No. 770,828. PATENTED SEPT. 27, 1904.

E. E. SHELTERS.

LOOM AND WEFT REPLENISHING MECHANISM THEREFOR.

APPLICATION FILED AUG. 26, 1903.

NO MODEL. 3 SHEETS—SHEET 1.

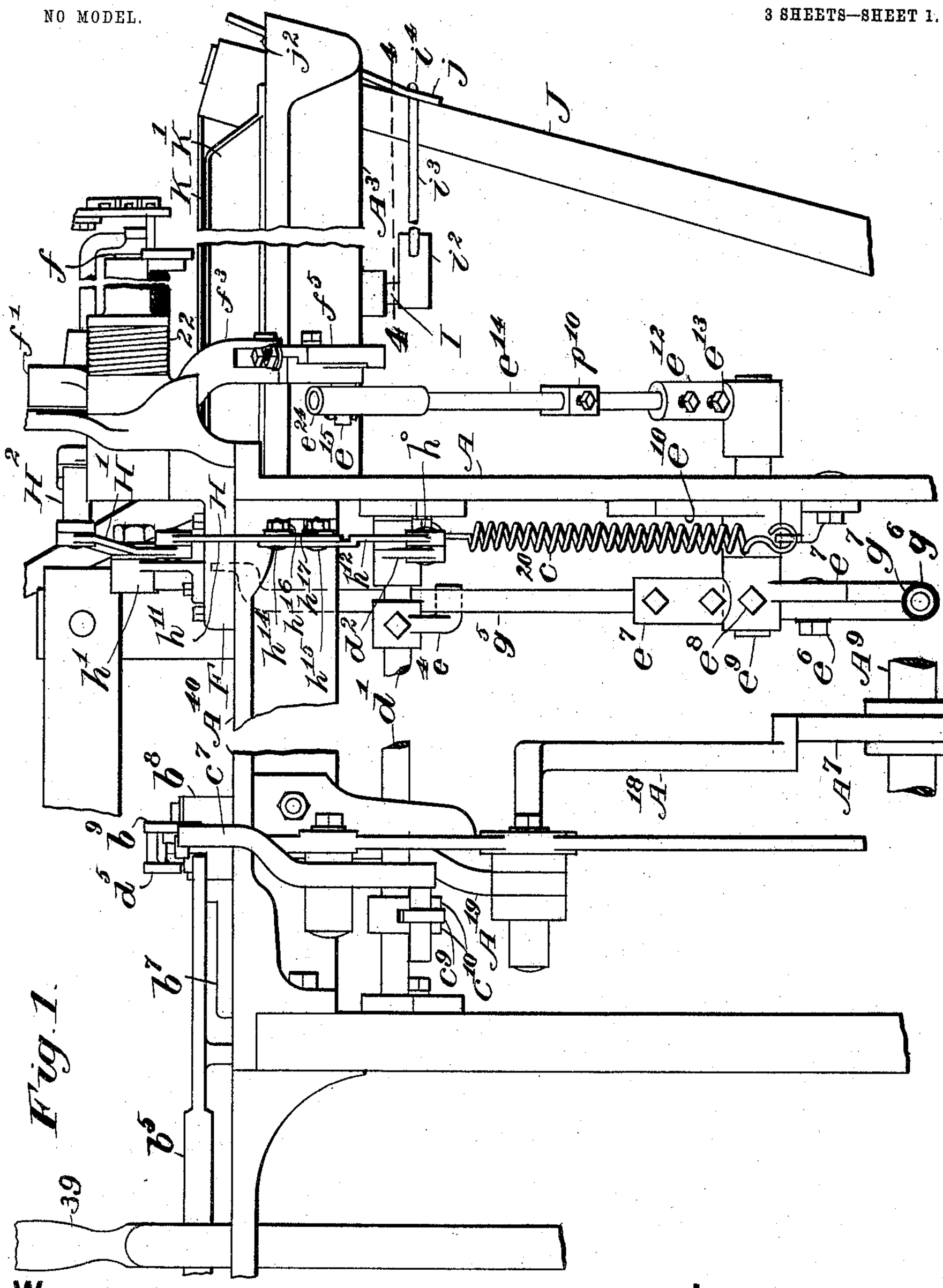

Fig. 1.

WITNESSES.

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NO MODEL. 3 SHEETS—SHEET 2.

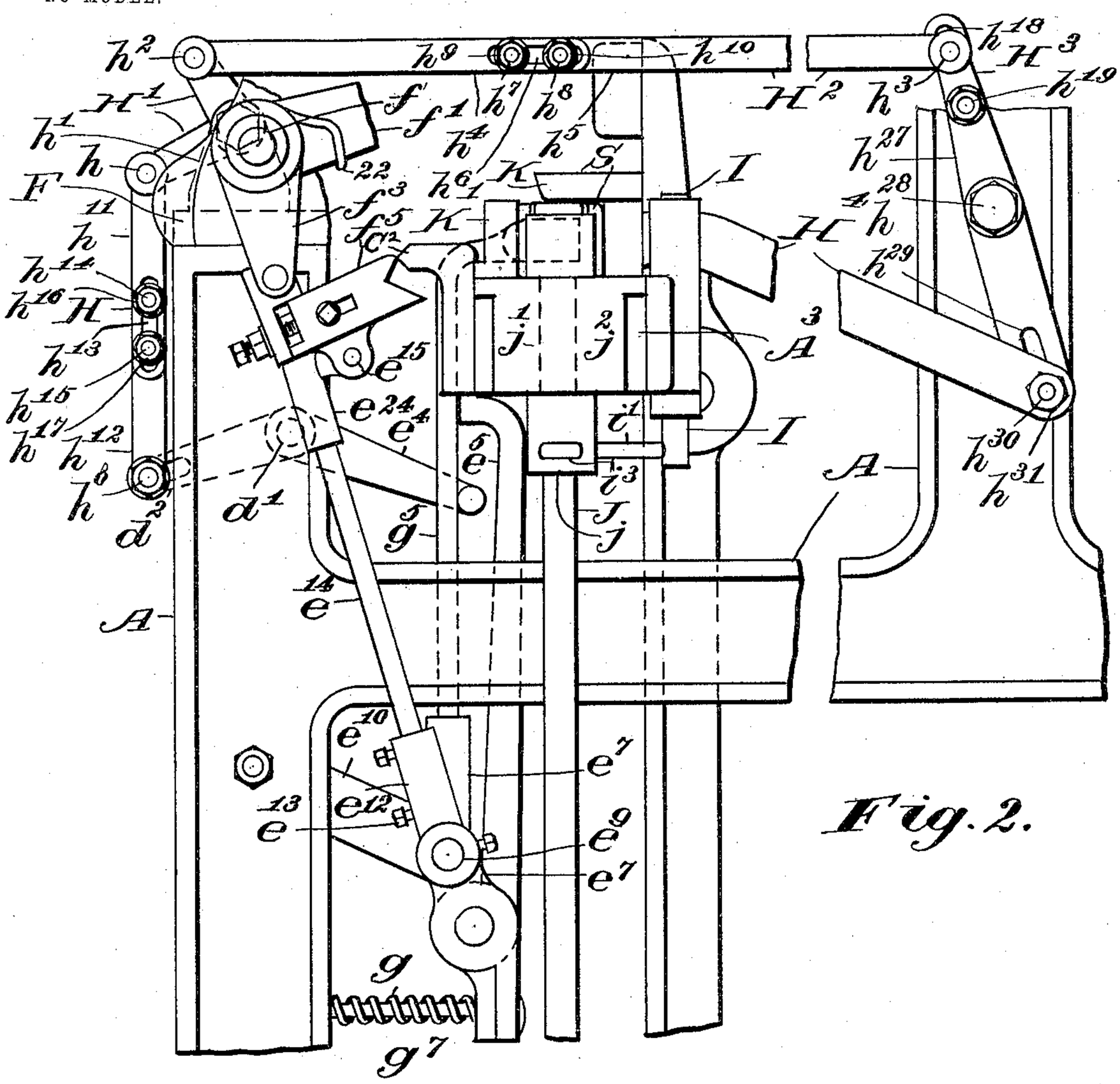


Fig. 2.

Fig. 8.

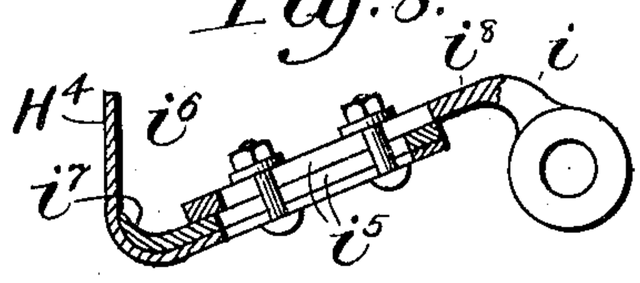
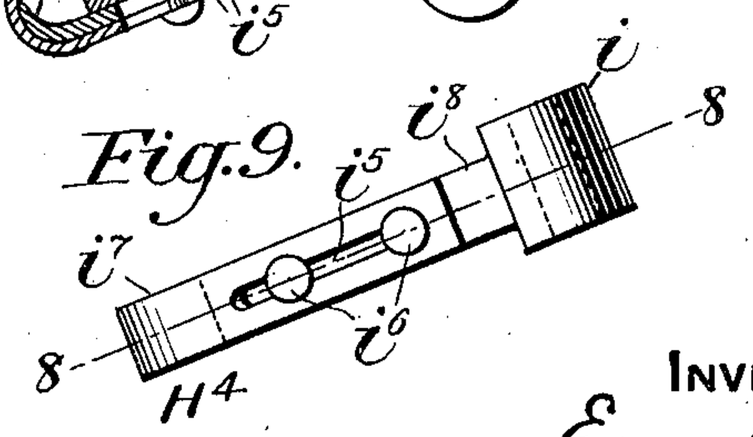


Fig. 9.



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NO MODEL. 3 SHEETS—SHEET 3.

Fig. 5.

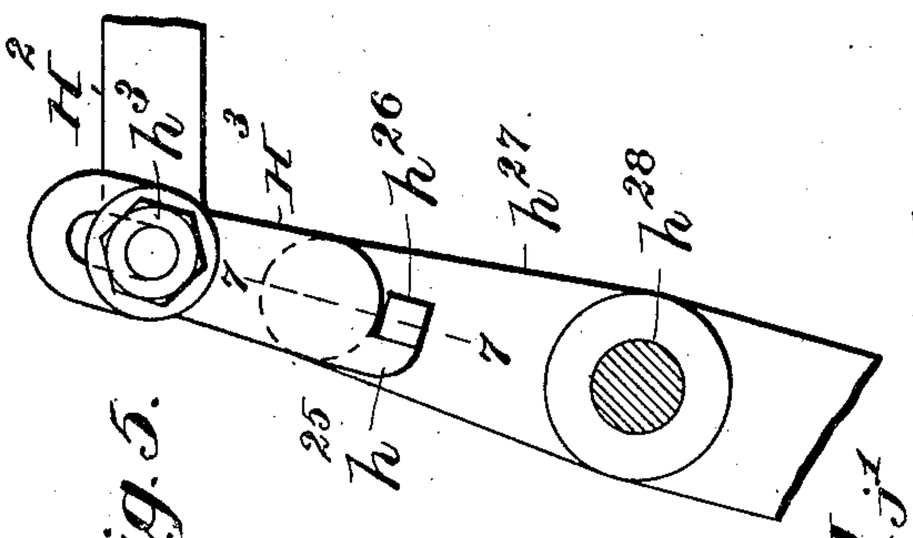

Fig. 6.

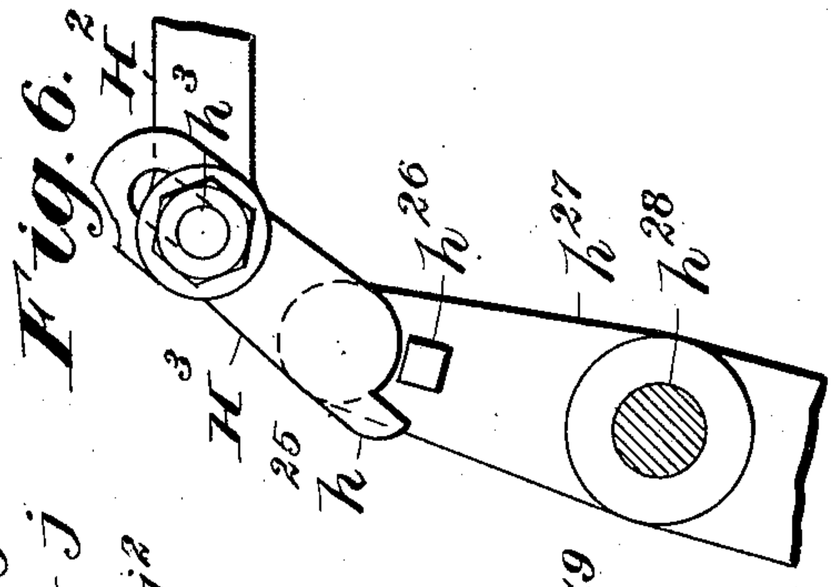

Fig. 4.

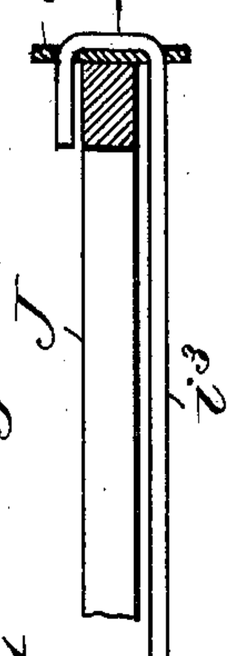

Fig. 7.

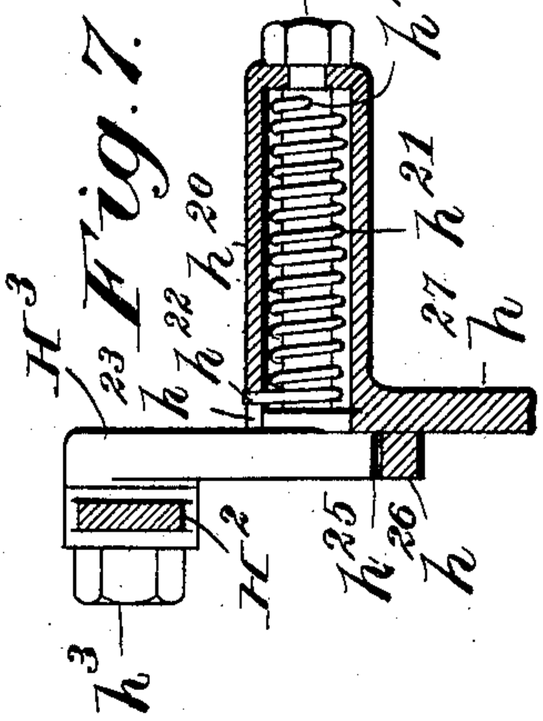

Fig. 3.

WITNESSES.

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His ATTORNEY.

No. 770,828. Patented September 27, 1904.

UNITED STATES PATENT OFFICE.

ERNEST E. SHELTERS, OF LOWELL, MASSACHUSETTS.

LOOM AND WEFT-REPLENISHING MECHANISM THEREFOR.

SPECIFICATION forming part of Letters Patent No. 770,828, dated September 27, 1904.

Application filed August 26, 1903. Serial No. 170,794. (No model.)

To all whom it may concern:

Be it known that I, ERNEST E. SHELTERS, a citizen of the United States, residing at Lowell, in the county of Middlesex and Commonwealth of Massachusetts, have invented a certain new and useful Improvement in Looms and Weft-Replenishing Mechanism Therefor, of which the following is a specification.

My invention relates especially to looms of that class in which provision is made for automatically replenishing the filling when the supply in the shuttle is exhausted, and comprises means for placing the shuttle in the proper position to receive a filling-carrier, as a bobbin or spindle, at the time of renewing the filling-supply in order to avoid breaking the filling-carriers, shuttles, and parts of the loom. In such looms when the picker becomes worn beyond a certain amount or separated from the picker-stick the shuttle enters the shuttle-box so far that the full bobbin in being forced downward by the pusher strikes on the flat surface of the shuttle between the incline and adjacent tip of the spindle and breaks the bobbin, and where instead of a bobbin the filling-carrier consists of a steel spindle the shuttle or the changing mechanism is liable to be broken. Sometimes when the picker is in place on the picker-stick and is less worn than in the case above mentioned the shuttle enters the box so far that the filling-carrier when pushed into the shuttle, if the shuttle-binder be too loose, forces the shuttle suddenly toward the center of the lay so far that the head of the filling-carrier is not properly engaged by the carrier-retaining springs; but under these circumstances it more frequently happens that the carrier, being much lighter than the shuttle, on striking the incline jumps toward the picker past the retaining-springs and fails to be engaged by said springs. When from either cause the carrier is not engaged by the springs, the next throw of the shuttle is likely to cause a break out of the warp besides a breaking of the bobbin.

The object of this invention is to restore a shuttle which has entered the shuttle-box too far to the proper position to receive the filling-carrier, which is accomplished by pressing the picker-stick against the outer end of the shuttle until the shuttle strikes against a properly-placed stop, the shuttle-binding devices being released during the replacing of the shuttle.

In the accompanying drawings on three sheets, Figure 1 is a front elevation of my invention applied to a weft-replenishing loom with such parts of the loom as are necessary to the understanding of said invention; Fig. 2, a side elevation of the same; Fig. 3, a plan of the shuttle-box and connected parts at the magazine side of the loom with my improvement; Fig. 4, a horizontal section of the picker-stick and of the vertical rock-shaft of my device on the line 4 4 in Fig. 1 and a plan of the means which connect said shaft and picker-stick; Fig. 5, an enlarged elevation of the inner side of the spring hinge or joint of the lever with the hinge closed; Fig. 6, an elevation similar to Fig. 5, showing the hinge open; Fig. 7, a horizontal central section of said lever on the line 7 7 in Fig. 5; Fig. 8, a horizontal section of the upper arm of the vertical rock-shaft and of the adjacent parts of the connected strap or link on the line 8 8 in Fig. 9; Fig. 9, a front elevation of the parts shown in Fig. 8.

United States Letters Patent No. 529,943 to Northrop, dated November 27, 1894, shows and describes most of the previously-known loom parts shown in the accompanying drawings, and for convenience I have adopted the letters of reference used in said patent to indicate like parts in this specification. The loom-frame A, lay A^3, breast-beam A^{40}, rock-shaft d', the arm e^4, secured thereto, weft-hammer A^{19} and connected lever A^{18}, bunter C^2, reciprocating weft-fork slide b^9, and the mechanism between said slide and rock-shaft d' are or may be all as shown and described in said patent.

It will be understood that upon a failure of the filling the weft-fork will not be tilted as the lay swings forward, and the shaft d' will be rocked, raising the arm e^4 against another arm e^5 and rocking the shaft e^9, lifting by intermediate mechanism the rear end of the dog f^5 into the path of the bunter C^2, and the pusher f' will force a new carrier into the

shuttle if said shuttle be far enough in the shuttle-box; but, as described in said patent, the operation of the pusher f' does not take place when the shuttle has rebounded from the shuttle-box too far to receive properly the new bobbin, there being a feeler g^5, carried by the above-mentioned shaft e^9, the upper free end of which feeler is moved toward the advancing lay when said shaft is rocked as above described and enters the inner end of the shuttle-box at the magazine end of the lay if not prevented by the shuttle; but if the shuttle has rebounded too far said shuttle will strike the free end of the feeler and cause the shaft e^9 to rock in the opposite direction from that caused by the arm e^4 and cause the notch or rear end of the dog f^5 to be depressed below the part of the bunter C^2, as fully described in said patent. When the feeler is not prevented from entering the inner end of the shuttle-box and the pusher is not prevented from acting, the shuttle may be in the proper position to receive a new carrier, or it may be too far in said box if for any reason, as by loss of the picker or by wear of the face of the picker or of the outer face of the picker-stick, the distance between the outer face of the feeler and the surface against which the outer end of the shuttle rests is greater than the length of the shuttle. I use the outer face of the feeler or face nearest the picker-stick as a stop for the inner end of the shuttle and crowd a shuttle against the feeler before the pusher f' is operated by means hereinafter described.

I provide the shaft d' with a forwardly-extending arm d^2, to the outer or front end of which at h^0 I pivot the lower end of a link or rod H, the upper end of which is pivoted at h to the lower arm of a bell-crank lever H′, (pivoted on a stand h', supported on the magazine-stand F,) the other arm of said lever H′ being pivoted at h^2 to a link or rod H^2 and said rod being pivoted at h^3 to the upper end of a jointed lever H^3, fulcrumed at h^{28} on the loom-frame A. The lower end of the lever H^3 is connected by a flexible or otherwise yielding strap or link H^4 to an arm i of a vertical rock-shaft I, journaled in a bracket I′, secured on the back of the lay behind the shuttle-box in which the filling transfer is made. The rock-shaft I is provided below the lay with another arm i', the free or front end of which is connected to the picker-stick in such a manner that when the outer end of the arm i is thrown backward the picker-stick will be drawn toward the inner end of the shuttle-box.

The links, rods, or connections H H^2 H^4 may, any or all of them, be adjusted in length by any usual means, and the working length of the lever H^3 is also made variable to adapt the apparatus to varying dimensions of looms or to vary the distance of movement of the shuttle in the shuttle-box. The connections H H^2 are of inextensible material, each being made in two lengths h^{11} h^{12} and h^9 h^{10}, the adjacent ends of which overlap each other and are slotted at h^6 h^{13}, the lengths of the connection H being adjustably secured to each other by bolts h^{14} h^{15} and nuts h^{16} h^{17}, and the lengths of the connection H^2 may be similarly connected to each other by the bolts h^7 h^8 and nuts h^9 h^{10} to permit of said connections being lengthened or shortened. The effective length of the lever H^3 is varied by moving the bolts h^3 h^{30}, which pivot the links or connections H^2 H^4, to the ends of said lever in longitudinal slots h^{18} h^{29}, with which said lever is provided. The upper arm i of the shaft I, which arm bears against the back of the binder K and presses it toward the front of the shuttle-box, is also formed in two parts i^7 i^8, connected to each other by slots i^5 and bolts i^6, to enable said upper arm to be lengthened to vary the pressure of said arm upon said binder, as shown in Figs. 3, 8, and 9, where the part i^7 is represented as arranged in front of the part i^8 or body of said arm and the front end portion of the strap H^4 is secured to the movable part i^7 by the same bolts, i^6, which secure said parts to each other. The lower arm of the binder is connected by a hinge or a flexible strap i^2 to a rod i^3, which has a hook i^4 to engage the picker-stick J, said rod being held in a nearly horizontal position by the arm i'' and by a support j, which is represented as a sheet of tough material, as leather or leatheroid, through which said hook passes, as shown in Figs. 2 and 4, and which is notched at j' j^2 on the sides to receive the sides of the picker-stick slot. This construction allows the picker to move away from the hook when throwing the shuttle and holds the hook in a position to receive said picker-stick when the latter moves outward.

The advantages of connecting the rock-shaft I to the picker-stick below the shuttle-box are that this arrangement keeps the strap i^2 and rod i^3 out of the way and that the connection between the picker-stick and said rock-shaft is in a plane parallel to the line of movement of said picker-stick and does not cause said picker-stick to twist or to be pulled against the side of the slot which guides said picker-stick, which would wear the stick and render it less capable of delivering a straight blow to the shuttle. When the picker-stick is worn "out of center," the shuttle is likely to be thrown against the dents of the reed and to bend said dents where the dents are very fine and to wear the surface of the shuttle.

Obviously the rocking of the shaft d' permits the feeler g^5 to move toward the shuttle-box and draws the picker-stick toward the inner end of the shuttle-box. It is evident that when the shuttle enters the box and strikes the picker-stick the latter moving outward rocks the shaft I in such a manner as to press the upper arm of said shaft I against the binder and causes the latter to press against the shuttle with a force regulated by the above adjustments of said last-named arm and

of the lever J^3 and its connections. The rocking of the shaft d' takes place only when the shuttle is traveling toward the magazine end of the loom, and the rocking of the shaft I suddenly tightens the connection H^4 between the lower end of the lever H^3 and the rock-shaft I. To prevent a breaking of said connection H^4 or other parts connected therewith and affected thereby between the arm d^2 of the rock-shaft d' and said connection H^4, I make said lever H^3 in two parts—the lower part, h^{27}, pivoted on the frame, as above described, and the upper part pivoted or hinged to said main part by a stud h^{19}, which is rigidly secured to said upper part and turns in a sleeve or tubular lateral extension h^{20} on the upper end of said lower part. A spiral spring h^{21} surrounds said stud in said sleeve and is secured at one end to said sleeve and at the other end to said stud and tends to keep a downward projection h^{25} on the upper part against a stop h^{26}, projecting from the lower part h^{27} of the lever H^3, as shown in Fig. 5, but while strong enough to hold the picker against the shuttle will yield before the connection H^4 breaks under the sudden and violent pull of the lay.

I claim as my invention—

1. In an automatic loom, the combination of filling-transferring mechanism, means actuated thereby for moving the shuttle toward the middle of the lay, and a stop to limit such movement of said shuttle.

2. In an automatic loom, the combination of filling-transferring mechanism, means actuated thereby for moving toward the shuttle-box entrance, a shuttle which has entered the shuttle-box too far, and a stop to limit such movement of said shuttle.

3. In an automatic loom, the combination of filling-transferring mechanism, the picker, and means actuated by said mechanism for pressing said picker against the outer end of a shuttle to crowd the inner end of said shuttle toward the entrance of the shuttle-box, and a stop to limit such movement.

4. In an automatic loom, the combination of a lay having a shuttle-box, filling-transferring mechanism, including the pusher and the operating rock-shaft of said transferring mechanism, a shuttle-feeler adapted to close the inner end of the shuttle-box, means actuated by said shaft for operating said feeler to close said shuttle-box, before said pusher is operated, and means for moving a shuttle in said box against said feeler in advance of the operation of said pusher.

5. The combination of the lay having a shuttle-box, a binder pivoted therein, a picker-stick, a vertical rock-shaft having an arm arranged to press against said binder, another arm on said vertical rock-shaft arranged below said shuttle-box, and connecting means below said box between said last-named arm and said picker-stick.

6. The combination of the lay having a shuttle-box, a binder pivoted therein, a picker-stick, a vertical rock-shaft having an arm arranged to press against said binder, another arm on said vertical rock-shaft arranged below said shuttle-box, connecting means below said box between said last-named arm and said picker-stick, and means of varying the length of said first-named arm to regulate the pressure of said arm upon said binder.

In testimony whereof I have affixed my signature in presence of two witnesses.

ERNEST E. SHELTERS.

Witnesses:
ALBERT M. MOORE,
AMOS H. SANBORN.