(No Model.) 3 Sheets—Sheet 1.

O. A. SAWYER & M. M. LAHUE.

SHUTTLE CHECKING AND RELIEVING MECHANISM FOR LOOMS.

No. 405,913. Patented June 25, 1889

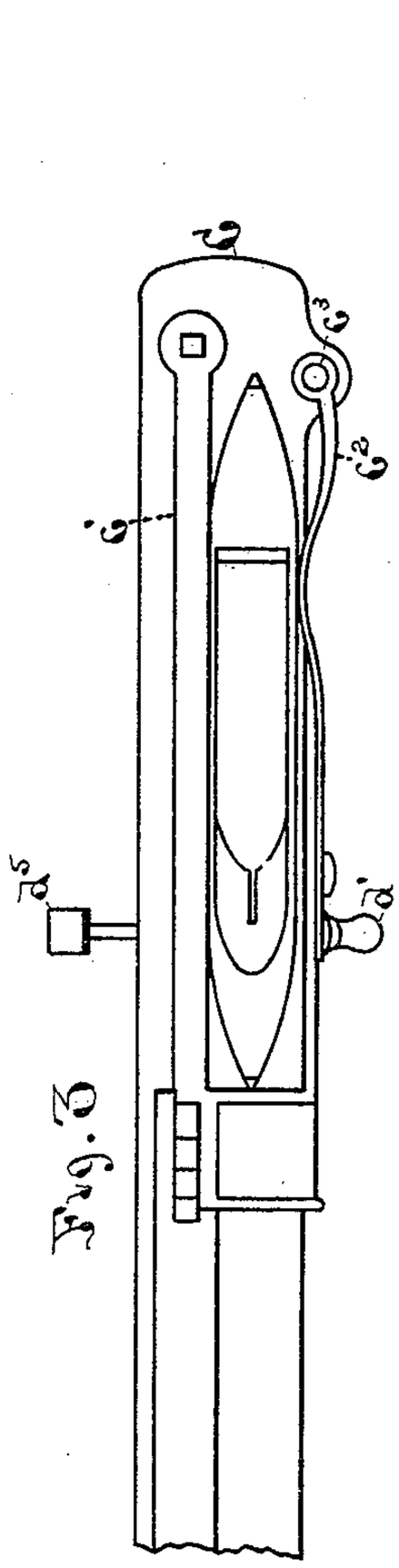

Fig. 3

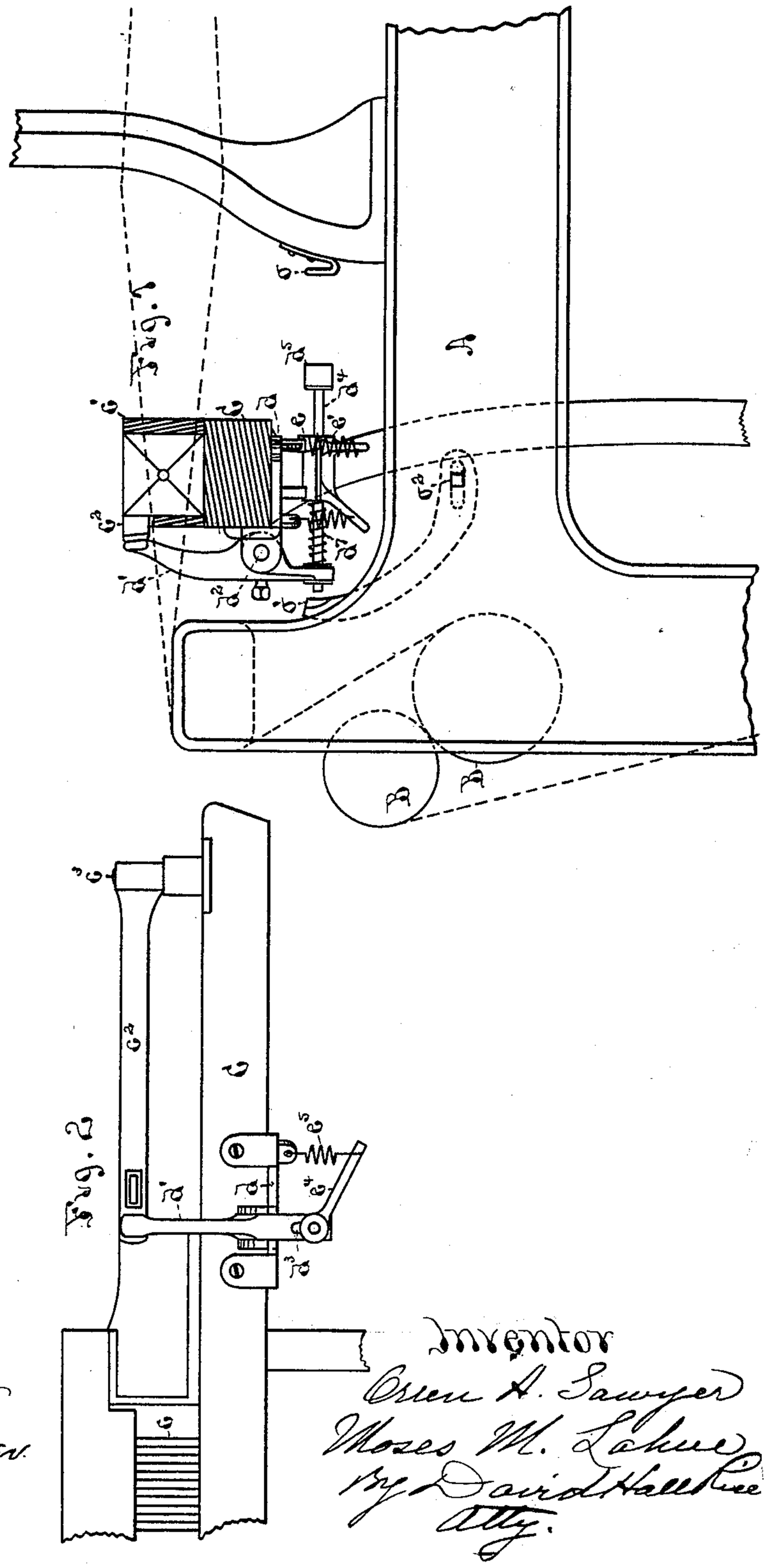

Fig. 1

Fig. 2

Witnesses
Wm. L. Brown
N. P. Ockington.

Inventor
Orrin A. Sawyer
Moses M. Lahue
By David Hall Rice
Atty.

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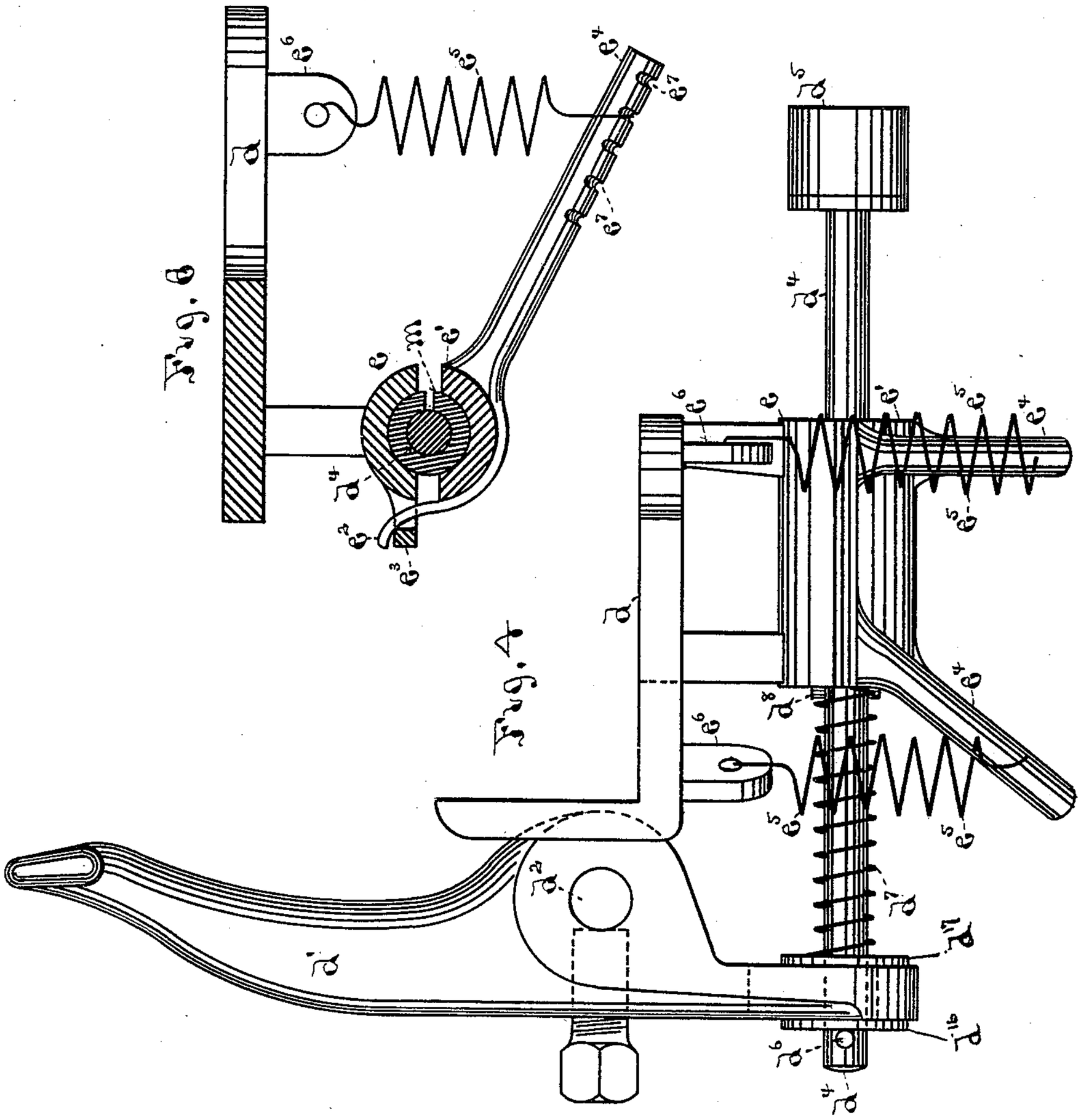

Witnesses
Wm. S. Brown
A. P. Ockington.

Inventor
Orren A. Sawyer
Moses M. Lahue
By David Hall Rice
Atty

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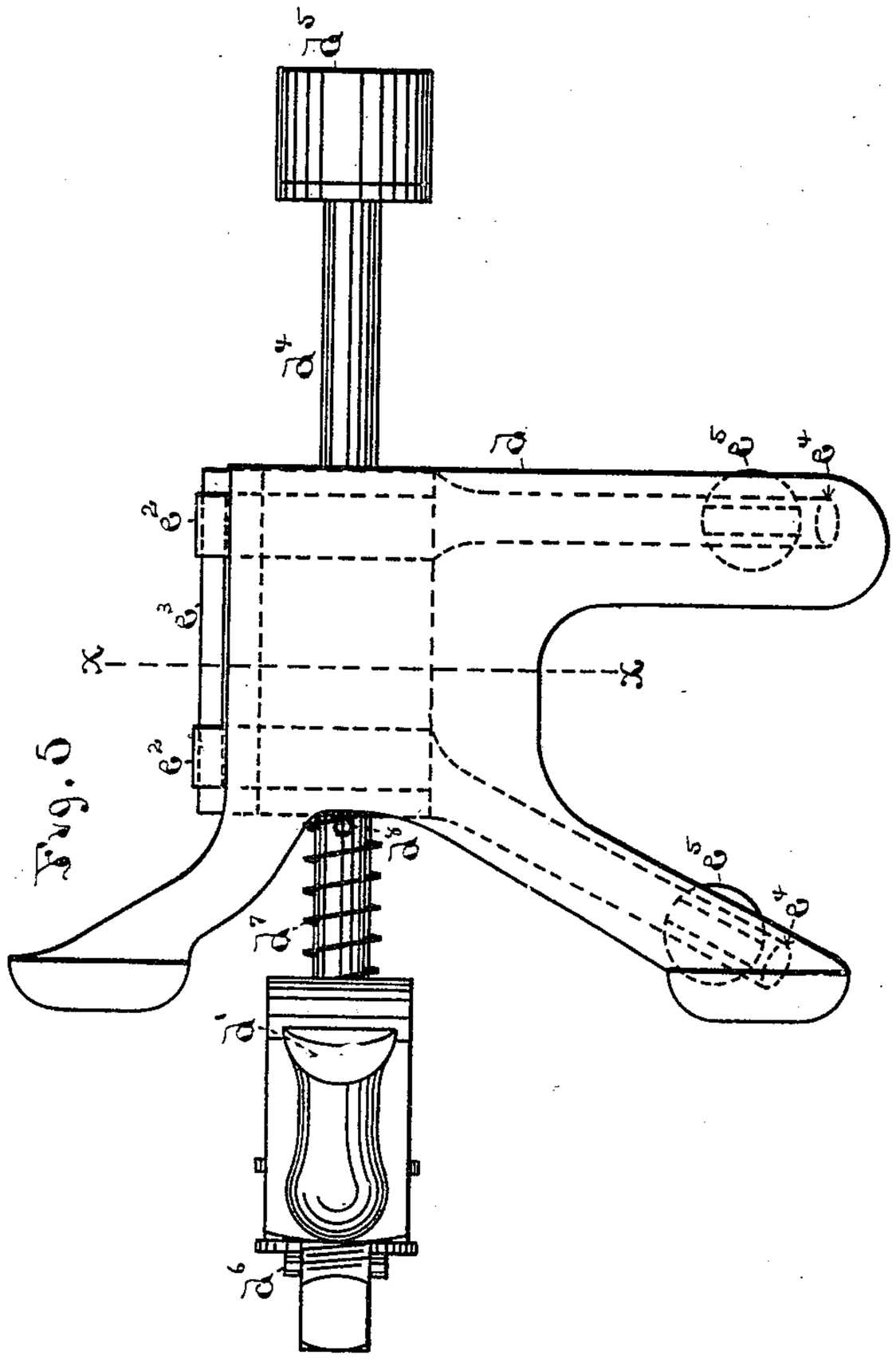

Witnesses
Wm. E. Brown
N. P. Ockington

Inventor
Orrin A. Sawyer
Moses M. Lahue
By David Hall Rice
Atty

UNITED STATES PATENT OFFICE.

ORREN A. SAWYER AND MOSES M. LAHUE, OF LOWELL, MASSACHUSETTS.

SHUTTLE CHECKING AND RELIEVING MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 405,913, dated June 25, 1889.

Application filed March 25, 1889. Serial No. 304,697. (No model.)

To all whom it may concern:

Be it known that we, ORREN A. SAWYER and MOSES M. LAHUE, of Lowell, in the county of Middlesex and State of Massachusetts, have invented a certain new and useful Improvement in Shuttle Checking and Relieving Mechanism for Looms, of which the following is a specification.

Our invention relates to shuttle-binder attachments for looms; and it consists in certain new and useful constructions and combinations of the several parts of the same, substantially as hereinafter described and claimed.

In the drawings, Figure 1 is a side elevation of a part of the frame and lay-beam attachments of a loom provided with our improvement, the lay-beam and shuttle-box being shown in section for the sake of clearness. Fig. 2 is a front view of part of the lay-beam and attachments. Fig. 3 is a plan view of the parts shown in Fig. 2. Fig. 4 is a side elevation of our shuttle-box attachment detached from the lay-beam and enlarged to show the several parts. Fig. 5 is a plan view of the parts shown in Fig. 4. Fig. 6 is a section on the line $x\ x$ through Fig. 5.

A is the frame of the loom, of the ordinary construction.

B B are the rollers for taking up the cloth when woven.

C is the lay-beam, which has the shuttle-race on its upper surface and carries the reed c. The shuttle-box is formed in the usual manner on the end of the lay-beam and has a plate c' on one side of it and a shuttle-binder c^2 on the other side. The shuttle-binder is pivoted at c^3 and swings thereon against the shuttle, binding the latter in its box.

In order to cause the binder to grip closely upon the shuttle when it is in the act of entering the shuttle-box, and at the same time release the shuttle from compression when thrown therefrom and grip the shuttle with a yielding compression, we have devised the following mechanism:

Upon a plate d, which is attached by screws to the lay-beam, we mount the finger d' by means of ears projecting from the lay-beam carrying the pivot d^2, upon which the finger turns. The upper end of this finger is swung to bear upon the shuttle-binder. The lower end has an elongated slot d^3, Fig. 2, through which one end of the rod d^4 passes, the rod extending transversely across under the lay-beam through the sleeve $e\ e'$. This sleeve is formed of the upper semi-cylinder e, attached or cast upon the plate d, and the lower semi-cylinder e', pivoted on one side to e by lugs e^2, passing through slotted projections e^3 on the side of e, and on the other side pressed up against the rod by arms e^4 and springs e^5, attached at one end to the arms and at the other to lugs e^6 on plate d. The arms e^4 are each provided with several notches e^7 on their lower sides for engagement with the lower ends of springs e^5, so that the upward pressure of the semi-cylinder e' may be varied at pleasure.

A piece of leather m is wrapped around the rod d^4 inside the semi-cylinders $e\ e'$, which, being compressed by them against the rod, gives these a frictional grip upon it. On one end of the rod d^4 it is provided with a head or enlargement d^5, preferably of leather or other elastic material, and at the other end it is fastened to the finger d' by a washer d^{16} and pin d^6 and a washer d^{17} on the inside, held against the finger by a spiral spring d^7 and pin d^8 passing through the rod.

On the frame of the loom at each end of the path of the rod d^4 as it is carried to and fro by the lay-beam are attached studs or fingers $o\ o'$, in such a position as to alternately strike the opposite ends of the rod and move it endwise. When the lay moves toward the breast-beam to beat up the weft in the shed, the end of rod d^4 on that side of the lay comes in contact with the finger-piece o', which is adjustably attached to the loom-frame by the bolt o^2, as shown in dotted lines in Fig. 1. This contact slides the rod back and draws the finger d' away from the shuttle-binder c^2. On its return movement, after beating up the weft, the shuttle is thrown from the shuttle-box while thus relieved from pressure, and the shuttle passes through the shed while the lay is completing the last half of this retreating movement and while it is making the first part of its return movement toward the shed. During this movement of the lay, however, the end d^5 of rod d^4 is

brought against the contact-stud *o*, which moves the rod forward again, pressing finger *d'* against shuttle-binder c^2, in which position it is held by the frictional grip of the semi-cylinders *e e'* on the rod. As above stated, however, the shuttle does not arrive in the shuttle-box to which it is thrown until after all the above adjustments have taken place, and it is therefore received by the shuttle-binder with the grip last above described and checked as it enters the shuttle-box.

It will be observed that the shuttle, being always uncompressed when thrown and always received with a compression or squeeze when received into the shuttle-box, is operated in the most economical manner possible. It will also be observed that by this mechanism, constructed and operating as described, it is automatically set to relieve the pressure of the binder on the shuttle, and so remains during the movement of the lay away from the shed, within which time the shuttle is to be thrown out of the box, and is automatically set to restore the pressure on the binder and receive the shuttle with a powerful compression during the return movement of the lay toward the shed, within which time the shuttle is always to be received in the shuttle-box. The shuttle-binder is therefore released from pressure while traveling with the lay through a certain part of its path in one direction, and subjected to compression while traveling over the same part of its path in the other, or, in other words, these diverse conditions, as it were, lap past a given point in the path of movement of the lay to and fro.

Heretofore the release and compression of the shuttle-binder have been effected both in its backward and forward movement from and toward the lay by some fixed object like a cam upon the frame, which necessarily caused the release and the compression of the shuttle-box binder to be effected in substantially the same place in the path of the lay whether on its backward or forward movement. The condition of compression of the finger *d'* against the shuttle-binder did not, therefore, depend alone in any part of the beat upon the mechanism mounted upon and carried by the lay, but upon some mechanism thereon acting in conjunction with a cam or projection on the frame. With our present mechanism, on the contrary, the condition of compression of finger *d'* upon the shuttle-binder when once produced is maintained throughout a certain part of the beat by the mechanism upon the lay alone independently of other parts of the construction. Practically the effect of this is to give a wider range of time during which the shuttle may be thrown out of the box while released from compression and a wider range during which it may be received or caught therein while the binder is under compression. When the lay is making one hundred and twenty to one hundred and forty beats per minute, this feature becomes important, both because the shuttle may be thrown slower, and thus save wear and tear, and also because there is greater certainty of its not being compressed too soon while the lay moves one way or gripped too late when it moves the other. Different picker-staff mechanisms of the same type vary slightly in the length of connections or amount of backlash therein, and our present improvement affords the necessary allowance for this.

The condition of remaining in a compressed position against the shuttle-binder may be given to finger *d'* by other means than the gripping of rod d^4 by the semi-cylinders *e e'*. Thus the finger may be made to work tight enough on its axis d^2 between its lugs to remain compressed against the binder, or elastic washers might be squeezed in between the lugs and finger, the main feature of its remaining in this condition when once set there being preserved.

It is of course understood that the shuttle-box on the opposite end of the lay is like the one shown with the parts of the described mechanism belonging thereto, and it has not therefore been illustrated.

The spring d^7 may be omitted, if desired, and the washer d^{17}, against the finger *d'* upon which it bears, be made fast to the rod d^4 in the position shown in Fig. 4 by welding or brazing it onto the rod; but we prefer to employ the spring with the washer, as it gives a more perfect bearing of the finger *d'* upon the shuttle-binder. The springs e^5 e^5 might be replaced by cords or straight wires; but the semi-cylinders *e e'* would then require frequent adjustment or setting up, which is avoided by employing the springs. The semi-cylinders *e e'* will of course be modified to fit rod d^4 if the shape of the latter in cross-section be altered. One of the springs e^5 might also be dispensed with and the other used alone with good effect; but we prefer to use both.

What we claim as new and of our invention is—

1. The combination of the lay-beam C, arranged to move to and fro, the shuttle-box mounted thereon, having the shuttle-binder c^2 pivoted upon one side thereof, the finger *d'* and rod d^4, mounted upon the lay-beam, stops *o o'*, attached to the frame and arranged to be alternately brought in contact with said rod at each end of its path, and a compressing-clamp adapted to hold them in position against the shuttle-binder when moved to the same by one of said stops, substantially as described.

2. The combination of the lay-beam C, arranged to move to and fro, the shuttle-box mounted thereon, having the shuttle-binder c^2 pivoted upon one side thereof, the finger *d'* and its rod d^4, mounted upon the lay-beam, stops *o o'*, attached to the same and arranged to be alternately brought into contact therewith at each end of its path, and the compressing semi-cylinders *e e'*, arranged to grip said

rod and hold it in the position to which it is moved, substantially as described.

3. The combination of the lay-beam C, arranged to move to and fro, the shuttle-box mounted thereon and provided with the shuttle-binder c^2, pivoted upon one side thereof, the finger d' and its rod d^4, mounted upon the lay-beam, stops o o', attached to the frame and arranged to be alternately brought into contact with said rod at each end of its path, the compressing semi-cylinders e e', arranged to grip said rod, and a spring e^5, arranged to compress them upon the rod, substantially as described.

4. The combination of the lay-beam C, arranged to move to and fro, the shuttle-box mounted thereon, having the shuttle-binder c^2 pivoted upon one side thereof, the finger d' and its rod d^4, mounted upon the lay-beam, stops o o', attached to the frame and arranged to be alternately brought into contact with the rod at each end of its path, a compression-clamp adapted to hold said rod in the position to which it is moved, and the spring d^7, carried by said rod and arranged to press said finger against the shuttle-binder, substantially as described.

ORREN A. SAWYER.
MOSES M. LAHUE.

Witnesses:
DAVID HALL RICE,
N. P. OCKINGTON.