

(No Model.)

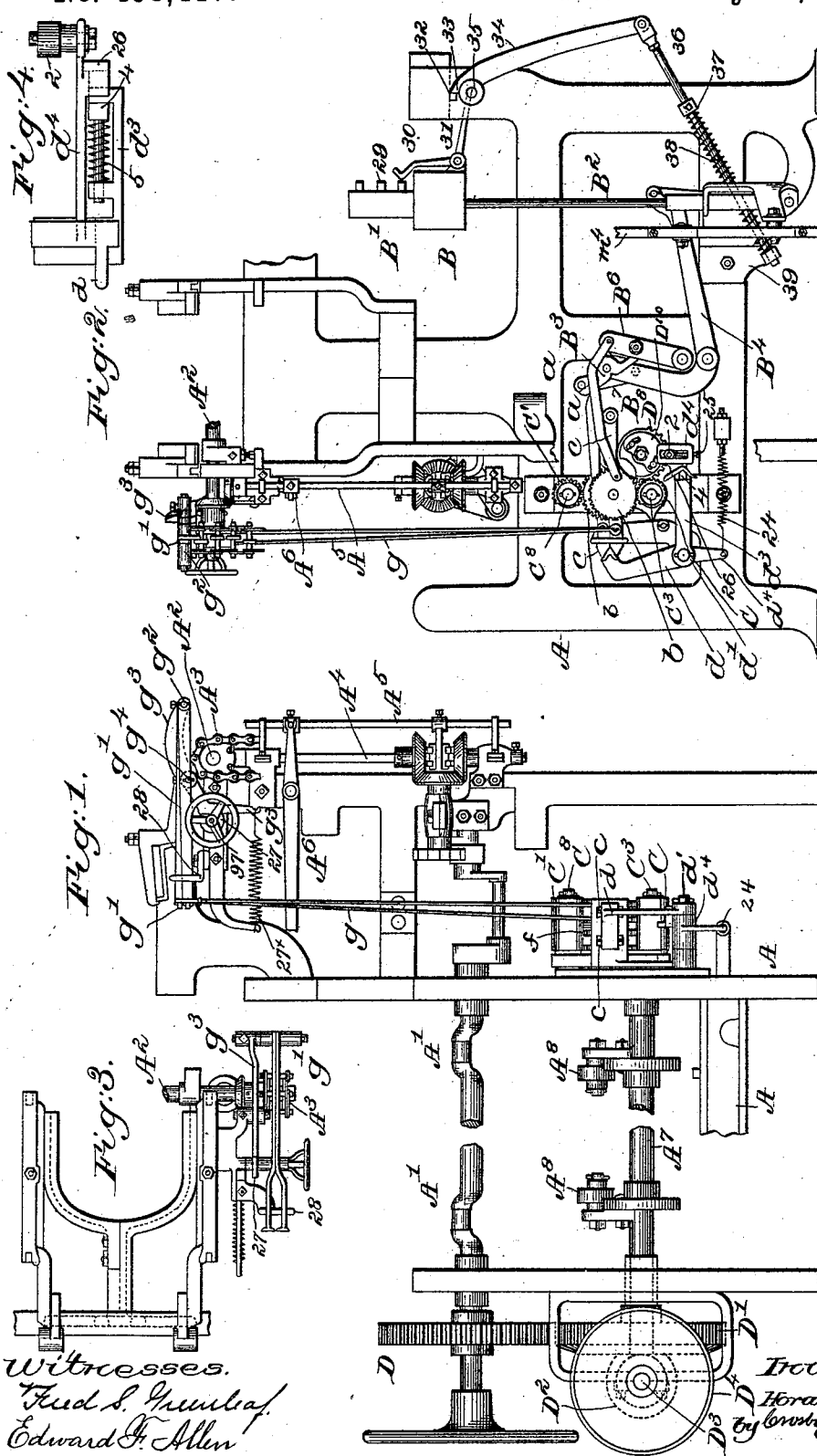
2 Sheets—Sheet 1.

H. WYMAN.

SHUTTLE BOX OPERATING MECHANISM FOR LOOMS.

No. 498,417.

Patented May 30, 1893.



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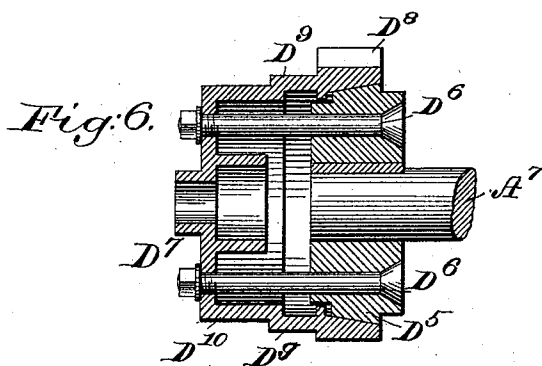
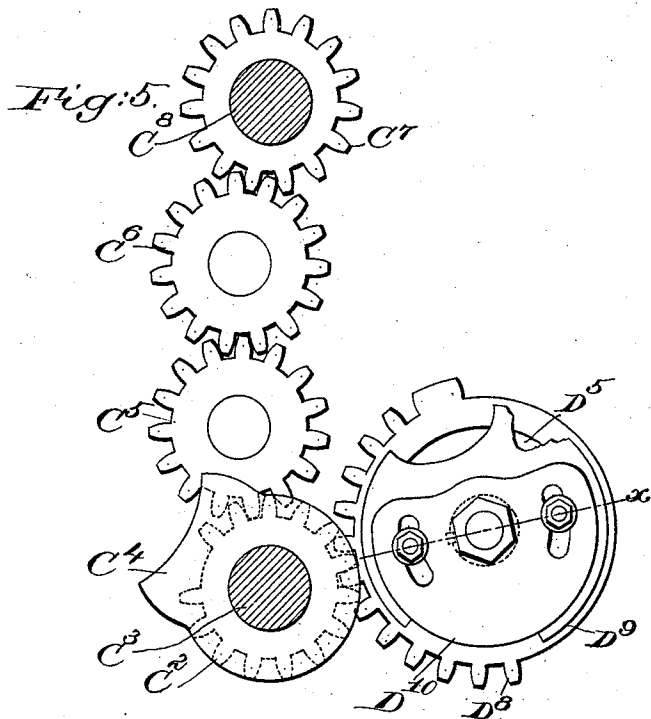
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SHUTTLE BOX OPERATING MECHANISM FOR LOOMS.

No. 498,417.

Patented May 30, 1893.



Witnesses,
Fred S. Grumbach,
Edward J. Allen.

Inventor,
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by Crosby & Gregory attys.

UNITED STATES PATENT OFFICE.

HORACE WYMAN, OF WORCESTER, MASSACHUSETTS, ASSIGNOR TO THE CROMPTON LOOM WORKS, OF SAME PLACE.

SHUTTLE-BOX-OPERATING MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 498,417, dated May 30, 1893.

Application filed February 10, 1892. Serial No. 421,041. (No model.)

To all whom it may concern:

Be it known that I, HORACE WYMAN, of Worcester, county of Worcester, State of Massachusetts, have invented an Improvement in Shuttle-Box-Operating Mechanism for Looms, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

This invention has for its object to improve and simplify the class of looms shown in United States Patents No. 281,842, granted July 24, 1883; reissued January 1, 1884, No. 10,433, and No. 455,175, granted June 30, 1891. In the class of looms referred to, the crank shaft is rotated twice while the under cam or pick shaft is rotated once, and the gear on the cam or pick shaft to rotate intermittingly the prime gear of the train of gears employed in the shuttle box actuating mechanism has two series of teeth and two locking segments, the cam or picking shaft being provided with two picking rolls placed diametrically opposite each other on the shaft, there being two sets of these diametrically placed rolls, one for each side of the loom, the rolls on one side of the shaft acting to move the pickers for throwing the shuttles for one pick, the other set of rolls on the other side of the shaft acting to throw the shuttles at the next pick, one of the two series of teeth in the gear driving the shuttle-box-actuating mechanism acting before one pick, and the other series before the other pick. In practice, difficulties are experienced in this arrangement of parts, for the parts fail to co-operate with each other as accurately as desired.

In this my present invention there is only one picking roll at each end of the loom, and each roll co-operates with the one series of teeth of the box-operating mechanism, whereby greater precision is maintained in the movements of the shuttles.

I have provided the vibrators having the toothed cranks with a novel locking device adapted to give in case of obstruction.

Figure 1 is a partial rear side elevation of a sufficient portion of a loom embodying my present improvements to enable my invention to be understood, the central part of the loom

being broken out to save space on the drawings; Fig. 2, a right-hand elevation of the loom shown in Fig. 1; Fig. 3, a partial top or plan view of the right-hand end of the loom shown in Fig. 1. Fig. 4 is a detail in plan of the yielding locking device for the vibrator levers carrying the toothed gears used in the shuttle-box motion. Fig. 5 shows enlarged the train of gears employed in the shuttle box actuating mechanism; Fig. 6, a section in the line *x* Fig. 5.

The frame-work A, the crank shaft A', the shaft A² carrying the shuttle-box pattern surface A³, the upright shaft A⁴; the gearing between it and the crank shaft on the one end, and between it and the shaft A² on the other end; the clutching hub controlled by the slide rod A⁵ and lever A⁶; the cam or pick shaft A⁷ having picking bowls A⁸; the lay B; its series of shuttle-boxes B'; shuttle-box rod B²; the main shuttle-box lever B⁴, the auxiliary lever B³, the stud carriers B⁶, B⁷, the connections *a, a*, the toothed cranks *b, b*, having their fulcra on vibrators *c, c*, the partial gears C, C', for rotating the said toothed cranks in one or the other direction according to the requirements of the pattern surface; the prime gear C² connected to the hub of the gear C and having a tooth omitted, the locking plate C⁴ carried between said gears C² and C, the gears C⁵, C⁶, C⁷, see Fig. 5, the latter fast on the end of the gear C' and rotating on the stud C⁸, are and may be all as common, said devices being shown in said United States patents.

I will now refer to the improvements to be made the subject of this invention, the same being co-operative with the old parts referred to by letter.

The crank shaft is provided with a gear D which is engaged with and rotated by a gear D' of like diameter fast on the cam or pick shaft A⁷. The gear D' has at its outer side bevel teeth, see Fig. 1, which in practice are engaged by a bevel pinion D², shown by dotted lines, fast on a power shaft D³ mounted in suitable bearings and provided with usual pulleys D⁴. The cam shaft has splined on it at one end, as shown best in Fig. 6, a plate or disk D⁵, shown as beveled at its periphery on which is attached by bolts D⁶ in an adjust-

able manner the shell gear D^7 , it having teeth D^8 extended part way about it and having a convex rim D^9 , to co-operate with the concave locking plate C^4 , so that the teeth D^8 may rotate the prime gear C^2 intermittingly. The shell gear also has a cam D^{10} to act on the roller or other stud 2, see Fig. 4, of the vibrator locking device to be described.

Fig. 4 shows the roll and its connected parts enlarged, and in plan view. The shell gear D^7 rotates in unison with the crank shaft and rotates the shuttle-box gears once for each rotation of the crank shaft which gives a very steady uniform motion. By loosening the bolts D^6 the shell gear may be partially rotated or adjusted with relation to the disk D^5 , and shaft A^7 , and in case of wear or breakage, the shell gear may be quickly renewed. The outer ends of the vibrators c are beveled in usual manner and co-operating with them is a locking device, shown as an elbow lever d mounted loosely on a stud d' , the upper end of the lever being beveled and arrow-pointed to engage and lock the vibrators in place while the gears b are being rotated. The locking lever d has a substantially horizontal arm d^3 provided with bearings for a bolt 4 acted upon by a spring 5, the outer end of said bolt entering a V-shaped notch in a projection 26 from one arm of a lever d^4 , the hub of which is also mounted on the stud d' at one side the lever d , the lever d^4 having also a downwardly extended arm to which is attached a rather strong spring 24, the latter acting through the lever d^4 to keep the roll 2 carried by the lever d^4 up against the cam D^{10} . The roll 2 is shown as having the stud on which it rotates held adjustably in a slot in an upright part of said lever d^4 , a screw 25 adjusting the said stud as required. When all the parts are working properly, the cam D^{10} acting on the roll 2 of the lever d^4 , vibrates that lever causing the lever d to be moved in unison with it so long as the bolt 4, the end of which is shown by dotted lines Fig. 4, enters the notch in the projection 26 of the lever d^4 , but in case of obstruction of any sort which would effect the breaking of parts, the spring 5 yields and lets the bolt 4 slip back out of the notch in the projection 26, of the lever d^4 leaving the lever d at rest, although the lever d^4 has been moved.

The vibrators c, c , are attached to rods g connected to the outer ends of fingers g' resting upon the pattern surface, the opposite ends of said levers being pivoted at g^2 upon a fulcrum carrying frame g^3 in turn pivoted at g^4 , see dotted lines Fig. 1, the opposite end of the said frame being adapted to be acted upon by a cam 27 see Figs. 1 and 3 on a short hand-operated shaft 97, the partial rotation of said cam causing it to act on the inner end of said frame g^3 and turn it to lift the fulcrum g^2 of the fingers high enough to remove the said fingers from contact with the pattern surface, this being done when it is desired to run the loom and not shift the shuttle boxes.

The spring 27^x connected at one end to the frame g^3 keeps the fingers normally against the pattern surface. The fingers g' are controlled as against lateral motion by a comb-like guide 28. The shaft A^2 having the shuttle box pattern surface, in practice also carries the shed forming pattern surface, and the shaft is rotated just prior to the formation of each shed and at a time when the vibrators c, c , are locked, and under such conditions it will be understood that the fingers g' will be lifted, and as the vibrators are locked, the fulcrum of the said levers must rise. This is provided for through the frame g^3 and spring 27^x .

The shuttle-box has usual binders 29 against which bears the finger 30 connected to a rock-shaft mounted in bearings carried by the lay. The protector shaft has a dagger 31 which when the shuttle has not been properly boxed, is lifted sufficiently to meet a short bunter lever 32 resting at one end against a toe 33 of a check lever 34 pivoted at 35 and acted upon by a rod 36 having a collar 37 acted upon by a spring 38 which normally keeps the toe 33 pressed toward the bunter 32. The rod 36 is guided in a stand 39. When the dagger meets the bunter the shock due to stopping the loom is absorbed by the lever 34, spring 37 and rod 36.

I have herein shown the picking-shaft as provided with picking-rolls A^8 , but I have not fully shown or described the picking mechanism, as the same has been made the subject of another application, Serial No. 451,123, filed on the 5th day of November, 1892.

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

1. A loom containing the following instrumentalities, viz:—a crank or lay-shaft; a toothed gear thereon; a cam shaft; a toothed gear thereon of the same diameter as the gear on the crank-shaft and in mesh therewith; a shuttle-box mechanism, including a prime gear and others driven from it; and a toothed gear on the cam-shaft having teeth for substantially one continuous half of its periphery and a single blank space for the remaining portion of its periphery, the said gear at each rotation of the said cam-shaft rotating the said prime gear only once, substantially as described.

2. The prime gear of the shuttle-box mechanism, and the cam shaft having a plate D^5 ; a shell gear having a toothed portion, a blank or smooth portion, and a cam; and means to connect the shell gear to the said plate; combined with the vibrators on which are mounted the toothed cranks, and yielding locking mechanism co-operating with said vibrators and actuated by said cam, substantially as described.

3. The cam shaft having a plate provided with a beveled edge, combined with a shell gear having its interior beveled, and bolts to adjustably connect the said plates and gear, substantially as described.

4. The vibrators *c* of the shuttle-box mechanism, their toothed cranks, the lifter and depressor gears *C*, *C'*, the cam portion *D*¹⁰, and the locking device *d* having a spring-pressed bolt 4, combined with the arm *d*⁴ having a notch to be engaged by said bolt, and having a stud adapted to be acted on only by the said cam portion, the arm *d*⁴ moving the arm *d* in unison with it, yet permitting the locking device to yield and the arm *d* to be stopped when an obstruction occurs, substantially as described.

5. A loom containing the following instrumentalities, viz, a crank or lay shaft; and a cam shaft rotating in equal times; a single picking roll carried on a picking arm near each side of the loom; and a shuttle-box-mech-

anism-operating gear on said cam shaft, said gear having a single series of toothed gears around a portion of its periphery.

6. The prime gear of the shuttle-box mechanism, and the cam-shaft having a plate *D*⁵, combined with a shell gear having a toothed portion, a blank or smooth portion, and means to connect the shell gear to the plate in an adjustable manner, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HORACE WYMAN.

Witnesses:

JUSTIN A. WARE,
SAMUEL B. SCHOFIELD.