No. 801,616. PATENTED OCT. 10, 1905.

C. O. SITTIG.

WEFT REPLENISHING MECHANISM FOR LOOMS.

APPLICATION FILED DEC. 30, 1903.

3 SHEETS—SHEET 1.

Fig. 1.

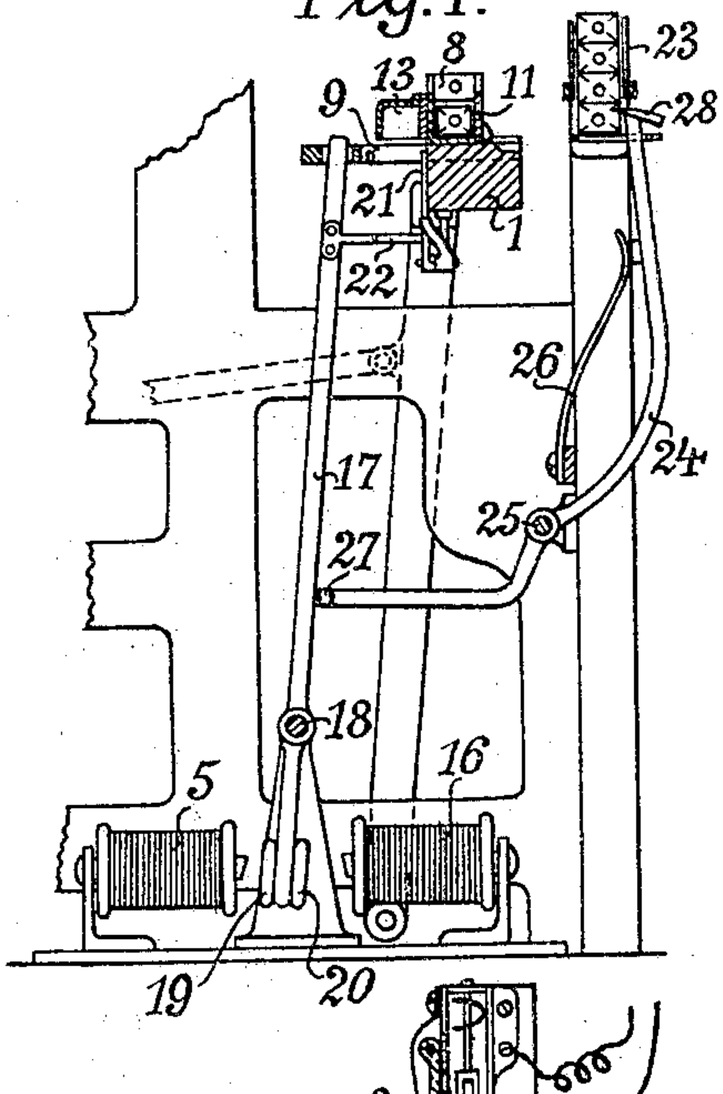


Fig. 2.

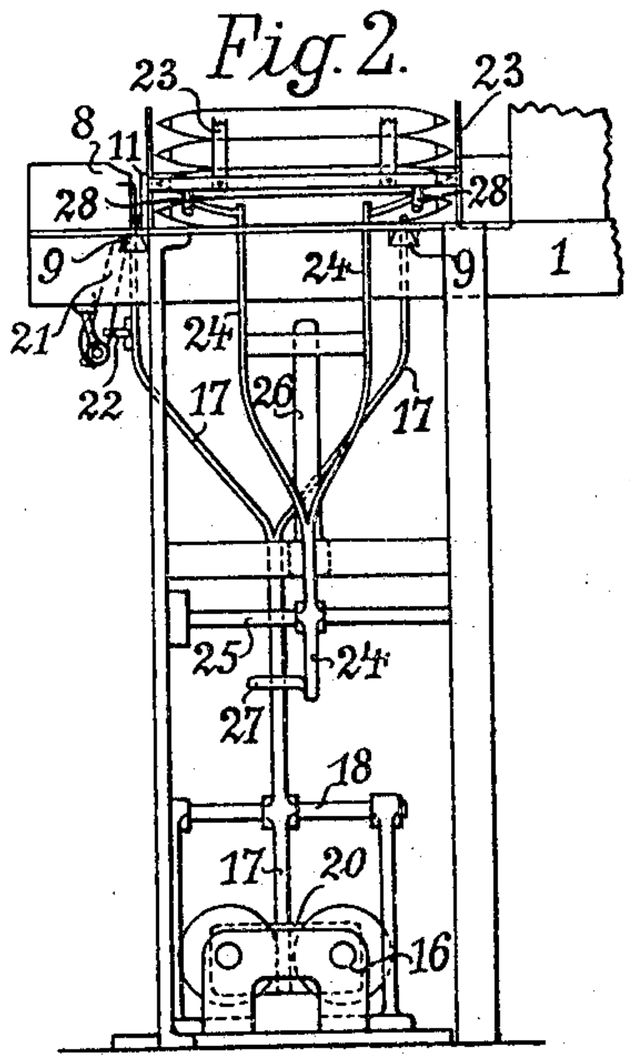


Fig. 3.

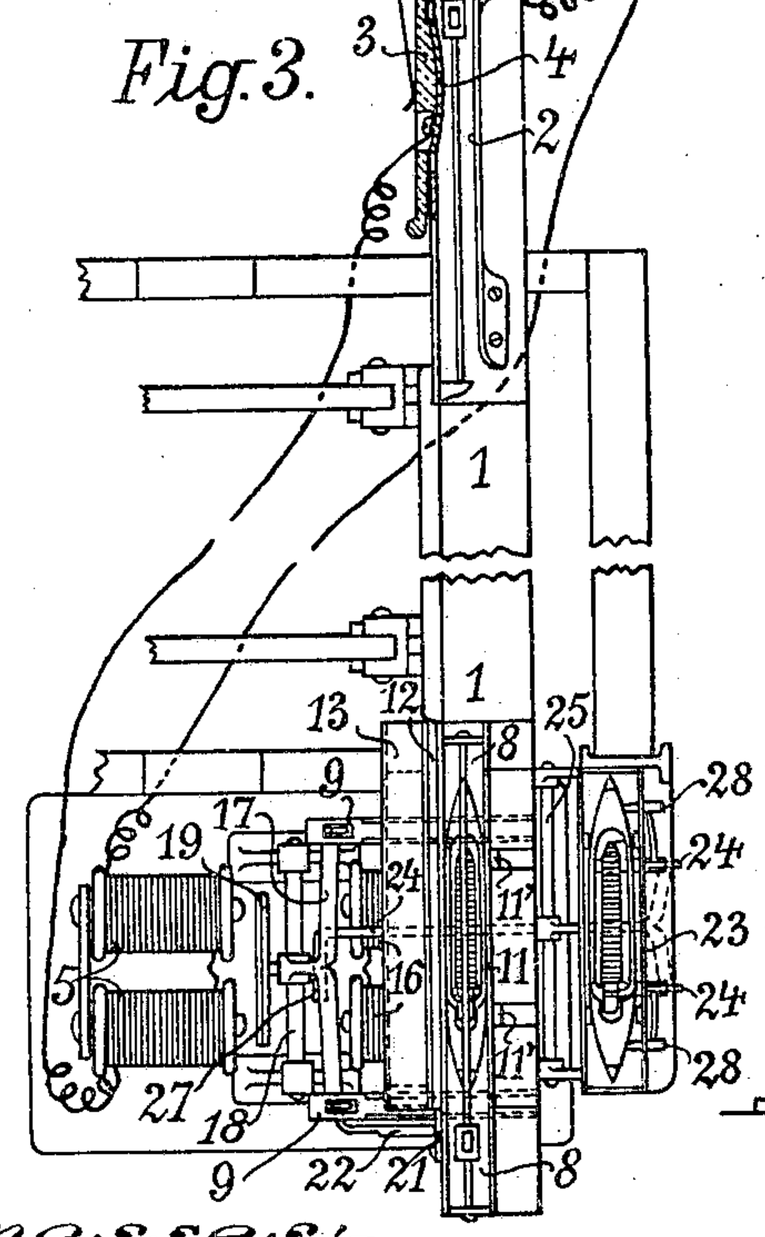
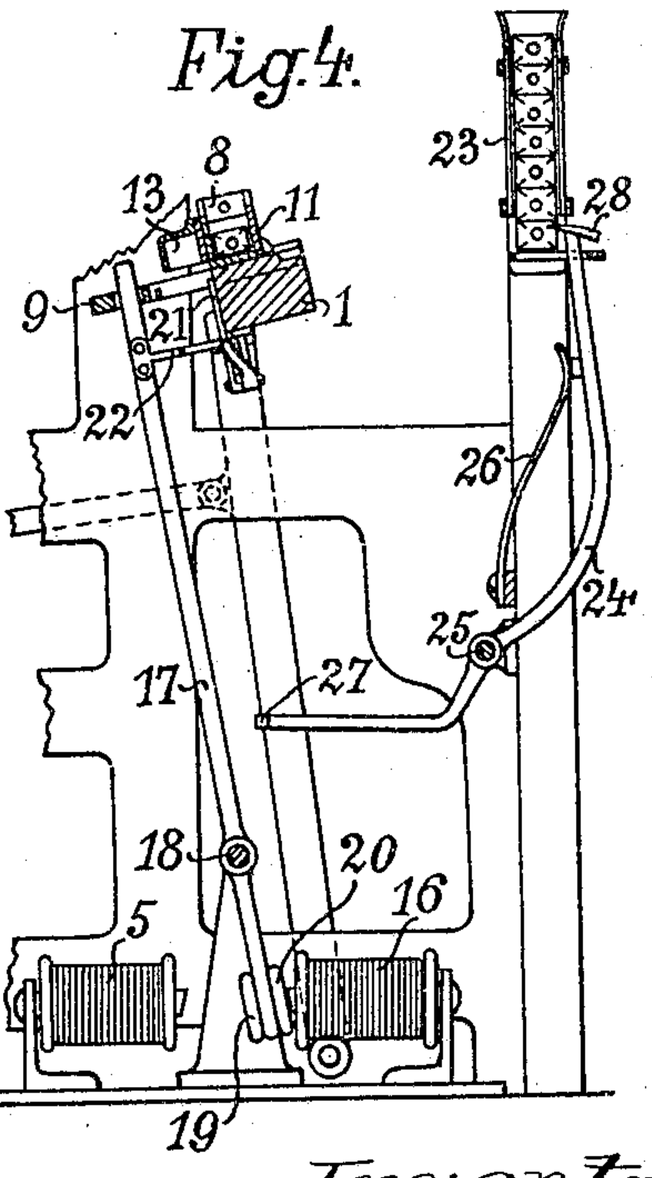


Fig. 4.



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3 SHEETS—SHEET 2.

Fig. 5.

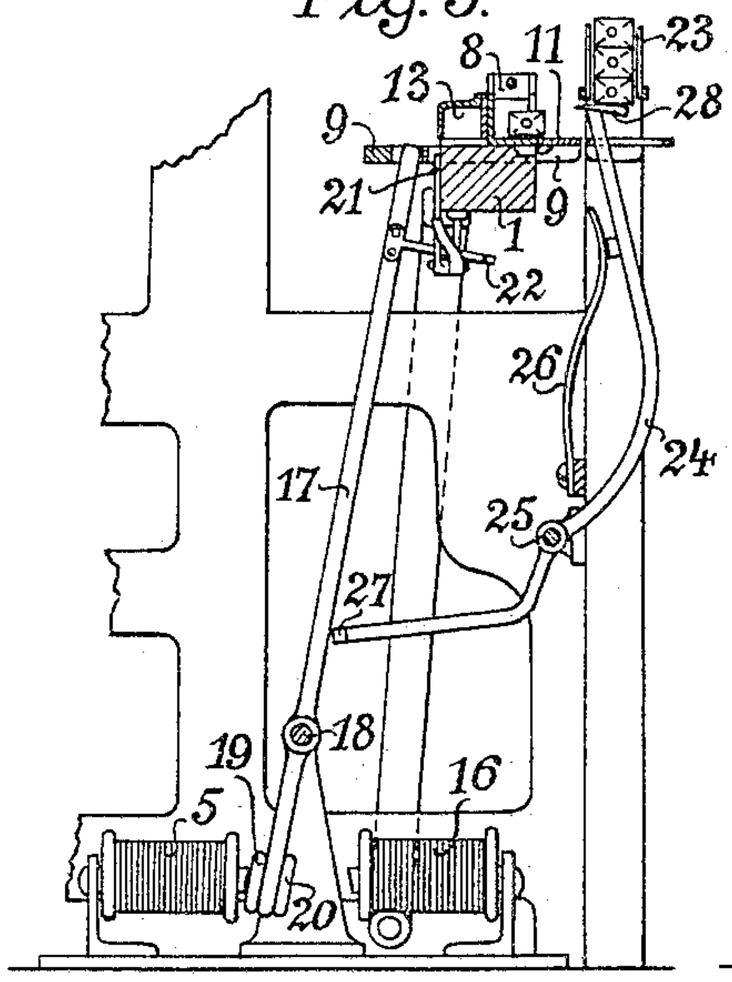


Fig. 6.

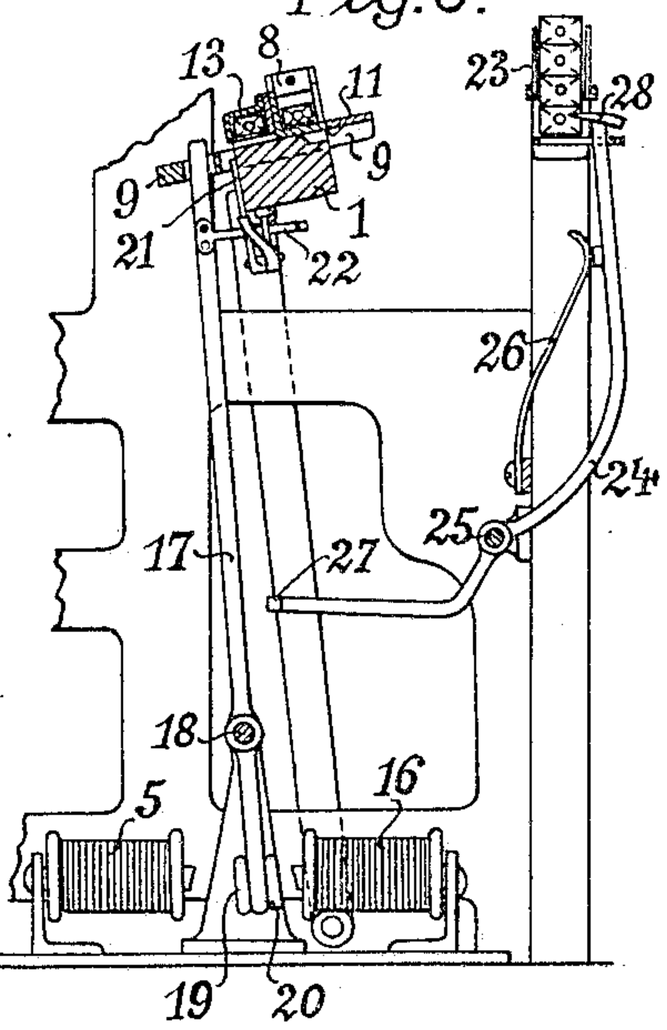


Fig. 7.

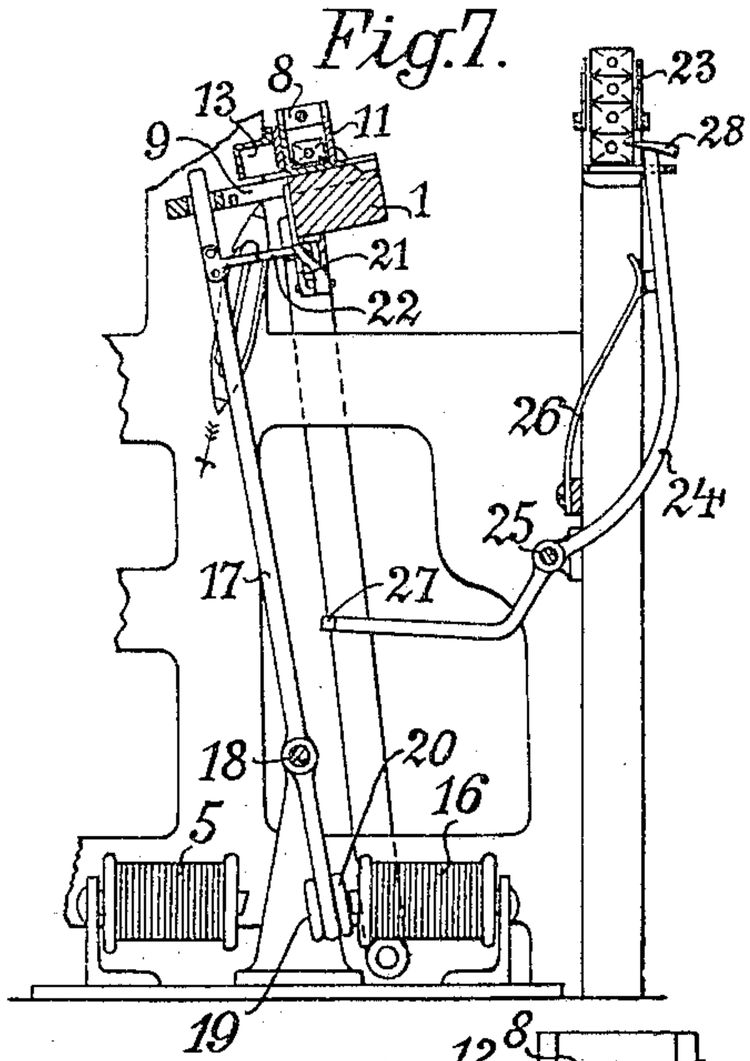


Fig. 8.

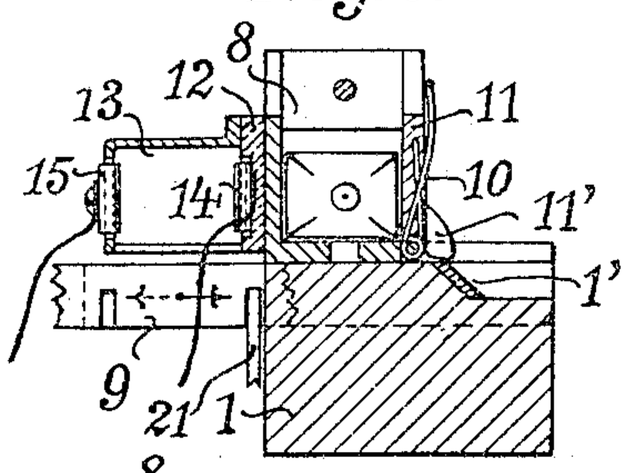


Fig. 9.

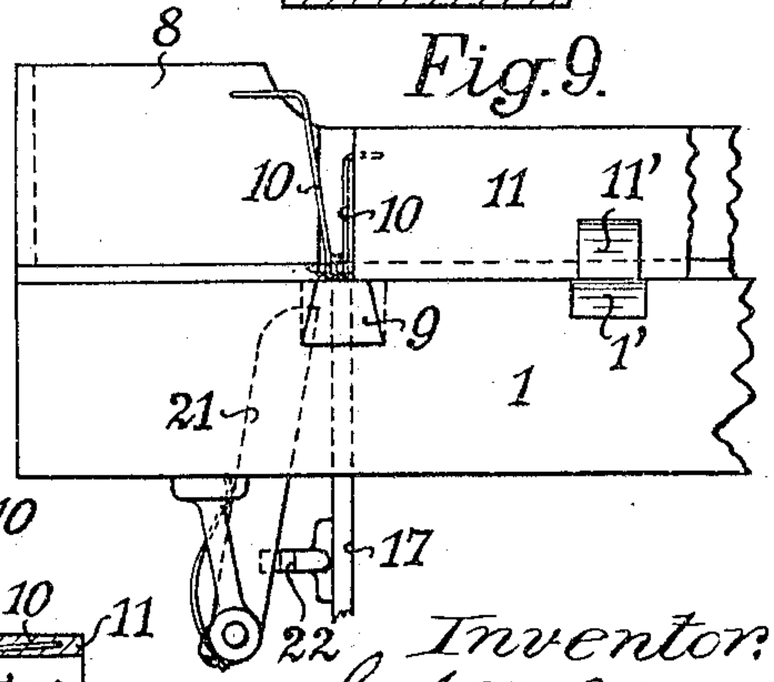
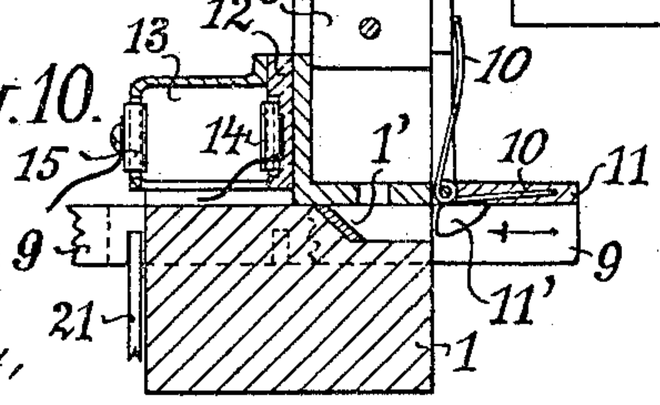


Fig. 10.



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3 SHEETS—SHEET 3.

Fig. 11.

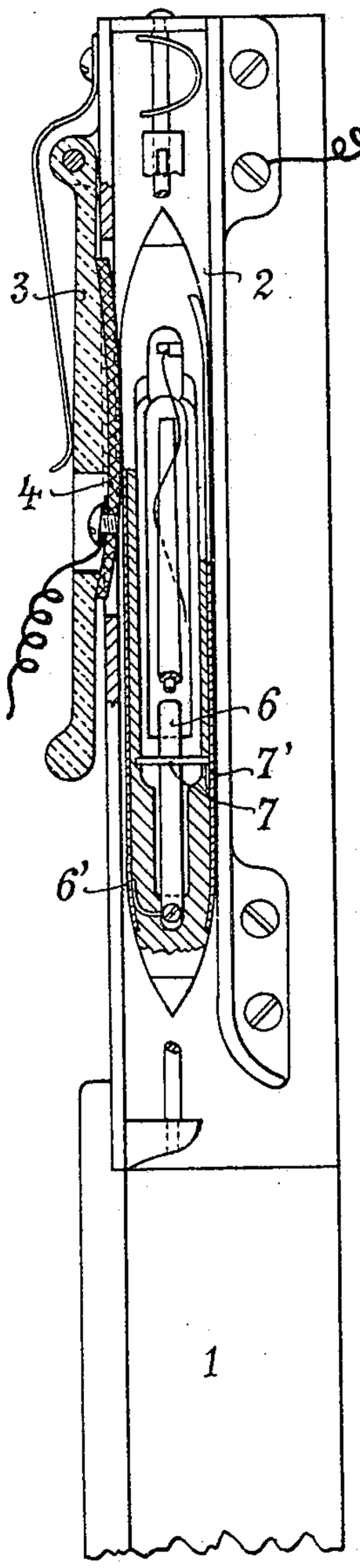
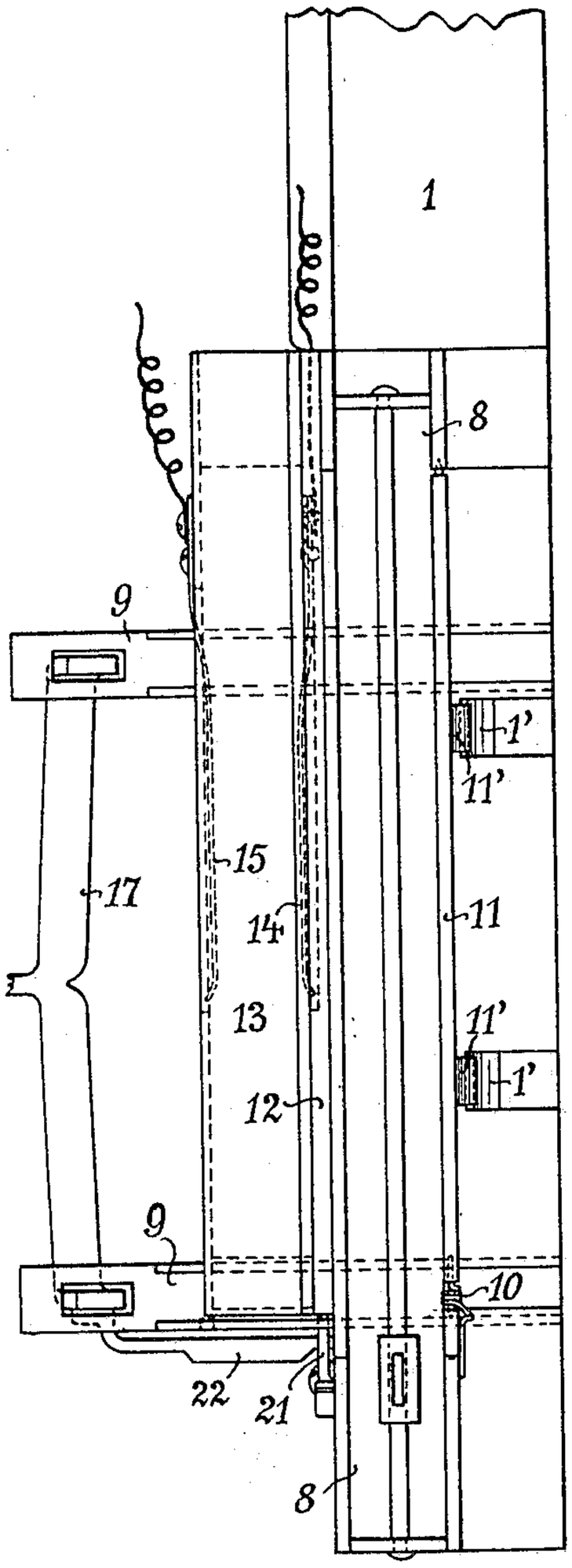


Fig. 11a.

Fig. 12.



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UNITED STATES PATENT OFFICE.

CARL OTTO SITTIG, OF DRESDEN, GERMANY, ASSIGNOR TO GUSTAV HERMANN PISCH, OF DRESDEN, GERMANY.

WEFT-REPLENISHING MECHANISM FOR LOOMS.

No. 801,616. Specification of Letters Patent. Patented Oct. 10, 1905.

Application filed December 30, 1903. Serial No. 187,123.

To all whom it may concern:

Be it known that I, CARL OTTO SITTIG, a subject of the King of Saxony, and a resident of 3 Friesengasse, Dresden, Kingdom of Saxony, German Empire, have invented a new and useful Improvement in Weft-Replenishing Mechanism for Looms, of which the following is a specification.

The present invention relates to apparatus for automatically changing shuttles in looms.

In the apparatus of this kind hitherto sometimes employed a bell-crank lever when the shuttle-thread is exhausted throws a feed device into operation, which is mechanically operated by the batten to remove the empty shuttle and substitute a full one.

According to the present invention the lever, which is shaped like a pair of tongs and operated by the exciting of an electromagnet, takes the full shuttle direct from the magazine and by exciting a second electromagnet directly removes the empty one while simultaneously inserting the new shuttle in the shuttle-race. This is attained according to the present invention by connecting the shuttle-box, which is mounted to slide laterally on the end of the batten and provided with an automatically rising and falling wall and an insulated cap for receiving the shuttles, directly to the lever, which with the two electromagnets is mounted alongside the loom and quite independently thereof. Loosely connected also to the lever is a rock-lever which projects into the shuttle-magazine and when the lever is attracted by one of the electromagnets operates with the former after the manner of a gripper to supply a fresh shuttle. By directly connecting the sliding shuttle-box to the lever a reliable supply and removal of the full and empty shuttles is always insured. The new apparatus also permits of the lathe being placed either above or below the shuttle-race, whereas in the devices hereinbefore mentioned the lathe could only be placed below the shuttle-race.

A construction embodying the new apparatus is shown in the accompanying drawings, in which Figures 1 to 7 represent all those parts of a loom to which my invention is applied, Fig. 1 being a vertical section parallel with the sides of the loom, Fig. 2 a front view, Fig. 3 a plan, Figs. 4, 5, 6, and 7 views corresponding with Fig. 1, but showing the parts in various working positions. Figs. 8, 9, 10, 11, 11[a], and 12 show various details to be hereinafter described on a larger scale than Figs. 1 to 7, Fig. 8 showing in section, and Fig. 9 in longitudinal elevation, the end of the batten carrying the slidable shuttle-box, Fig. 10 a section similar to that of Fig. 8 of the shuttle-box changed in position, Fig. 11 a plan of the batten carrying the fixed shuttle-box, Fig. 11[a] showing the shuttle partly in longitudinal elevation and partly in section, and Fig. 12 showing a plan of part of the batten carrying the slidable shuttle-box and the parts for moving and holding the same.

Upon one end of the batten 1 is mounted the shuttle-box 2, one wall of which is provided with a flap 3, of insulating material, controlled by a spring. The flap 3 is provided with a contact-piece 4, which projects through a sufficiently large opening in the wall of the box 2 into the interior thereof, as shown in Fig. 3.

The box 2 and the contact-piece 4 are connected by a circuit interrupted by the insulating-flap 3, which circuit leads back through an electromagnet 5, mounted independently of the loom to the source of electrical supply. This circuit is closed when the shuttle with its nearly-exhausted thread shoots into the box 2.

As shown in Figs 11 and 11[a], a spring 6 and a cross-pin 7 are provided for closing the circuit through the coils of the electromagnet 5 or 16 when the shuttle with its nearly-exhausted thread enters the box 2 and afterward the cap 13. One side wall of the shuttle is provided with a metal shield or cover 6′ and the other wall of such shuttle with a similar shield or cover 7′. As shown in Fig. 11, the spring 6 is electrically connected with the cover 6′ and the cross-pin 7 connected in the same manner with the cover 7′. During the rest of the shuttle within the box 2 the yielding flap 3 presses, by means of its contact-piece 4, connected to the electromagnet 5, against the cover 6′ of the shuttle, so that the cover 7′ of the shuttle is in close contact with the side wall of the box 2, connected to the source of electrical supply. The spring 6 cannot touch or meet the cross-pin 7 when there is still sufficient thread within the shuttle. In consequence of this the circuit cannot be closed by the shuttle. If, however, the thread in the shuttle is almost exhausted, the spring 6 will be in close contact with the

cross-pin 7 and the circuit will be closed through the electromagnet 5. In the same manner the circuit is closed through the electromagnet 16 when the empty shuttle moves into the cap 13, running between the contact-making springs 14 15, as clearly shown in Figs. 8, 10, and 12.

Upon the other end of the batten 1 is mounted the shuttle-box 8 by means of suitably-guided running-rails 9 9, so as to slide transversely. The shuttle-box 8 is provided on each side with a wall 11 to be moved on horizontal studs. A coiled spring 10, Figs. 8, 9, 10, and 12, is wound on one of these studs and rests with its one end against the fixed part of the front wall of the shuttle-box, whereas the other end of such spring is connected to the wall 11 under sufficient tension. By this arrangement the spring 10 tends to turn over the wall 11 outward. While the box 8 on the batten 1 is in the position of Fig. 8, the lugs 11′, provided on the wall 11 and shown in Figs. 8, 9, 10, and 12, do not admit the turning over of the wall 11 by supporting or resting of the lugs against the upper surface of the batten. A recess provided with a slanting or inclined surface 1′ is provided in the batten 1 and in front of each lug, so that on moving the box 8 on the batten 1 in the right-hand direction the lugs 11′ are not supported any more and the coiled spring 10 turns down the wall 11 into the position shown in Fig. 10. When the box 8 is moved back on the batten 1, the lugs 11′ meet the inclined surface 1′. These inclined surfaces act on the lugs 11′ in such a manner that on the movement of the box 8 into the position Fig. 8 the wall 11 is erected under the tension of the coiled spring 10.

To the fixed side wall of the box 8 is attached a cap 13, perforated on its under side and separated from the box 8 by an insulating-plate 12. (See Fig. 8.) To this insulating-plate 12 is attached a contact-making spring 14, from which, as also from another spring 15, attached to the outer wall of the cap, or from the wall of the cap itself, a circuit interrupted by the insulating-plate passes and leads through a second electromagnet 16, mounted opposite the electromagnet 5, back to the source of electricity.

Between the two electromagnets 5 and 16 is mounted the double lever 17, rocking on the pivot 18. The short limb of this lever carries the armatures 19 and 20 for the electromagnets 5 and 16, the long limb being loosely connected by its forked ends to the running-rails 9 9 of the shuttle-box 8. In one of the rails 9 recesses may be cut corresponding to the two positions of the box, and in either of which a spring-catch 21 may be caused to enter for the purpose of securing the box in the necessary positions. This catch is released by a cam 22 on the lever 17 before the lever begins to push against the shuttle-box 8. In front of the shuttle-box is mounted the lattice-shaped magazine 23, carried on suitable stationary supports, in which magazine a large number of full shuttles are piled on top of each other. Between the supports of the magazine is mounted the double lever 24, rocking on the shaft 25 and normally held in the position shown in Figs. 1, 4, 6, and 7 by the spring 26.

The short limb of the lever 24, as shown in Figs. 1 and 2, bears lightly with its bent arm 27 against the lever 17, the long limb of the lever 24 projecting with its forked ends through slots provided in the floor of the magazine 23. The ends of the lever protruding from the slots are provided with fingers 28, which by catching under the last shuttle but one in the magazine 23 facilitate the expulsion of the lowest shuttle by the ends of the lever 24.

The method of operation of the apparatus above described is as follows: As long as the shuttle contains sufficient thread the shuttle-box 8 remains in the same position on the batten 1 during its motion from position Fig. 1 to position Fig. 4, the lever 17 only assuming the position shown in Fig. 4 owing to the swing of the batten. At this stage, however, the lever 17 cannot push the shuttle-box 8, as the latter is rigidly held by the spring-catch 21 and the circuits of both electromagnets 5 and 16 are broken. Supposing now there is a shuttle in the shuttle-box 8 in the position Fig. 4 with a somewhat exhausted thread, immediately this shuttle enters the box 2 the circuit leading to the electromagnet 5 will remain closed as long as the shuttle remains with its armored sides in close contact with the contact-piece 4 and the opposite fixed wall of the box. This continues till the batten, and with it also the rocking-lever 17, has again nearly arrived at the position of Fig. 1, in which the electromagnet 5, being still excited, attracts the lever 17, this position being shown in Fig. 5. The lever 17 has now after releasing the spring-catch 21 pushed the empty shuttle-box 8 onto the batten 1 into the position shown, which is again insured by the spring-catch 21. During the thrusting of the box 8 its wall 11 is turned down by the spring 10, (see Fig. 8,) so that it lies close against the floor of the shuttle-magazine 23 and forms one plane therewith. While the box 8 has been thrust forward by the lever 17, this latter has simultaneously brought the lever 24 into the position shown in Fig. 5, whereby the ends thereof have thrust a full shuttle out of the magazine 23 into the box 8 and the said shuttle, owing to the backward swing of the batten (see Fig. 6) which now takes place, slides of itself right home into the box. By the backward swing of the batten the lever 17 has receded from the arm 27 of the lever 24, so that the latter is returned

to its position of rest by the spring 26. If now in the position Fig. 6 the nearly empty shuttle is shot out of the box 2, it enters the cap 13, now lying in the shuttle-race. When the shuttle enters the cap, the circuit leading to the electromagnet 16 will be closed and the magnet after releasing the spring-catch 21 brings the lever 17, and with it the shuttle-box 8, into position shown in Fig. 7. By the thrusting back of the box 8 its wall 11 has once more become erect, so as to prevent the full shuttle in the box from falling out sidewise, while the empty shuttle in the cap 13 loses its support and falls out, as shown at Fig. 7. The work then commences with the newly-supplied shuttle, which when its thread is exhausted is removed and replaced by another, as already explained.

What I claim is—

1. In an apparatus for automatically changing shuttles in looms, the combination with the batten, of a rock-lever shaped like a pair of tongs, two electromagnets moving such lever, a lattice-shaped magazine piled with full shuttles, a double lever bearing against the tong-shaped rock-lever and a shuttle-box receiving single shuttles from a magazine, substantially as described and for the purpose specified.

2. In an apparatus for automatically changing shuttles in looms, the combination with the batten, of a tong-shaped rock-lever, running-rails, a sliding shuttle-box carried by such rails, a movable wall in the shuttle-box, turning over during the movement of the box in one direction under spring action to receive a new shuttle and becoming erect again during the back movement of the box, a cap perforated on its under side and separated from the box by an insulating-plate provided with a contact-making spring, a second contact-making spring attached to the outer wall of the cap, an electromagnet and a source of electricity, substantially as described and for the purpose specified.

In testimony that I claim the foregoing as my invention I have signed my name, in presence of two witnesses, this 15th day of December, 1903.

CARL OTTO SITTIG.

Witnesses:
OTTO HELLMUTH KNOOP,
PAUL ARRAS.