No. 646,904. Patented Apr. 3, 1900.

H. I. HARRIMAN.

LOOM.

(Application filed Feb. 7, 1900.)

(No Model.) 3 Sheets—Sheet 1.

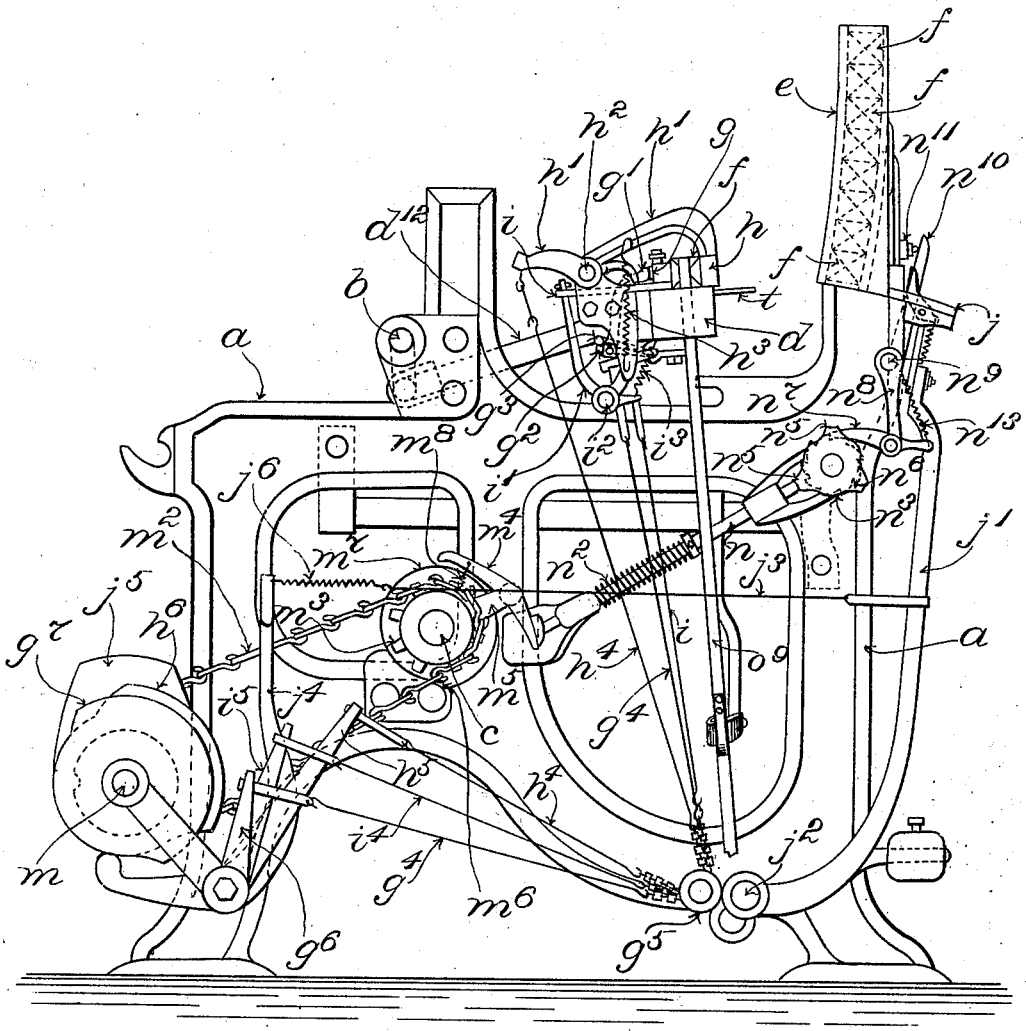

Fig. 1.

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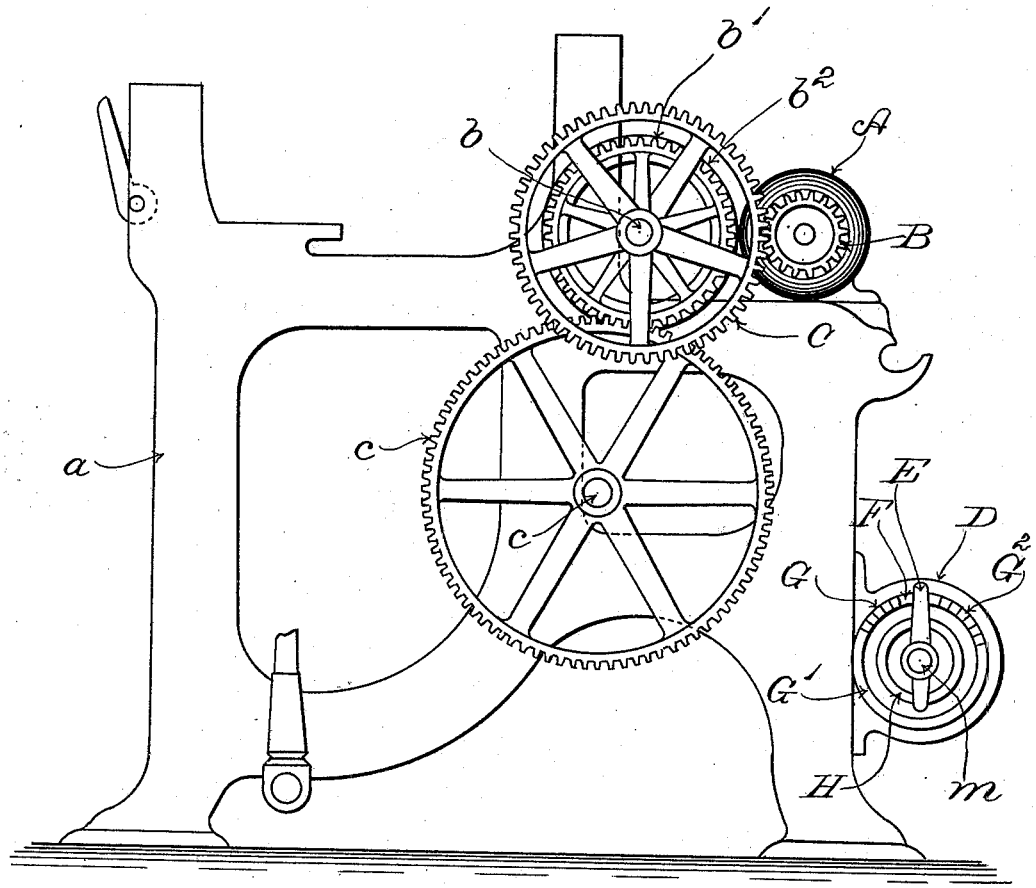

Fig. 2.

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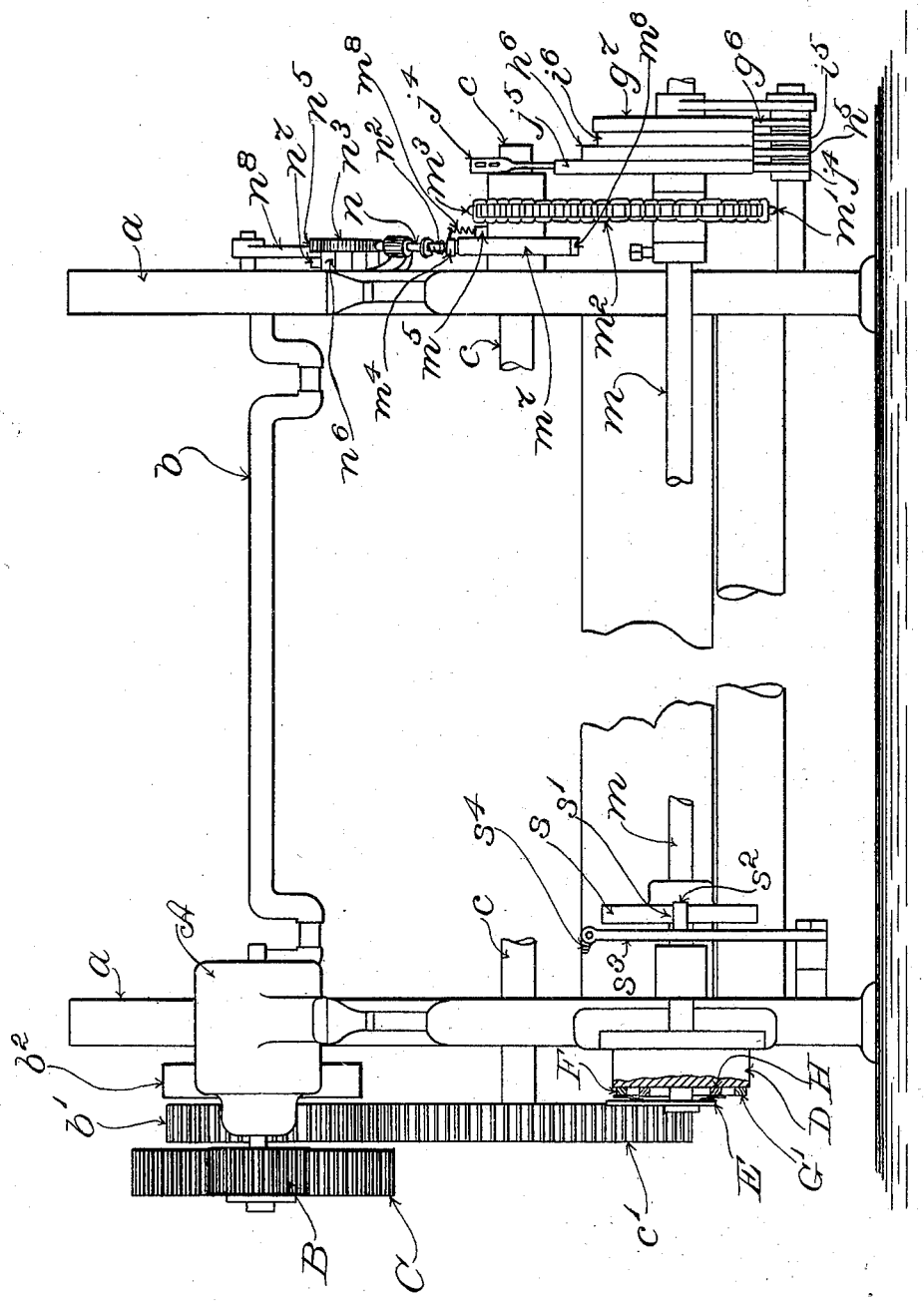

Fig. 3.

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UNITED STATES PATENT OFFICE.

HENRY I. HARRIMAN, OF NEW YORK, N. Y.

LOOM.

SPECIFICATION forming part of Letters Patent No. 646,904, dated April 3, 1900.

Application filed February 7, 1900. Serial No. 4,301. (No model.)

To all whom it may concern:

Be it known that I, HENRY I. HARRIMAN, a citizen of the United States, residing at New York, in the county of New York, State of New York, have invented a certain new and useful Improvement in Looms, of which the following is a specification, reference being had therein to the accompanying drawings.

The invention has relation to looms of that class in which replenishment of the working weft-supply is effected automatically by the mechanism of the loom when necessity arises therefor—as, for example, on exhaustion of the supply of weft or filling that is carried by the working shuttle on the lay or on exhaustion thereof to a predetermined extent or on loss of continuity of such weft or filling, the action of the replenishing instrumentalities being brought about or instituted through the agency of suitable forms of weft-indicator mechanism.

More especially the invention has relation to automatic weft-replenishing looms of the type in which the speed of the loom is reduced during the performance of the operations which are incident to the weft-replenishment and afterward is restored to its normal rate. A loom of this type is presented in Letters Patent of the United States No. 626,834, granted to me June 13, 1899, to which reference may be had.

The special aim of the present invention is to provide a simple and convenient means of driving the loom at the different speeds which are required for the regular working of the loom and also during replenishment.

The invention will be described with the aid of the accompanying drawings, in which—

Figure 1 is an elevation of the change end of a loom on the order of those to which my invention is to be applied in practice. Fig. 2 is an elevation of the opposite or driving end of the loom, illustrating the application of one embodiment of my invention. Fig. 3 is a rear elevation of certain portions of the said loom, showing the said embodiment.

Having reference to the drawings, *a a* designate the end frames of a loom, and *d* the lay thereof.

One of the picker-sticks is shown in Fig. 1 at o^9.

In Fig. 1 one of the lay-pitmen or connecting-rods is shown at d^{12}. *b* is the crank-shaft. b^2, Figs. 2 and 3, is the brake or balance wheel thereon. *c* is the cam-shaft, and *c'* the gear on the cam-shaft in mesh with the pinion *b'* on the crank-shaft.

By way of making clear the relations, &c., of my present invention I will now describe, briefly, certain features of an automatic weft-replenishing loom of the type aforesaid. My invention is not restricted to use in connection with replenishing instrumentalities of the particular character or arrangement herein shown and referred to, although in practice I prefer to employ shuttle-changing mechanism of the same general class as that which is shown and described in my Letters Patent aforesaid. The instrumentalities which I have chosen to illustrate for the purposes of the present case are arranged to effect replenishment of the working supply of weft or filling by ejecting from the lay the spent or failed working shuttle and substituting a reserve shuttle from a hopper or magazine *e*. The latter is shown mounted independently of the lay at one end of the breast-beam.

In Fig. 1, *f* designates the working shuttle on the lay. Reserve shuttles are shown in dotted lines in the hopper or magazine *e*. *j* is the injector or pusher for transferring at the proper time a shuttle from the said hopper or magazine *e* over into the shuttle-box on the corresponding end of the lay.

j' is the arm on which the injector or pusher is mounted, and j^2 is the pivot of said arm, the said pivot being applied to the corresponding end frame of the loom.

h is the vertically-movable front wall of the shuttle-box at the supply end or change end of the loom. *h'* is the rocker to which the said front wall is connected, and h^2 the pivot of the said rocker on a suitable support carried by the lay.

h^3 is the spring, which acts to hold the rocker and front wall *h* in their normal position (represented in Fig. 1) and to return them thereto after the rocker has been moved to raise the said front wall.

In Fig. 1, *g* is the swell or binder located at the rear of the shuttle-box, and *g'* the usual protector-finger acting against the said swell or binder and mounted upon a rearwardly-extended portion of the protector-shaft g^2.

g^3 is the rocker mounted upon the lay and having an arm in engagement with the said rearwardly-extended portion of the protector-shaft, by means of which the protector-shaft is rocked at the proper time to take the pressure of the protector-finger g' off the swell or binder g, as deemed advisable in some cases for the purpose of facilitating the movement of the front wall h of the shuttle-box and the entrance of a reserve shuttle into the shuttle-box under the action of the injector j.

i designates the ejector for pushing the spent or failed shuttle out of the shuttle-box after the movable shuttle-box front h has been raised out of the way, the said ejector being in the form of a plate working beneath the lower edge of the swell or binder g.

i' is the rocker for actuating the ejector, it being pivoted at i^2 to a support carried by the lay. One arm thereof is in connection with the ejector. A spring i^3, acting on rocker i', serves to hold the ejector in its rearwardly-retracted position.

m is the change-shaft located at the rear of the loom and carrying the cams h^6, g^7, i^6, and j^5, by means of which are actuated the rocker h', carrying the shuttle-box front h, the rocker g^3, acting on the protector-shaft, the rocker i for the ejector, and the injector j. The bell-cranks, which are engaged by the said cams, respectively, are designated h^5, g^6, i^5, and j^4, respectively. The connections, which extend from the said bell-cranks to the various rockers and the injector-arm j', are designated, respectively, h^4, g^4, i^4, and j^3. The direction-changing pulleys or sheaves, around which connections h^4, g^4, and i^4 pass, are indicated at g^5. The spring, which is included in the connections between bell-crank j^4 and the injector, is shown at j^6.

In some respects the instrumentalities which have just been described differ from those of my Letters Patent No. 626,834 aforesaid and resemble those which are shown and described in Letters Patent No. 637,113, granted to me November 14, 1899.

I have shown herein the change-shaft m arranged to be driven from the cam-shaft c by the aid of power-transmitting connections substantially such as in my Letters Patent No. 637,113, the same comprising a sprocket-wheel m', fast on the change-shaft, a sprocket-wheel m^3, loose on the cam-shaft, a sprocket-chain m^2, connecting the said sprocket-wheels, a clutch-disk m^7, having a single clutch-tooth m^6 and fast with the cam-shaft, driving-arm m^5, fast with the sprocket-wheel m^3, and a clutch-dog m^4, pivoted on said driving-arm. As disclosed in said Letters Patent No. 637,113, when the engaging end of said clutch-dog is permitted to be moved by spring m^8 into the path of rotation of clutch-tooth m^6 on disk m^7 the sprocket-wheel m^3 becomes clutched to the cam-shaft and is rotated so as to transmit movement to the change-shaft m. As in my said Letters Patent No. 637,113, the clutch-dog is held normally out of the path of clutch-tooth m^6 by means of the disengaging-bolt n, the latter being forced against the tail of the clutch-dog by the projections n^5 n^5 n^5, respectively, on the cam-disk n^3, but being retracted from the tail of the clutch-dog by the spring n^2 when the projections n^5 n^5 n^5 are out of the way. The ratchet-wheel connected with cam-disk n^3 is designated n^6. The actuating-pawl therefor is designated n^7. The arm carrying said pawl is shown at n^8, and the detector rock-shaft on which said arm is mounted is shown at n^9. The spring which holds the free end of the pawl n^7 pressed into contact with the teeth of ratchet-wheel n^6 is marked n^{13}. The working of these parts last referred to is as set forth in my Letters Patent No. 637,113 aforesaid.

In the loom of my Letters Patent No. 626,834 I employ supplemental driving devices for securing the slow speed of the loom during the performance of the operations that are connected with weft-replenishment and also two belt-shifters, which are under the operative control of the change-shaft. In accordance with my present invention I employ for driving the loom at all times an electric motor, which is represented at A and which is in driving connection with one of the shafts of the loom. Herein the said motor is provided with a driving-pinion B, the latter meshing with a gear C on crank-shaft b. In connection with motor A, I also employ a rheostat, as D, by means of which to regulate the working of the said motor, and thereby govern the speed at which the loom is driven. The movable brush of the rheostat is shown at E, and it is arranged to be operatively controlled from the change-shaft m. In the present instance this control is attained by affixing the said brush to the change-shaft, the contact-pieces F, G, G', G², and H of the rheostat being arranged concentrically with relation to the said change-shaft. One part of the brush E is arranged to bear at all times against the contact-piece H, and during the normal working of the loom while the change-shaft is at rest the other part of the brush bears upon the contact-piece F, the resistances of the rheostat E being cut out and the motor being permitted to run at high speed to drive the loom correspondingly for regular work. When, however, the change-shaft is set in motion, brush E is carried around, so as to pass over the series of contact-pieces G, cutting in resistances successively until contact-piece G' is reached, by which time the amount of electrical energy acting at motor A will be diminished sufficiently to give the required reduced speed to the loom. The loom will be run at the latter speed until about the completion of the replenishing operations, at which time the brush E will reach and begin to travel over the contact-pieces G². In traveling over these latter it

will cut out the resistances successively, thereby causing the speed of the motor and loom to be gradually increased until it reaches the required maximum, when the brush will have returned to the contact-piece F.

s designates the stop-disk, which is made fast on the change-shaft, it having in its periphery at *s'* a notch to receive the stud or pin s^2, carried by the locking arm or lever s^3. The said arm or lever is acted upon by the spring s^4, and the entrance of the said pin into the said notch when the latter presents itself at the conclusion of the rotating movement of the change-shaft serves to lock the change-shaft in a definite position, with brush E in contact with contact-piece F, as aforesaid.

The wiring of the electric motor and rheostat and usual appurtenances of the motor are omitted from the drawings for the sake of securing greater simplicity and clearness. The devices required in practice for securing the stopping and starting of the motor, &c., may be of any known or approved character suitable for the purposes required.

Breakage or exhaustion of the working supply of weft or filling is in the nature of a fault in the working of the loom, and this fault is corrected automatically by the weft-replenishing instrumentalities, as will be clear. I consider that my invention in its broad phase embraces the employment in a loom, in connection with an electric motor for driving the latter and the means whereby the speed of the motor and loom are reduced temporarily, of devices for correcting automatically faults of other kinds as well.

I have not shown or described herein any means for suspending the picking. This may be effected in any preferred manner—as, for instance, in the manner and by the means disclosed in my Letters Patent No. 626,834.

I claim as my invention—

1. In a loom, in combination, automatic weft-replenishing instrumentalities, an electric motor by which the loom is driven, and automatic means to vary the speed of the said motor and consequently of the loom, whereby the speed of the loom is temporarily reduced for the performance of the replenishing operations.

2. In a loom, in combination, automatic weft-replenishing instrumentalities, an electric motor by which the loom is driven, a rheostat in circuit with the said motor, and automatic means in control of the said rheostat whereby the speed of the said motor and consequently of the loom is temporarily reduced for the performance of the replenishing operations.

3. In a loom, in combination, automatic weft-replenishing instrumentalities including a change-shaft as a part thereof, an electric motor by which the loom is driven, and a rheostat in circuit with the said motor, under operative control of the said change-shaft, and actuated to reduce the speed of the loom temporarily for the performance of the replenishing operations.

4. In a loom, in combination, devices acting automatically to correct a fault in the working of the loom, an electric motor by which the loom is driven, and automatic means acting to reduce the speed of the motor and consequently of the loom temporarily while the fault is being corrected.

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

HENRY I. HARRIMAN.

Witnesses:
LEPINE HALL RICE,
ROBERT WALLACE.