttle when required, means for setting in motion said driving mechanism, said means being controlled by the presence or absence of weft in the shuttle, a box-motion situated at the opposite side of the loom from the magazine, and mechanical selecting means between said box-motion and said selecting-detents, whereby the box-motion, in its movements, controls the extent of movement of the magazine.

4. In a loom, the combination with a rotatable magazine carrying weft-holders with weft of different kinds or colors, the weft of

each kind or color being on holders grouped together in the magazine, selecting-detents, one for each color or kind of weft, and a normal detent which arrests the selected weft-holder at the delivery-point, of means for driving the weft-holder at this point into the shuttle when required, electrical means for setting in motion said driving mechanism, said means being controlled by the presence or absence of weft in the shuttle, a box-motion situated at the opposite side of the loom from the magazine, and mechanical selecting means between said box-motion and said selecting-detents, whereby the box-motion, in its movements, controls the extent of movement of the magazine.

5. In a loom, the combination with a rotary magazine carrying weft of different colors or kinds arranged in series in the magazine, and a box-motion, of detent-arms, one for each color, controlling the extent of rotation of the magazine so as to bring a certain kind or color of weft to the delivery-point, a selecting-cam which controls said detent-arms, means between said selecting-cam and the box-motion whereby the latter controls and operates the former, means for driving a weft-holder from the magazine into the shuttle at proper times, and means for setting in motion said driving mechanism, said means being controlled by the presence or absence of weft in the shuttle.

6. In a loom, the combination with a rotary magazine carrying weft of different colors or kinds arranged in series in the magazine, and a box-motion, of detent-arms, one for each color, controlling the extent of rotation of the magazine so as to bring a certain kind or color of weft to the delivery-point, a selecting-cam which controls said detent-arms, means between said selecting-cam and the box-motion whereby the latter controls and operates the former, means for driving a weft-holder from the magazine into the shuttle at proper times, and electrical means for setting in motion said driving mechanism, said means being controlled by the presence or absence of weft in the shuttle.

7. In a loom, the combination with a rotary magazine carrying weft of different colors or kinds in bobbin-cases and arranged in series in the magazine, and a box-motion, of detent-arms, one for each color, controlling the extent of rotation of the magazine so as to bring a certain kind or color of weft to the delivery-point, a selecting-cam which controls said detent-arms, means between said selecting-cam and the box-motion whereby the latter controls and operates the former, means for driving a weft-holder from the magazine into the shuttle at proper times, and means for setting in motion said driving mechanism, said means being controlled by the presence or absence of weft in the shuttle.

8. In a loom, the combination with a rotary magazine carrying weft of different colors or kinds in bobbin-cases and arranged in series in the magazine, and a box-motion, of detent-



arms, one for each color, controlling the extent of rotation of the magazine so as to bring a certain kind or color of weft to the delivery-point, a selecting-cam which controls said detent-arms, means between said selecting-cam and the box-motion whereby the latter controls and operates the former, means for driving a weft-holder from the magazine into the shuttle at proper times, and electrical means for setting in motion said driving mechanism, said means being controlled by the presence or absence of weft in the shuttle.

9. In a loom, the combination with a box-motion, and selecting means comprising automatic detent devices and controlled by the box-motion for selecting the color or kind of weft or filling to be supplied, of an automatic weft-supplying mechanism comprising a rotary magazine carrying weft-holders arranged in series, one color or kind in each segment of the magazine, and mechanism for driving a weft-holder from the magazine into the shuttle, and means, controlled by the presence or absence of weft in the shuttle, for setting in operation said supplying mechanism.

10. In a weft or filling supplying mechanism for looms, a rotatively-mounted magazine to carry the weft-holders, a sheave for driving said magazine mounted loosely on the same, and a spring between said sheave and the magazine, substantially as and for the purposes set forth.

11. In a weft or filling supplying mechanism, the combination with a rotatively-mounted magazine to carry the weft-holders, of the sheave 4, rotatively mounted on the magazine, the volute spring 5, between said sheave and magazine, the slip-belt 6, the sheave 7, on a shaft of the loom, and an automatic detent to arrest the rotation of the magazine.

12. In a loom, the combination with the box-motion at one side of the loom, and the rotary magazine at the other side thereof, adapted to receive and carry weft-holders arranged in series, of the detent-drum, the detent-arms, the selecting-cam *y* adapted to operate said arms, the shaft *v* carrying said cam, the arm *w* thereon, and means connecting said arm with the box-motion.

13. In a loom, the combination with the box-motion, the rotary magazine adapted to receive and carry weft-holders arranged in series, means for rotating said magazine, and the normal detent 8, provided with a bar 11, of the detent-drum 9, provided with detents situated in different transverse planes, the detent-arms and their springs, the selecting-cam *y* upon which said arms bear, mechanism between said box-motion and cam whereby the former operates the latter, the driver *t*, provided with a bar 12, and means for operating said driver.

14. In a loom, the combination with the rotatable magazine, and the detent-drum carried thereby, of a hinged detent 10, mounted in said drum, the rock-shaft 13, coupled to said detent for actuating it, and the spring-

detector 16, coupled to said shaft for rocking it, substantially as and for the purposes set forth.

15. In a weft or filling supplying mechanism for looms, a magazine or holder adapted to receive and carry weft or filling of different kinds or colors, said magazine having segments each containing weft of one kind or color, selecting detents controlling the positions of said segments with respect to the delivery-point, means for actuating said detents, and automatic electromechanical means, controlled by the presence or absence of weft in the active shuttle, or that at the time in play, for feeding from said magazine to said shuttle weft of the particular kind or color required.

16. In a loom, the combination with a box-motion, and selecting means comprising automatic detent devices, for selecting the kind or color of weft or filling required by the active shuttle, of an automatic weft-supplying mechanism, comprising a rotary magazine carrying bobbin-cases containing weft-holders arranged in series, one color or kind in each segment of the magazine, mechanism for driving the proper bobbin-case from the magazine into the shuttle, and means, controlled by the presence or absence of weft in the shuttle for setting in operation said supplying mechanism.

17. In a loom, the combination with a box-motion, and selecting means comprising automatic detent devices, for selecting the kind or color of weft or filling required by the active shuttle, of an automatic weft-supplying mechanism, comprising a rotary magazine carrying weft-holders arranged in series, one color or kind in each segment of the magazine, mechanism for driving the proper weft-holder from the magazine into the shuttle, and means, controlled by the presence or absence of weft in the shuttle for setting in operation said supplying mechanism.

18. In a loom, the combination with a box-motion, and selecting means comprising automatic detent devices, for selecting the kind or color of weft or filling required by the active shuttle, of an automatic weft-supplying mechanism comprising a rotary magazine carrying bobbin-cases containing weft-holders arranged in series, a plurality of weft-holders all carrying one color or kind of weft in each segment of the magazine, mechanism for driving the proper bobbin-case from the magazine into the shuttle, and electromechanical means controlled by the presence or absence of weft in the shuttle for setting in operation said supplying mechanism.

19. In a loom, the combination with a box-motion, and selecting means comprising automatic detent devices, for selecting the kind or color of weft or filling required by the active shuttle, of an automatic weft-supplying mechanism, comprising a rotary magazine carrying weft-holders arranged in series, a plurality of weft-holders all carrying one color or kind of weft in each segment of the maga-



zine, mechanism for driving the proper weft-holder from the magazine into the shuttle, and electromechanical means controlled by the presence or absence of weft in the shuttle for setting in operation said supplying mechanism.

20. In a weft or filling supplying mechanism for looms, a rotatively-mounted magazine adapted to receive and carry holders for weft of different kinds or colors arranged in series, a series of each kind or color occupying a particular segment of said magazine, selecting-detents controlling the positions of said segments with respect to the delivery-point, means for actuating said detents, and electromechanical means, controlled by the presence or absence of weft in the shuttle, for feeding the proper kind or color of weft to the shuttle to automatically maintain the loom in operation.

21. In a weft or filling supplying mechanism for looms, a rotatively-mounted magazine adapted to receive and carry holders for weft inclosed in bobbin-cases and carrying weft of different kinds or colors, a series of such bobbin-cases containing weft of a like kind or color being mounted in each segment of the magazine, selecting-detents controlling the positions of said segments with respect to the delivery-point, means for actuating said detents, and means, controlled by the presence or absence of weft in the shuttle, for feeding a bobbin-case containing weft of the proper kind or color to the shuttle to automatically maintain the loom in operation.

22. In a weft or filling supplying mechanism for looms, a rotatively-mounted magazine adapted to receive and carry holders for weft inclosed in bobbin-cases and carrying weft of different kinds or colors, a series of each kind or color occupying a particular segment of said magazine, selecting-detents controlling the positions of said segments with respect to the delivery-point, means for actuating said detents, and electromechanical means, controlled by the presence or absence of weft in the shuttle, for feeding the proper kind or color of weft to the shuttle to automatically maintain the loom in operation.

23. In a weft or filling supplying mechanism for looms, a magazine or holder adapted to receive and carry weft or filling of different kinds or colors, said magazine having segments each containing weft of one kind or color, automatic detent devices for arresting the rotation of the magazine, and automatic means, controlled by the presence or absence of weft in the active shuttle, or that at the time in play, for feeding from said magazine to said shuttle weft of the particular kind or color required.

24. In a weft or filling supplying mechanism for looms, a magazine or holder adapted to receive and carry weft or filling of different kinds or colors, said magazine having segments each containing weft of one kind or color, automatic detent devices for arresting

the rotation of the magazine, and electromechanical automatic means, controlled by the presence or absence of weft in the active shuttle, or that at the time in play, for feeding from said magazine to said shuttle weft of the particular kind or color required.

25. In a loom, the combination with a rotatable magazine having a single head or end and bars extending therefrom parallel with the axis of rotation, means on said bars to receive and hold weft-holders carrying weft of different kinds or colors, said magazine being situated at one side of the loom, the said weft-holders, a box-motion situated at the opposite side of the loom, mechanism for driving a weft-holder from the magazine into the shuttle as required, and means for setting in motion said driving mechanism, said means being controlled by the presence or absence of weft in the shuttle, of selecting means, controlled by said box-motion, whereby the shifting of the box-motion determines the kind or color of weft or filling in the magazine which shall be brought to the delivery-point.

26. In a loom, the combination with a rotatable magazine having a single head or end and bars extending therefrom parallel with the axis of rotation, means on said bars to receive and hold weft-holders carrying weft of different kinds or colors, said magazine being situated at one side of the loom, the said weft-holders, a box-motion situated at the opposite side of the loom, mechanism for driving a weft-holder from the magazine into the shuttle as required, and means for setting in motion said driving mechanism, means for controlling the operation thereof, said means consisting of an open electric circuit connected therewith held open by the presence and adapted to be closed by the absence of weft or filling in the shuttle in play, of selecting means, controlled by said box-motion, whereby the shifting of the box-motion determines the kind or color of weft or filling in the magazine which shall be brought to the delivery-point.

27. In a weft or filling supplying mechanism for looms, the combination of a magazine adapted to receive weft-holders carrying weft or filling of different kinds or colors, said magazine having segments each containing a plurality of weft-holders carrying weft of one kind or color, a box-motion at the side of the loom opposite to said magazine, and means connected with said magazine for bringing the first weft-holder in a segment of the color or kind corresponding to that in the shuttle in play, between the driver and shuttle, of the said driver for driving the weft-holder into the shuttle as required, and when the first weft-holder of a segment has been removed, means connected with the magazine to allow the magazine to rotate, independently of the box-motion-rotating means, to the next adjoining full weft-holder in that same segment, the times of operation thereof being controlled



by the presence or absence of weft or filling in the active shuttle.

28. In a weft or filling supplying mechanism for looms, the combination of a magazine  
5 adapted to receive weft-holders carrying weft or filling of different kinds or colors, said magazine having segments each containing a plurality of weft-holders carrying weft of one  
10 kind or color, a box-motion at the side of the loom opposite to said magazine, and means connected with said magazine for bringing the first weft-holder in a segment of the color or kind corresponding to that in the shuttle in play, and between the driver and shuttle,  
15 of the said driver for driving the weft-holder into the shuttle as required, and when the first weft-holder of a segment has been removed, means connected with the magazine to allow the magazine to rotate, independently of the box-motion-rotating means, to  
20 the next adjoining full weft-holder in that same segment, and electromechanical means made inoperative and operative, respectively, by the presence or absence of weft or filling  
25 in the shuttle in play, for controlling the operation of said mechanism.

29. In a weft or filling supplying mechanism for looms, the combination of a magazine

adapted to receive weft-holders carrying weft or filling of different kinds or colors, said magazine having segments each containing a plurality of weft-holders carrying weft of one  
30 kind or color, a box-motion at the side of the loom opposite to said magazine, and means connected with said magazine for bringing the first weft-holder in a segment of the color or kind corresponding to that in the shuttle in play, into position to be transferred to the shuttle, of means for transferring the weft-holder into the shuttle as required, and when  
35 the first weft-holder of a segment has been removed, means connected with the magazine to allow the magazine to rotate, independently of the box-motion-rotating means, to the next adjoining full weft-holder in that  
40 same segment, the times of operation thereof being controlled by the presence or absence of weft or filling in the active shuttle.

In witness whereof we have hereunto signed our names this 29th day of January, 1900, in  
50 the presence of two subscribing witnesses.

WILLIAM H. BAKER.  
FREDERIC E. KIP.

Witnesses:

PETER A. ROSS,  
HENRY CONNETT.