

(No Model.)

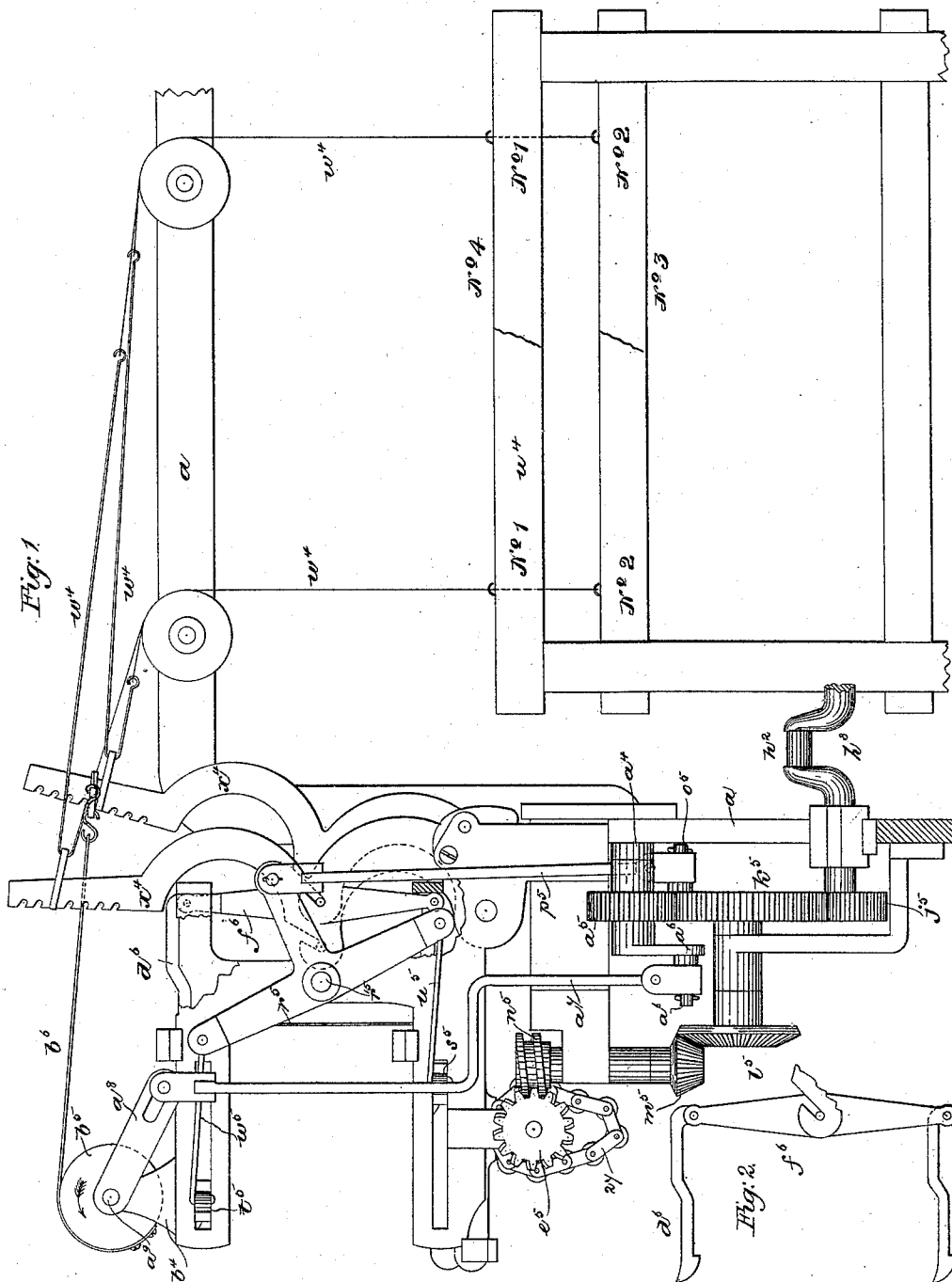
2 Sheets—Sheet 1.

J. COLDWELL.

SHEDDING MECHANISM FOR LOOMS FOR CROSS WEAVING.

No. 488,497.

Patented Dec. 20, 1892.



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Fig. 3.

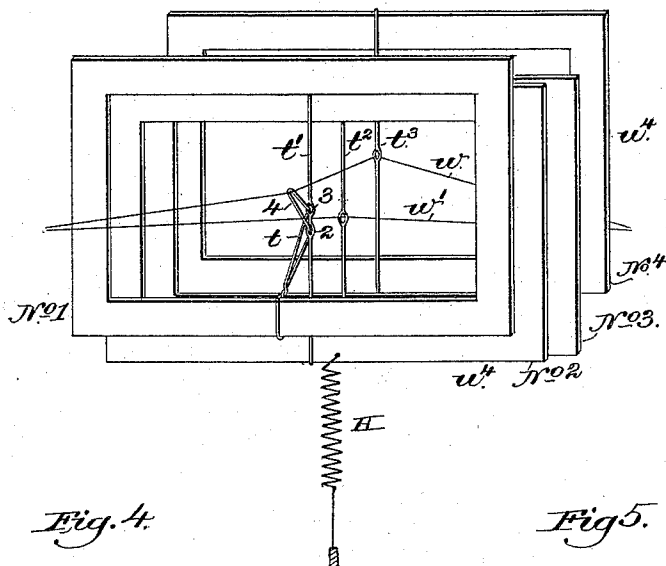


Fig. 4.

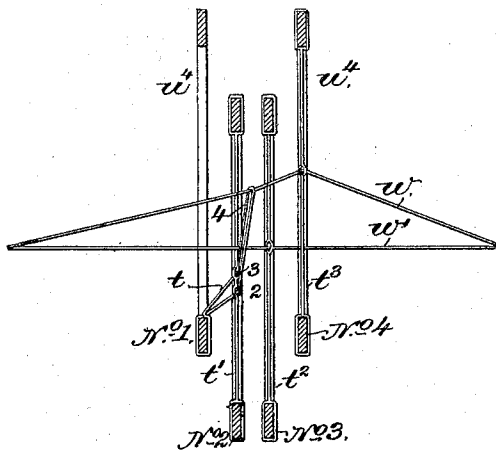
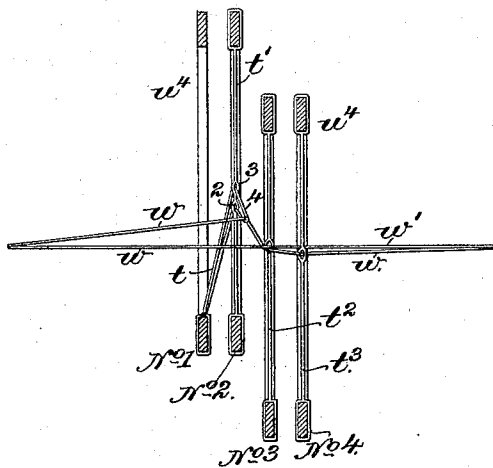


Fig. 5.



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UNITED STATES PATENT OFFICE.

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SHEDDING MECHANISM FOR LOOMS FOR CROSS-WEAVING.

SPECIFICATION forming part of Letters Patent No. 488,497, dated December 20, 1892.

Application filed September 17, 1889. Serial No. 324,240. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH COLDWELL, of New Bedford, county of Bristol, State of Massachusetts, have invented an Improvement in Shedding Mechanism for Looms for Cross-Weaving, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

10 This invention has for its object to adapt an open shed loom of that class shown in United States Patent No. 217,589, dated July 15, 1879, granted to George Crompton and Horace Wyman for the production of what is known as "leno" work, wherein one warp is at times

15 crossed under and drawn up at the other side of an adjacent warp, the warp so drawn appearing at opposite sides of the adjacent warp during the progress of the weaving.

20 In accordance with my invention I have provided a loom of the class referred to, with an auxiliary lifting device, whereby the harness frame carrying that set of warps which is to remain in the bottom shed during the

25 "leno" pick may be lifted into an intermediate position with relation to the open shed at about the time the warps are being shifted to form the "leno" shed in accordance with the requirements of the pattern surface. At

30 other times than when making the "leno" weave, the said frame may if desired be moved into the upper shed without interference from the auxiliary motion, which result I accomplish by means of a flexible connection between said harness lever and the auxiliary

35 motion. The auxiliary lifting device or motion herein shown consists essentially of a rock shaft having a pulley, which by suitable flexible connection, is joined to a harness lever, which is connected in usual manner with

40 the harness frame carrying the warp threads which are to remain in the lowermost shed when the shuttle is thrown. This rock shaft is actuated by means of suitable connections between it and a moving part of the loom, the connections herein represented including

45 a crank which makes one revolution for every movement of the lay, but this auxiliary lifting device may derive its motion from a cam or other suitable moving part of the loom.

50 My improvement consists in combining an

auxiliary lifting motion with such harness lifting motions for looms as are provided with springs to carry and retain the harnesses in the lower shed, as for instance, in that shown 55 in United States Patent, No. 217,589, dated July 15, 1879; and the auxiliary motion consists of a rocking shaft carrying an arm or pulley,—the pulley only being shown in the drawings,—with an attached flexible connection 60 from the arm or pulley to a lever from one of the harnesses, the oscillation of the pulley or arm drawing up and letting down such attached lever during one movement of the main lifting motion, the purpose of the 65 auxiliary motion being to bring one of those harnesses to about the level of the warps at the point at which the harnesses of the sheds pass each other, to enable some of the threads to cross over other threads and to be returned 70 again during about the usual time for the forming of the regular sheds for weaving, independently of the regular lifting or shed forming devices of the dobby. The oscillations may be given to the rocking shaft by a 75 crank pin rotating at the same speed as the crank shaft, as is shown in the drawings, which method I prefer, although any well-known method of oscillating the rock-shaft may be employed and be within the range of 80 my invention, which consists essentially of a rocking shaft with an attached arm or pulley with its connections, combined with a main lifting harness motion.

Figure 1 of the drawings in side elevation 85 represents a sufficient portion of a loom of the class referred to in said patent, together with my improvements added thereto to enable my invention to be understood. Fig. 2 is a detail chiefly to show one of the usual 90 connectors mounted on the harness lever, and its attached hooked jacks. Fig. 3 is a perspective detail showing a series of four harness frames arranged for "leno" work, the frames being in position to form an ordinary open 95 shed. Fig. 4 is a section through the four frames shown in Fig. 3, and Fig. 5 is a like section but with the frames moved to cross the warps as for "leno" work.

The loom frame *a*, the crank shaft *h*¹ but 100 partially represented, it having cranks *h*², which in practice receive the lay connecting

rods, the pinion j^5 fast on the said crank shaft, the toothed gear k^5 having a crank pin o^5 , and fast on a shaft having a bevel wheel l^5 , engaging a bevel wheel m^5 , on a shaft having a worm n^5 engaging a worm wheel e^5 , on the shaft of the usual cylinder carrying the pattern surface or chain 27, the link p^5 , the three-armed lever r^5 fast on one end of a rock shaft r^{15} , there being another lever at the opposite end of the said rock shaft, the two lifters t^5 and s^5 , the rods w^5 , w^5 joining them with the levers on the rock shaft r^{15} and the harness levers x^4 , the connectors f^6 mounted thereon and having at their ends usual notched jacks d^6 , to be engaged by the lifters s^5 , t^5 , the harness cording w^4 , and the harness frames w^4 , are and may be all as in United States Patent No. 217,589, it being understood that the said harness frames will in practice be depressed by springs as provided for in the said patent.

In Fig. 1 let it be supposed that there are four harness frames and four like harness levers having each two notched jacks under the control of a pattern surface, and that the first and fourth harness frames are lifted into the upper shed, the second and third frames being down in the lower half or bottom of the shed. It will be remembered that in open shed weaving a thread once lowered into the bottom of the shed will be left there until it is again necessary that the said thread shall appear in the top of the shed so as to show on the top of the fabric, and at such time a thread is lifted into the top shed.

In the diagram Figs. 3 and 4 where the shed is shown as formed for plain weaving, and in Fig. 5 where the warp thread carried by one frame is shown as crossed under a warp thread next to it, I have numbered said harness frames 1, 2, 3 and 4.

I have shown No. 1 frame as having attached to its lower bar the thread loop t , forming part of the "doup," and the frame No. 2 next to it is represented as provided with a heddle t' , forming the other part of the "doup," the said heddle having as represented two eyes, 2, 3.

The frames Nos. 3 and 4 have usual heddles t^2 , t^3 , each provided with a single eye, a series of warp threads w being extended through the eyes of the heddle t^3 of frame No. 4, while the warp threads w' are extended through eyes of the heddle t^2 carried by frame No. 3.

The "doup" loop t is shown as led through the eyes 2, 3, of the heddle t' of frame No. 2, a loop 4 of said "doup" part t beyond said eyes 2, 3, receiving through it the warp w .

I will now describe one form of my invention as applied to the loom referred to. I have provided the loom side with a bearing a^4 for a short shaft having a pinion a^5 and crank a^6 , the said pinion being engaged and rotated by the toothed gear k^5 . The crank a^6 has a link a^7 jointed to the arm a^8 of a rock shaft a^9 mounted in bearings b^4 . The rock-

shaft a^9 has a pulley b^5 , to which is attached a flexible connection l^6 , operatively secured at its other end to the third harness lever from the breast beam, or that harness lever to which is connected the frame No. 3. The shaft and pulley referred to constitute one form of auxiliary harness lifting device. The toothed gear k^5 for moving the lifters t^5 and s^5 , makes one revolution for every two rotations of the crank shaft h^2 , and consequently every two beats of the lay, not shown, and for every rotation of the gear k^5 , the said lifters move in one and then in the reverse direction. The pinion a^5 is one-half the diameter of the toothed gear k^5 , and consequently makes one full rotation for each beat of the lay.

With the mechanism described, when the lay is in its forward stroke to beat up or in the filling, the auxiliary lifting device by a movement in the direction of the arrow on the pulley b^5 , Fig. 1, acts to pull the harness lever with which the flexible connection b^6 is joined, into an intermediate position with relation to the other harness frames then in the top and bottom of the shed, so as to place the threads carried by the said harness frame into an intermediate position in the shed, so that other threads can be drawn around it without unnecessary strain, if the next pick is to be of "leno" or cross weaving.

The harness frame No. 3 to be lifted by the auxiliary lifting device preparatory to the selection of the warps for each shed, is sometimes in the upper part of the shed, and at other times in the lower or bottom part of the shed, yet by reason of the flexible connection b^6 , the auxiliary lifting device may act at any time without interfering with the movement of that harness frame by or through the hooked or notched jacks and their co-operating lifters as required by the pattern surface.

In cross or "doup" weaving where one thread is to be carried around another thread of the warp as thread w around thread w' , see Fig. 5, the thread w will always be in the top shed when the pick takes place, and the thread w' in the bottom shed when the pick is inserted, the thread w thus always appearing on the top of the fabric, and thread w' at the bottom side. To cross thread w around thread w' , it is advantageous to bring the heddle carrying the thread w' into substantially the center line of the shed, so that when the harness frames are moved according to the demands of the pattern surface, the thread w may be readily passed under the thread w' with the least possible strain or friction.

In ordinary dobby looms fitted for "leno" weaving, it is customary to employ doup harnesses t , see Figs. 3 and 4, which are passed through eyes 3 of harnesses t' carried by a frame next to the one carrying the doup harnesses. In this class of loom, the pattern mechanism is adjusted to move the shed forming devices and harness frames in such order that at the proper times the warp threads, as

w , are crossed about the warp threads w' , this crossing being effected by causing the harness frame No. 4 having the harnesses t^3 to pass to the lower plane of the shed and the frame 5 having the harnesses t' to pass into the upper plane of the shed as in Fig. 5, and during this movement of the parts the eyes 3 of the harnesses t' slide upwardly on the doup harnesses, in such manner that the warp threads w in the doup harnesses become, as it were, connected with and put under the control of the harnesses t' , thus enabling the thread w' which, as shown in Fig. 4, was between the doup harnesses t and the harnesses t' to cross the warp w and be on the other side of the doup harnesses, the warps being slackened at this time. The strain on the warp during this operation will be very considerable. To overcome to a great extent this difficulty, I attach a strap or other flexible connection from the lever carrying the harness t^2 to the oscillating pulley or arm b^5 which is so timed in its movements as to lift the warp threads w' to near the middle of the shed about the same time that the harnesses t and t' are also brought to the central portion of the shed. In this position of the parts, the warp threads w are enabled to cross the warp threads w' , thus permitting warps w' to come down during the return movement of the oscillating arm b^5 , outside of the doup harnesses t and effect the crossing of the warps w and w' at a point near the harnesses t^2 , as shown in Fig. 5.

In Fig. 3 I have shown a spring H connected to one of the harness frames, it being understood that each harness frame will have a like spring attached to it and to some fixed part of the loom to normally depress or draw down said frame.

The levers x^4 and their actuating devices exclusive of the strap b^6 and the auxiliary motion device b^5 constitute what I shall denominate a main lifting motion. The oscillating

arm b^5 constitutes one form of auxiliary lifting motion for one of the harness frames.

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

1. In a dobby loom, a main lifting motion for the harness levers to thereby make sheds in the warp for the passage of the shuttle; an auxiliary lifting motion adapted to give a half-way lift more or less, and return movement to one of said levers, said auxiliary lifting motion co-operating in time with the main lifting motion, combined with a flexible connection between the auxiliary motion and said harness lever, whereby each lifting motion may operate independently of the other, substantially as described.

2. A rock-shaft; a pulley or an arm thereon; means to oscillate the rock-shaft; flexible connections from the arm or pulley to a harness lever; the harness lever; and harness frame and connections thereto; combined with a spring to carry the harness lever into its lowest position, substantially as described.

3. A rock-shaft; a pulley or an arm thereon; means to oscillate the rock-shaft; flexible connections from the arm or pulley to a harness lever; the harness lever; and harness frame and connections thereto; combined with a spring to carry the harness lever into its lowest position, and with a crank rotating at the same speed as the lathe crank, and connections between the said crank and an arm on the said rock-shaft, substantially as described.

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

JOSEPH COLDWELL.

Witnesses:

WILLIAM M. BUTLER,
 MAYHEW R. HITCH.