

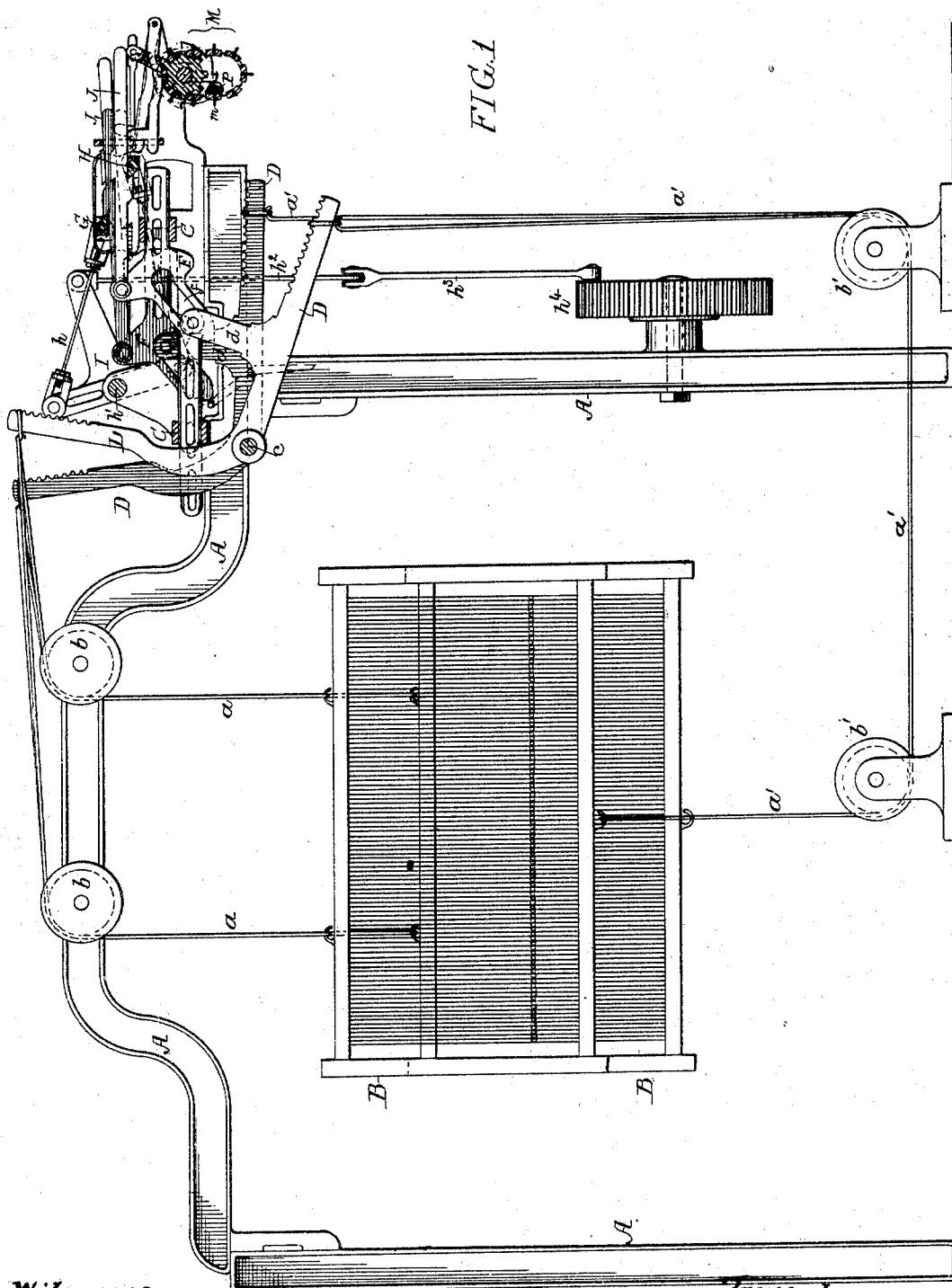
(No Model.)

3 Sheets—Sheet 1.

E. INGRAHAM.
SHEDDING MECHANISM FOR LOOMS.

No. 503,375.

Patented Aug. 15, 1893.



Witnesses
R. Schleicher
A. V. Group

Inventor
Edmund Ingraham
by his Attorneys
Howson & Howson

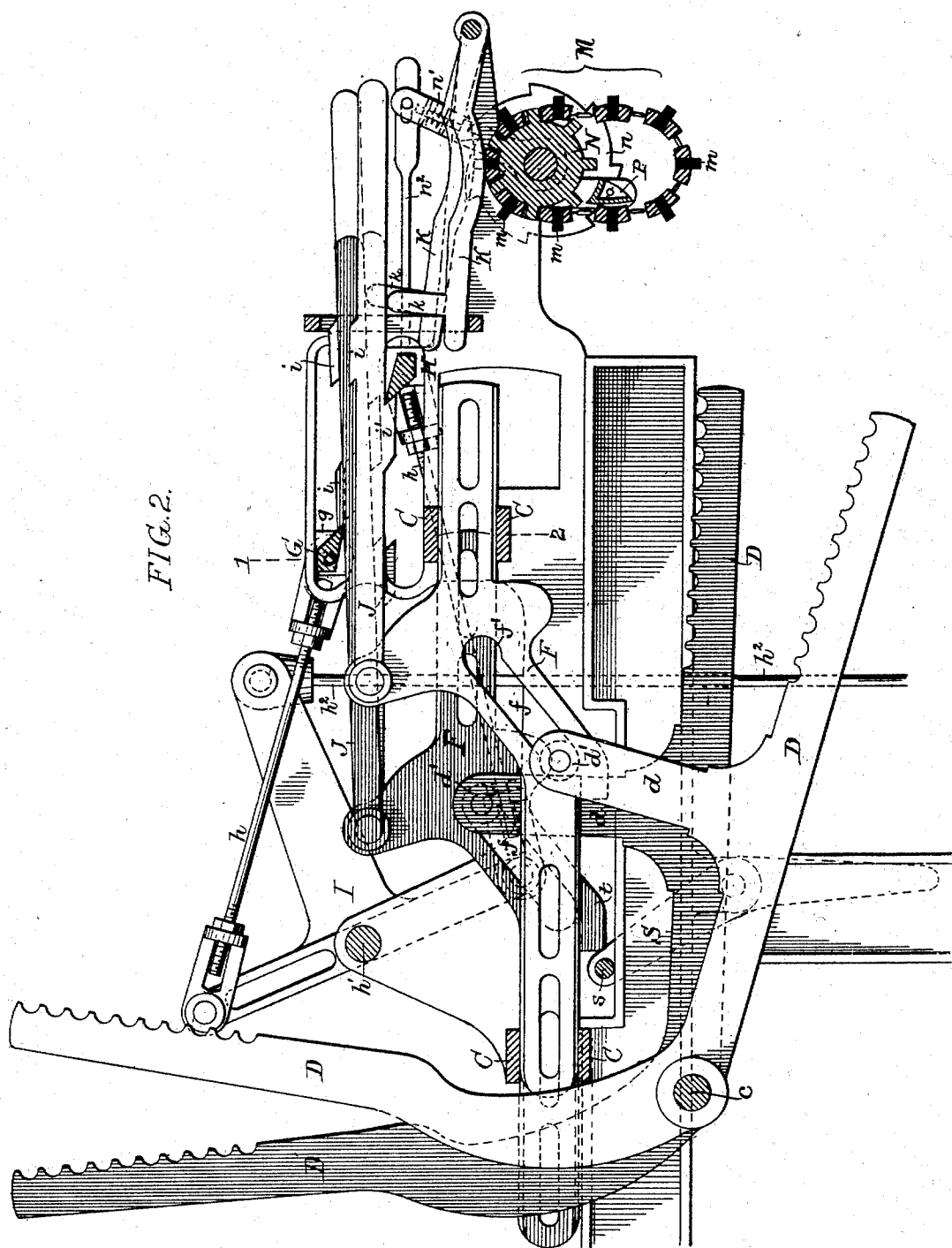
(No Model.)

3 Sheets—Sheet 2.

E. INGRAHAM.
SHEDDING MECHANISM FOR LOOMS.

No. 503,375.

Patented Aug. 15, 1893.



Witnesses:

R. Schleicher.
A. V. Groupe

Inventor:

Edmund Ingraham
by his Attorneys
Hosson & Hosson

(No Model.)

3 Sheets—Sheet 3.

E. INGRAHAM.
SHEDDING MECHANISM FOR LOOMS.

No. 503,375.

Patented Aug. 15, 1893.

FIG. 5.

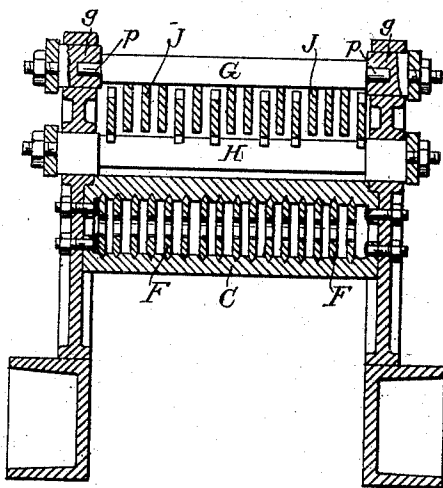


FIG. 3.

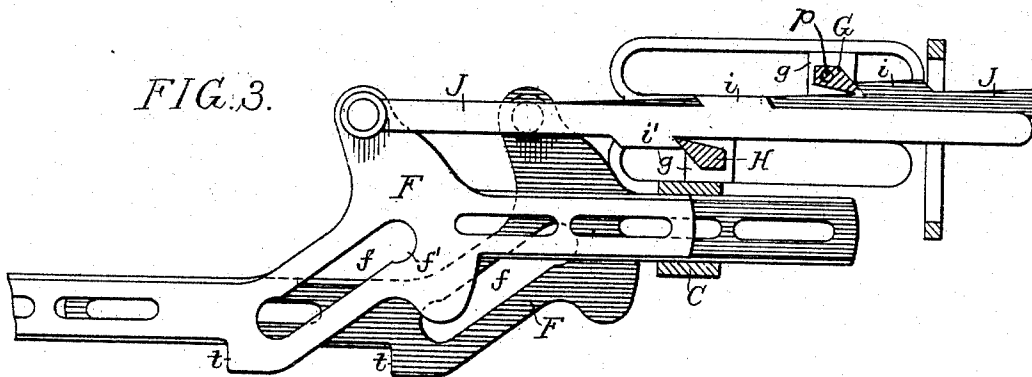
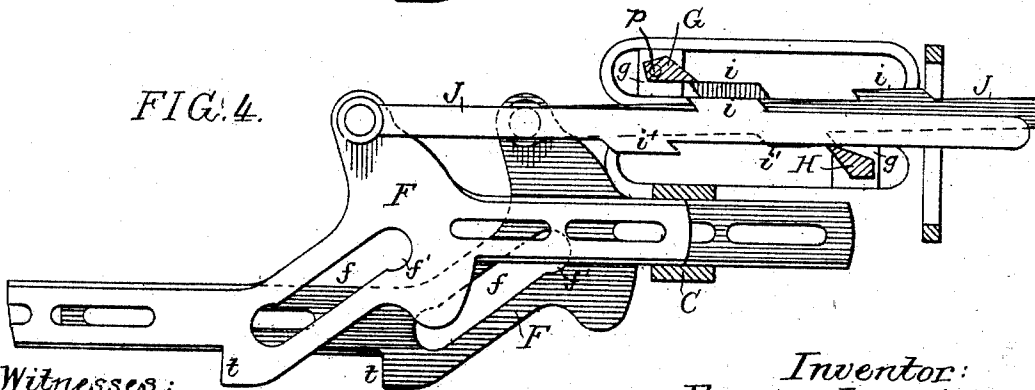


FIG. 4.



Witnesses:
R. Schleicher.
A. V. Grouper.

Inventor:
Edmund Ingraham
by his Attorneys
Howson & Howson

UNITED STATES PATENT OFFICE.

EDMUND INGRAHAM, OF PHILADELPHIA, PENNSYLVANIA.

SHEDDING MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 503,375, dated August 15, 1893.

Application filed March 23, 1891. Serial No. 386,033. (No model.)

To all whom it may concern:

Be it known that I, EDMUND INGRAHAM, a citizen of the United States, and a resident of Philadelphia, Pennsylvania, have invented certain Improvements in Shedding Mechanism for Looms, of which the following is a specification.

My invention relates especially to heddle or harness operating devices for what are known as "open shed" looms, the object of my invention being to effect the movement of the heddle frames without any severe strain on the operating devices, to insure the locking of the heddle frames when the shed is open, so as to permit the jacks to be readily shifted, and to provide for lifting the depressed heddle-frames independently of the regular operating mechanism when it is desired to gain access to a warp thread in the lower portion of the shed. These objects I attain in the manner hereinafter set forth and claimed, reference being had to the accompanying drawings, in which—

Figure 1, is a transverse section, partly in elevation, of a loom provided with heddle operating mechanism constructed in accordance with my invention. Fig. 2 is an enlarged vertical sectional view of said heddle operating mechanism. Figs. 3 and 4, are like views of parts of the mechanism, in different positions, and Fig. 5, is a transverse section on the line 1—2, Fig. 2.

A represents part of the frame of a loom, and B, B represent heddle frames to which are connected cords *a, a'* passing over pulleys *b, b'*, said cords being connected to heddle levers *D* mounted on the frame of the loom, and these heddle levers being in the form of bell cranks, one arm of each lever being connected to the upper cords *a* of its corresponding heddle frame, and the other arm to the lower cord *a'* of the same. Each heddle lever has on its lower arm an upwardly projecting stud *d*, the upper end of which carries an antifriction roller *d'*, (see dotted lines Fig. 2) which is adapted to an inclined slot *f* in slide *F* guided in suitable transverse bearings *C* on the frame of the heddle operating mechanism, so that, as these slides are moved to and fro, their inclined slots, acting on the antifriction rollers carried by the studs *d* of the heddle levers, will cause said heddle levers to vibrate upon

the fulcrum shaft *c*, and will thus raise and lower the heddle frames *B* and the path in which the roller is forced to travel by the action of the inclined slot will be curved, and will be almost at right angles to the thrust imparted by the inclined portion of the slide *F*; by which means the up and down thrusts upon the slide *F* is lessened, as compared with a thrust directly across the line of movement of said slide.

At each end of the inclined slot of each slide *F* is an offset *f'*, and when the slide is in either of its extreme positions, the antifriction roller on the stud *d* of the heddle lever occupies one of these off-sets and the heddle frames are thereby effectually locked in their extreme positions corresponding to the "open shed," the strain upon the heddles having no effect in moving the slides from the positions to which they have been adjusted.

In order to provide for the effective guidance and lateral retention of the slides *F*, and yet permit said slides to be arranged closely together, the top and bottom edges of the guiding portion of each slide are beveled or V-shaped, and the guide bars *C* have like beveled or V-shaped grooves for the reception of these beveled edges of the slides, as shown in Fig. 5.

The movement of the slides *F* to effect the rise and fall of the heddle-frame demanded by the required shedding of the warp, is derived from reciprocating bars *G* and *H*, which are carried by guide blocks *g* the latter being connected by rods *h* respectively to the upper and lower arms of a three-armed lever *I* hung to a transverse shaft *h'*, the third arm of said lever being connected by a rod *h²* and link *h³* to a spur wheel *h⁴* driven from any suitable part of the loom.

Hung to each of the slides *F* is a jack *J*, which has, on its upper and lower edges, lugs *i, i'* facing in opposite directions, and each of these jacks *J* is under the control of a finger *k* on a pivoted arm *K*, which is acted upon by the pins *m* of a pattern chain *M*, carried by a pattern drum *N*, the intermittent movement of the latter being effected by any suitable means, for instance by means of a ratchet wheel *n* on the drum shaft, acted on by a pawl carried by an arm *n'* hung to said shaft, and vibrated by the bar *H* through the medium

of a rod n^2 , as shown in Fig. 2. When the parts are in the position shown in Fig. 2, the bars G and H are at the extremes of their rearward movement, and are about to move forward, that is to say, the bar G is about to move to the right and the bar H to the left. The jacks of the slides F of those heddle frames which are to be lifted have been raised so that their lugs i are in engagement with the bar G, while the jacks of the slides of those heddle frames which are to be lowered, have been dropped so that their lugs i' engage with the bar H, the jacks of the slides of those heddle frames which are not to be raised being allowed to remain down, and the jacks of the slides corresponding to the heddle frames which are not to be depressed being allowed to remain up. As the bars G and H move forward, corresponding movement is imparted to those slides whose jacks are in engagement with the bars, as shown in Fig. 3, the movement of the heddle-frames from one position to the other being effected by the slides, which, owing to their inclined slots, so act upon the heddle levers, that the movement of the latter is effected easily and smoothly and without shock or jar upon the operating portions of the device, the heddle frames being finally locked in their extreme positions, (that is to say with the shed open) owing to the off-set ends of the inclined slots in the slides. On the backward movement of the slides G and H, the pattern chain is shifted and the jacks J are raised and lowered in accordance with the requirements of the pattern. (See Fig. 4.) In order to permit the upper bar G to yield against the pressure of the jacks from below, said bar has journals p which are free to turn in the guide blocks g , the preponderance in weight being in advance of the journals, so that the acting edge of the bar G will fall into engagement with the lugs i of the jacks, as soon as said bar is fully retracted.

To prevent the links of the pattern chain from being carried around by the under side of the drum N, I mount adjacent to the latter, a deflecting shoe P, which so acts upon the depending portion of the chain, as to press its links out of the spaces between the teeth of the drum, as shown in Fig. 2.

In order to effect the raising of the lower heddle frames without corresponding movement of the reciprocating bar G, when it becomes necessary to raise the warps constituting the lower portion of the shed, so as to tie up a broken thread, or for other purposes, I mount at one side of the loom a lever S, as shown by dotted lines in Fig. 2, this lever carrying a transverse bar s which acts upon downwardly projecting lugs t upon the slides

F of all of the depressed heddle frames, so that on operating the lever S by hand, an outward movement of all of these slides can be effected independently of the regular operating devices. It will be observed that the reciprocating bars G and H act only upon one side of the lugs i of the jacks J so that said lugs are free to move away from the reciprocating bars when the slides are moved by the evener bar. By so connecting the lever S, the leverage for raising the heddle frames when desired, is so increased that this operation may be easily performed. This is of great importance, especially where the loom has a large number of heddles.

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

1. The combination of the heddle frames, bell crank levers each having one arm connected to the top and the other arm to the bottom of its respective heddle frame, a stud projecting from one arm of each bell crank lever and having an antifriction roller at its outer end, slides each comprising horizontal end portions and an inclined central portion with slot having offset ends for the reception of said antifriction roller, guides for the horizontal portions of said slides, jacks hung to the slides and having lugs at top and bottom, upper and lower reciprocating bars acting on said jacks, the upper bar being pivoted, and pattern mechanism for controlling the engagement of the jacks with said bars, substantially as specified.

2. The combination of the heddle frames, the heddle levers, slides having inclined slots and beveled edges, upper and lower bars having beveled notches for receiving and guiding the beveled edges of the slides, jacks hung to said slides, reciprocating bars acting on said jacks, and pattern mechanism controlling the jacks, substantially as specified.

3. The combination of the heddle frames, the heddle levers, slides having inclined slots for receiving projections on said heddle levers, jacks hung to said slides, and having projecting lugs reciprocating bars acting on one side only of said lugs, pattern mechanism controlling said jacks, and a lever having a rod for acting upon the slides of the depressed heddles independently of the ordinary reciprocating mechanism, substantially as specified.

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

EDMUND INGRAHAM.

Witnesses:

EUGENE ELTERICH,
HARRY SMITH.