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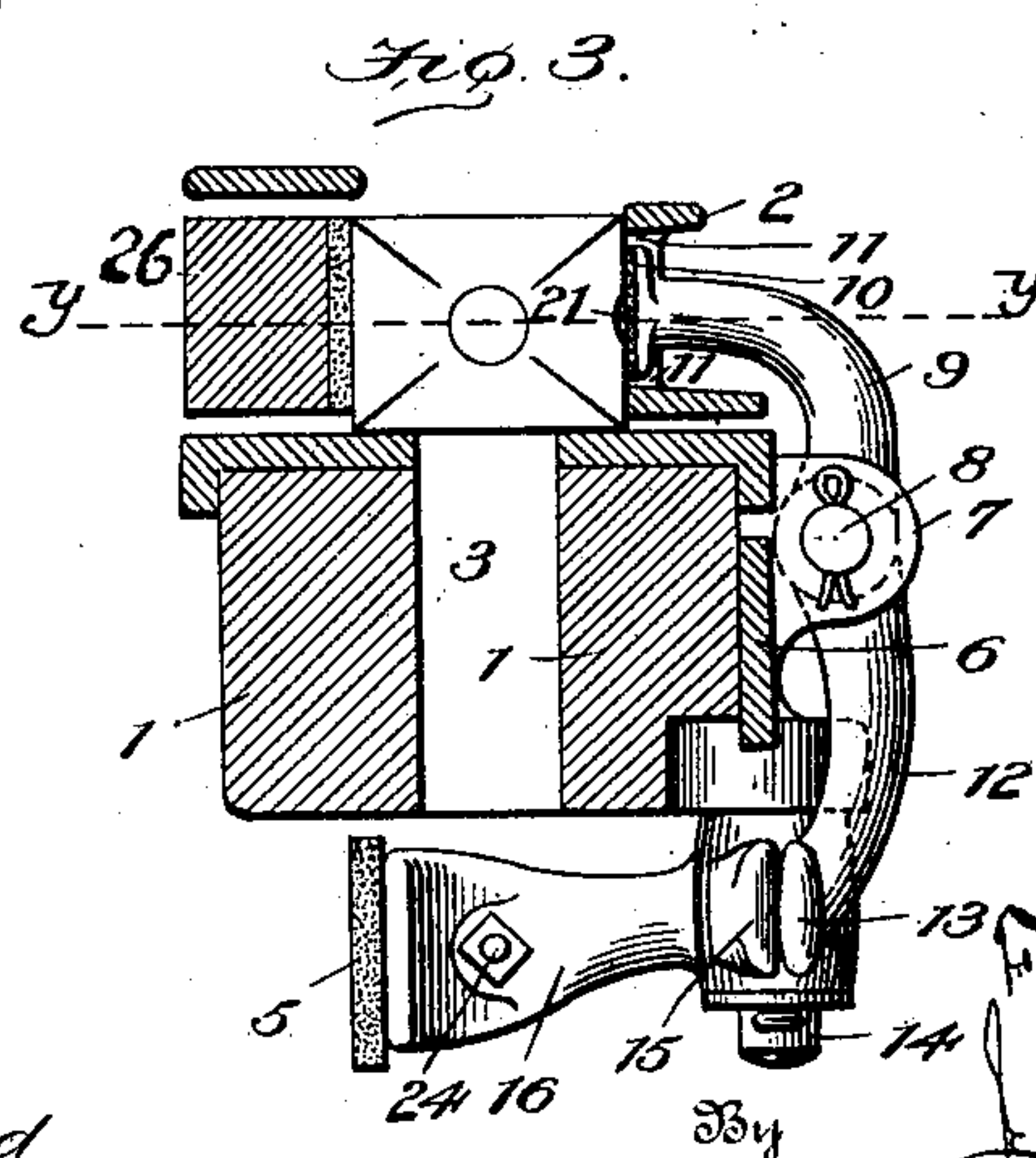
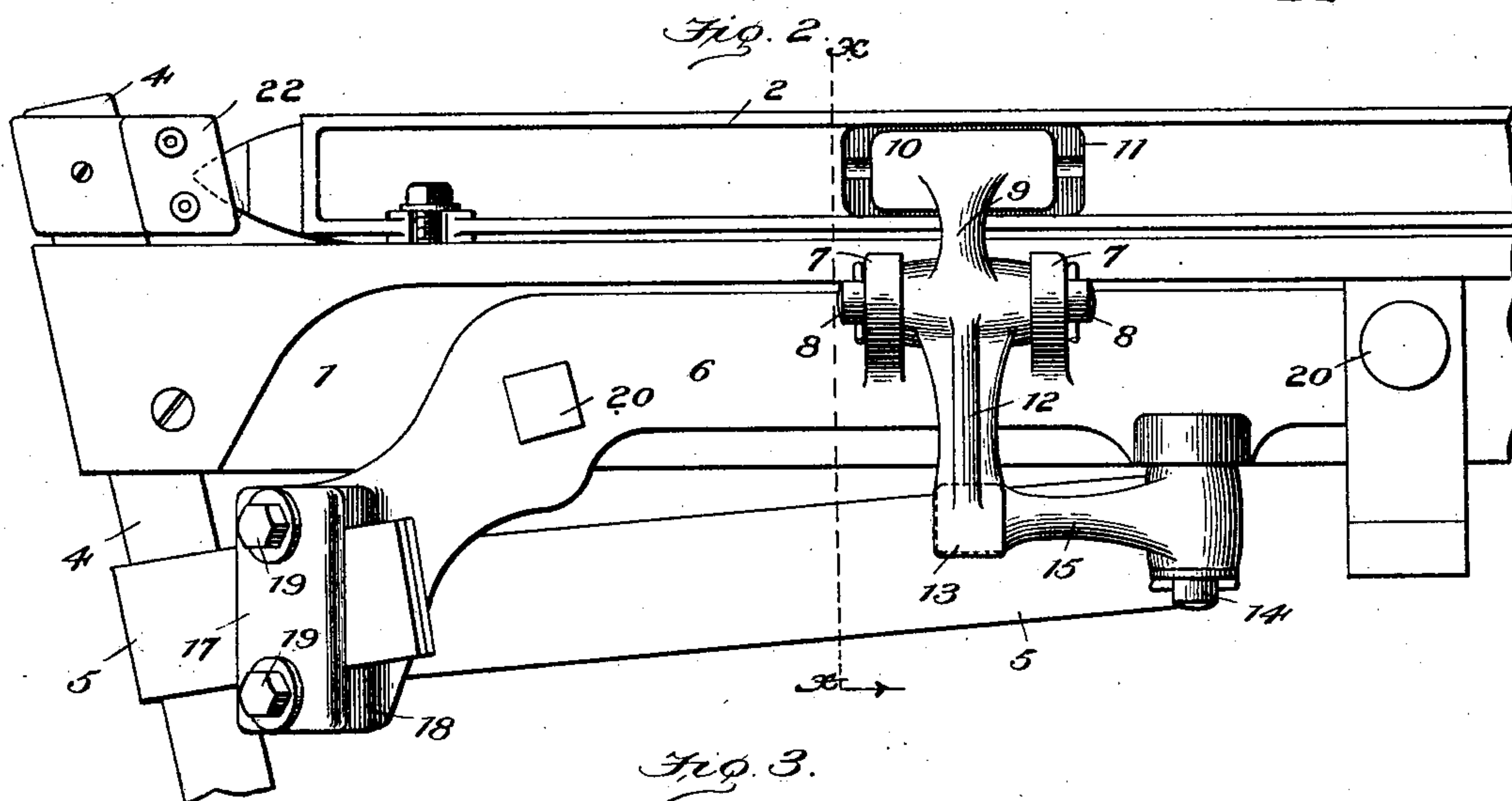
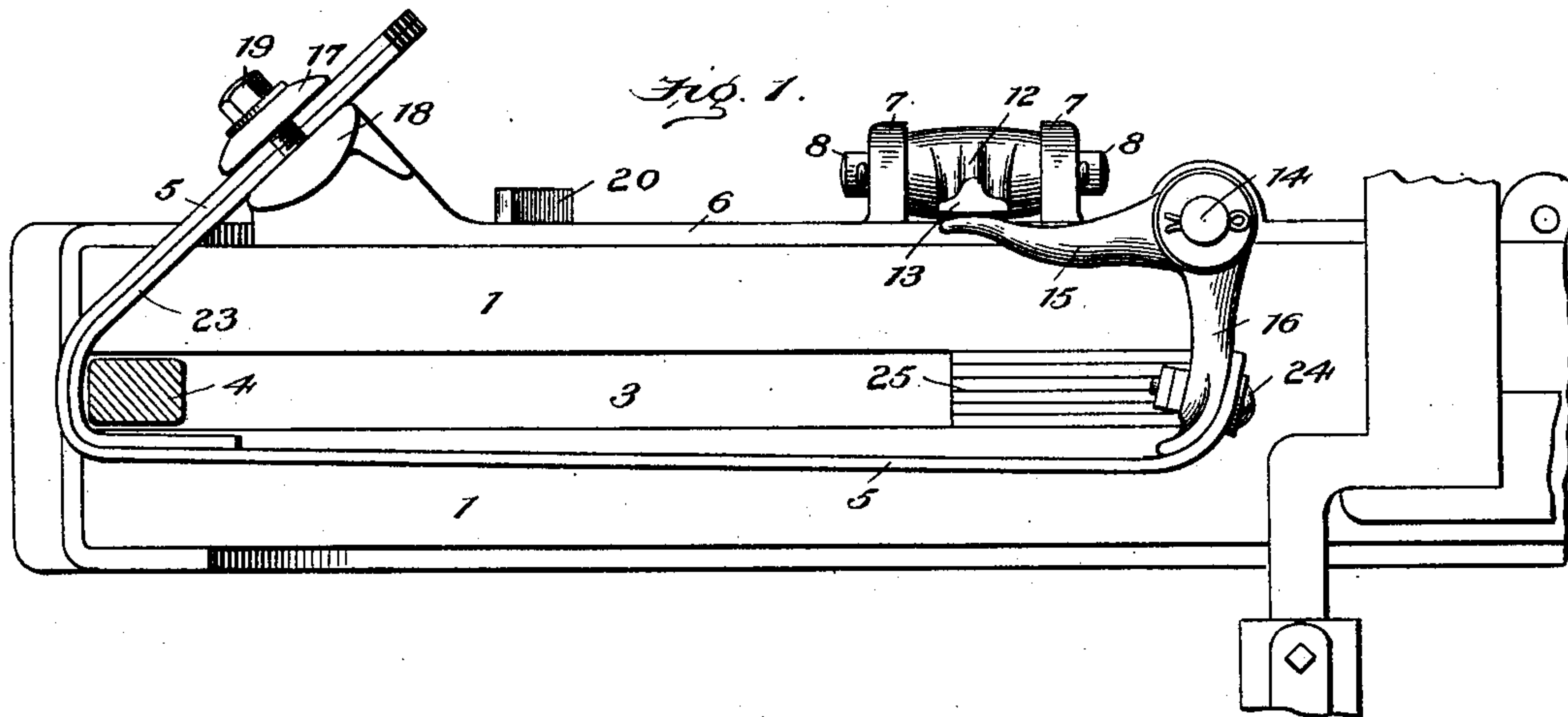
PATENTED MAR. 29, 1904.

F. A. MILLS.
SHUTTLE LOCK FOR LOOMS.

APPLIOATION FILED SEPT. 26, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses

Edwin L. Bradford
Anne B. Johnson

Inventor

13 Francis Arthur Mills
14 John C. Johnson
his Attorneys

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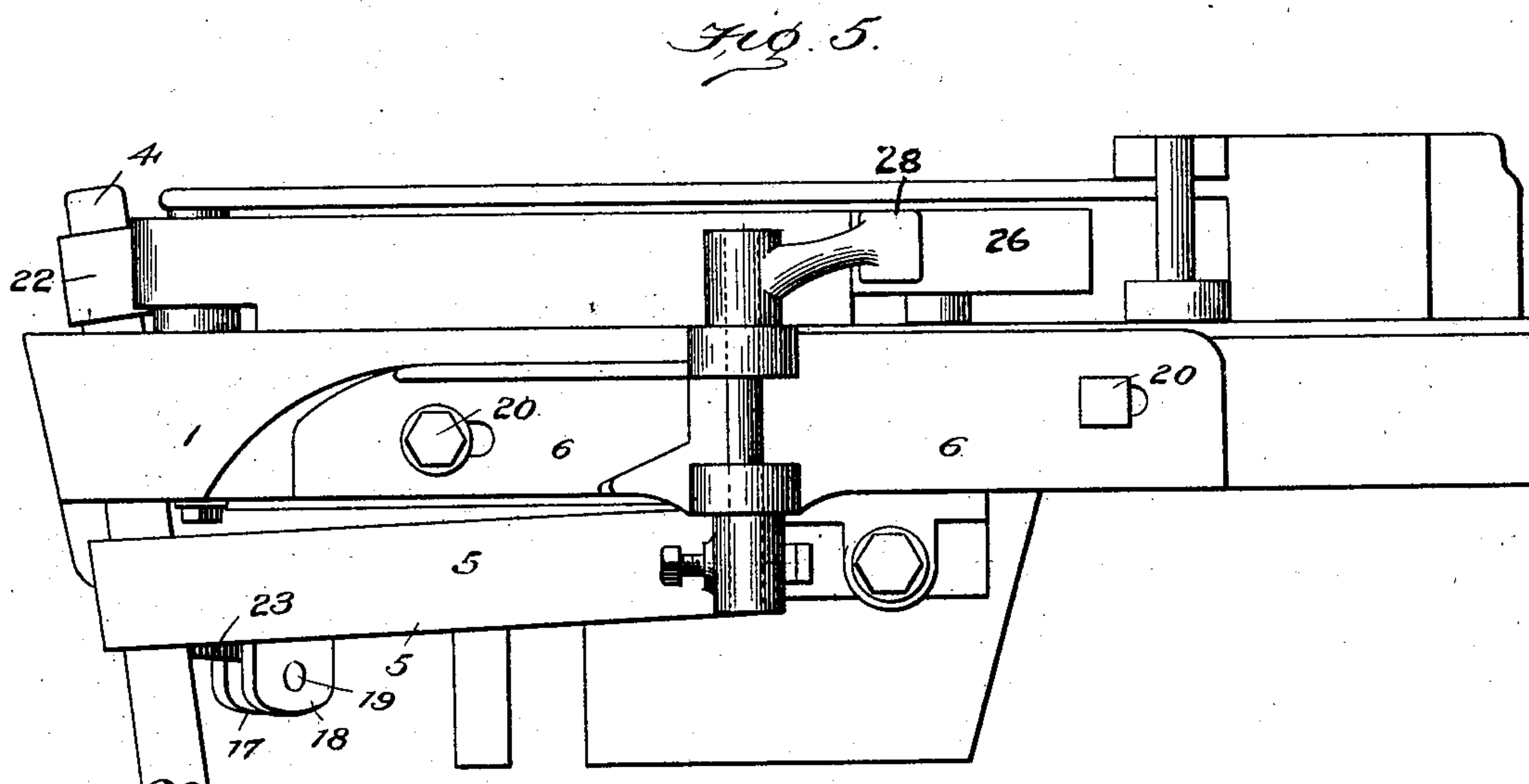
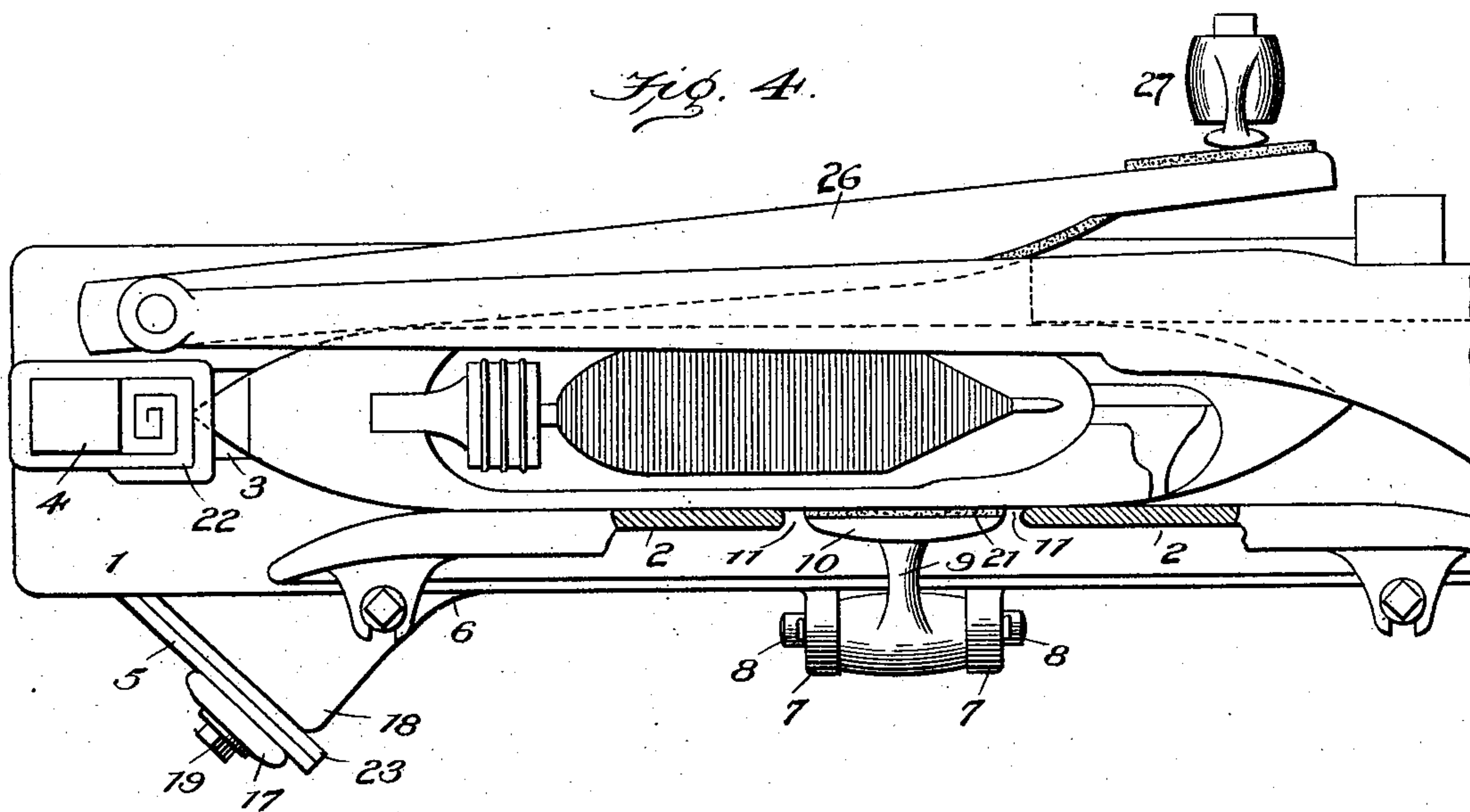
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Edwin L. Bradford
Anne B. Johnson.

Inventor

Francis Arthur Mills
By *John M. Johnson*
his Attorneys.

UNITED STATES PATENT OFFICE.

FRANCIS ARTHUR MILLS, OF LAWRENCE, MASSACHUSETTS, ASSIGNOR
OF ONE-HALF TO GROSVENOR B. EMMONS, OF METHUEN, MASSACHUSETTS.

SHUTTLE-LOCK FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 755,911, dated March 29, 1904.

Application filed September 26, 1903. Serial No. 174,805. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS ARTHUR MILLS, a citizen of the United States of America, residing at the city of Lawrence, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Shuttle-Locks for Looms, of which the following is a specification.

My present invention in looms is directed to means whereby the shuttle-binder in its function of pressing against the shuttle to stop it and prevent rebound is dispensed with, as one of the elements of a lever device and the force of the impact of the shuttle upon picker-stick is caused to effect the contact or engagement of a pressure lever device directly with the shuttle itself to press it against a shuttle-binder and the opposite wall of the shuttle-box and lock it at a desired position in the shuttle-box and prevent its rebound at the end of its flight, and so far as I know and can find I am the first to conceive the idea of locking the shuttle at a desired position in the shuttle-box and preventing rebound by the direct engagement with and pressure upon the shuttle itself of a lever device and a connection therefor actuated by the force of the impact of the shuttle upon the picker-stick or picker, the transmission of such force being direct from the shuttle's impact to the shuttle itself and not through the intervention of a binder. The arrangement of the impact-strap beneath the lay and the connection of the strap with means beneath the lay whereby the impact of the picker-stick is caused to operate above the lay to check and lock the shuttle at the end of its flight in the shuttle-box is also a feature of my invention.

The following description read in connection with the accompanying drawings will enable any one skilled in shuttle-locking mechanism for looms to understand my invention and to practice it in the form in which I prefer to employ it; but it will be understood that my invention is not limited to the precise form and details of construction herein illustrated and described, as various modifications and changes may be made without exceeding

the scope of the claims in which my invention is set out.

The object of my invention is to prevent the rebound of and to effect the locking of the shuttle in the shuttle-box at a desired position, and particularly in what is known as a "magazine-loom" in patent to Northrop, No. 529,940, dated November 27, 1894, in which it is necessary that the shuttle be stopped at a position in the shuttle-box to permit a transfer of a bobbin of filling from the magazine to the shuttle.

Referring to the drawings, Figure 1 shows a bottom view of the left end of a lay, illustrating the arrangement of an impact-strap at the under side of the lay, the picker-stick as having delivered its impact upon the strap, and a lever connection by which the force of the impact upon the strap is delivered by pressure directly upon the shuttle itself to stop it. Fig. 2 is a view of the front side of the left end of the lay, showing the arrangement of the lever device and its impact-strap connection for delivering the force of the impact of the shuttle directly upon the shuttle itself to stop it. Fig. 3 is a transverse section on the line *x* of Fig. 2, showing the lever locking device in direct contact with the side of the shuttle instead of upon the shuttle-binder. Fig. 4 is a top view, the wall of the shuttle-box being in horizontal section on the line *y y* of Fig. 3, showing the shuttle as having delivered its impact upon the picker and the shuttle locked by the direct contact therewith of the lever-locking device, which is actuated by the impact of the shuttle. In this figure I have also shown the protection-finger, which is actuated in the usual manner by the shuttle-binder. Fig. 5 shows in rear view the right end of the lay to illustrate the arrangement of the impact-strap and its lever connection as used for locking the shuttle by the usual binder and the difference between pressing on the binder from pressing on the shuttle.

The lay 1, having a shuttle-box 2 at each end, and the slot 3 for the picker-stick 4 are of the usual or any approved construction, and the invention which constitutes the sub-

ject-matter of this patent is carried out by a preferred means which I will now state.

A strap 5 constitutes the connection for receiving and transmitting the impact of the shuttle upon the picker-stick or picker by pressure upon the shuttle itself to stop it at the end of its flight, and for this purpose the strap is arranged at the under side of the lay, passed around and crossing the path of the picker-stick, and is fastened by a suitable strap-clamp having clamping-screws 19 19. The other end of the strap is connected to a lever device by which the force of the impact on the strap is transmitted by pressure directly against the side of the shuttle itself, as I will now state. A plate 6 is bolted, preferably, to the front side of the lay and has a pair of outward-projecting lugs 7 7, to which is fitted a horizontal bearing-pin 8, on which a lever is loosely mounted between the lugs, its upper arm 9 terminating in a pressure-hand 10, somewhat in form like a cross and positioned so as to operate in an opening 11 in the side of the shuttle-box for direct engagement by pressure with the shuttle itself. The lower arm 12 of this lever terminates in a flat bearing 13 below the lay, and this lever is caused to rock upon its bearing to communicate the impact on the strap direct to the shuttle. A second armed lever is loosely fitted upon a stud 14, depending from the side plate, so that one of its arms 15 extends to and engages the depending arm 12 of the vertical lever, while the other arm 16 of this under lever is connected to that end of the strap which extends beneath the lay, so that this lever is caused to rock horizontally to communicate the impact on the strap to lower end of the vertical lever to force its upper end directly against the shuttle. The horizontal lever is of bell-crank form, its arms standing at right angles, with one of them in the line of the lay, the other arm extending toward the rear side of the lay for connection with the impact-strap, so that the blow of the picker or picker-stick upon the strap under the impact of the shuttle is caused to give a quick jerk or pull of the strap toward the end of the lay and with it pull the lever to which the strap is connected, which gives a sudden drive to the other lever-arm outward against the depending end of the vertical lever, driving it outward and its upper arm inward against the shuttle itself, forcing it instantly hard against the opposite binder and wall of the box and locking it at the very point which will allow a bobbin of filling to be perfectly transferred into the shuttle. Provision is made for adjusting the strap at the end where it is clamped to the plate by a binder-plate 17, crossing the strap and screwed to a raised seat 18 on the side plate, and to give the proper impact movement of the strap to the locking device it is important that the adjustable end of the strap should stand away

from the picker-stick, and this is effected by the seat standing oblique from the lay. The adjustable plate 6 carries the lugs for the vertical lever, the depending stud for the horizontal lever, and the strap-clamp and is bolted to the lay by the bolts 20 20 as an entirety, making it very convenient to apply the locking device and its lever members. That end of the vertical lever which engages the shuttle presents a flat pressure-surface having a leather face 21 to the shuttle, and it is important to note that the end of the lever stands within the opening with its shuttle-engaging face coincident with the inner wall of the box, so that the shuttle will be in contact with the end of the lever at the moment the locking force is put upon the lever.

In Fig. 2 the shuttle is shown as engaging the picker 22 at the moment the shuttle is locked and the locking-lever standing in the opening in the shuttle-box wall against the side of the shuttle, and it will be understood that the lock of the shuttle is instantaneous with its impact on the picker and that the release of the lock on the shuttle is at the moment the shuttle has been started to be thrown. In this operation it is important to note that the upper arm of the vertical lever curves inward and overhangs its pivot bearing-pin and the lay, that the lower arm is longer and curves slightly inward, that the pivot of the horizontal lever depends from the lay vertically in line with its front side, that the meeting ends of the levers are maintained in contact, and that these meeting lever-arms are about of equal length with the strap-connected arm; but the shuttle-contacting arm is preferably shorter, so that the lever members are thereby caused to act with a compound leverage pressure directly against the shuttle and presses it against the binder and opposite wall of the box. It will also be noted that when the strap and the lever members are in their normal positions there is no tension on the strap, and the pressure-hand, by which the lever is locked, will thereby be maintained within its wall-opening with its acting face in line with the inner wall of the shuttle-box. It will also be noted that the plate which carries the lever members has depending below the lay the clamp-seat for the strap standing obliquely to hold the clamped end of the strap in oblique relation to the picker-stick, the clamp also securing a short reinforcing or wear strap 23 for the picker-stick. At its lever-connected end the strap is fastened by a nutted bolt 24 upon a curved end of the lever-arm. As seen in Fig. 1, the normal position of the picker-stick is in contact with the impact-strap, and it is in this position that it receives the impact of the shuttle, and at the inner end of the lay-slot is seen the fixed bunter 25 for the picker-stick.

It is important to note that the arrangement of the impact-strap at the under side of the

lay is advantageous in affording a better impact and locking action of the picker-stick upon the strap and because it will not catch on the filling when transferring a bobbin from the magazine to the shuttle.

The low-down position of the impact-strap is important, because it gives the advantage of contact of the picker-stick a considerable distance from the upper end of the picker-stick, and thereby permits a slight spring or giving action to the upper part of the picker-stick under the impact of the shuttle. This is because the picker is about four or five inches above the strap and will therefore allow the picker-stick to spring back above the strap when the picker is struck by the shuttle, and it is this yielding of the picker when struck that conduces to a better locking action of the strap upon the lever members than could be obtained if the strap passed around the picker-stick at the top of the lay and directly back of the picker. Moreover, the arrangement of the strap beneath the lay takes it away from rubbing and wearing against the end of the shuttle-box and the heel or pivoted end of the shuttle-binder, and thereby avoids all friction on the strap, and as a result renders the strap more sensitive in transmitting the force of the impact to the lever connections of the strap.

Looking at Figs. 1 and 2 it will be seen that a single plate 6 carries the separate lever members and the oblique clamp-seat for the adjustable end of the strap, so that, with the strap and the lever members, the plate forms an entirety ready to be bolted to the side of the lay, so that when so bolted the strap will extend along one side of the picker-stick slot and the shuttle-engaging lever in the exact position to effect the lock of the shuttle, thereby giving the advantage of applying the shuttle-lock mechanism as a single device with its parts properly related to each other and to the shuttle-box. In this attachment both ends of the strap stand toward the same side of the lay, and the lever which connects its inner end while crossing the line of the path of the picker-stick crosses the inner end of the fixed bunter 25, which limits the inward throw of the picker-stick, and thereby prevents the lever from being struck by the picker-stick.

In Figs. 3 and 4 I have shown a shuttle-binder 26 and the protection-finger 27 operated thereby in the usual manner; but it will be noticed that the binder is at that side of the shuttle-box opposite the lever device, the pressure of which upon the shuttle locks it against the spring-pressed shuttle-binder and the wall at the opposite side of the box. In this arrangement the lever device first presses against the shuttle, and the shuttle is thereby pressed against the spring-pressed shuttle-binder and the opposite wall of the shuttle-box and actuates the protection-finger. By this arrangement the protection-finger is constantly under an inward pressure upon the

shuttle-binder, and the latter is therefore caused to act upon the shuttle, pressing it inward at the same time the lever device acts upon the shuttle to press it in a reverse direction against the binder and the shuttle-box wall, whereby the shuttle is stopped and locked by the coöperative action of lever device on one side and the binder device on the opposite side of the shuttle.

In Fig. 5 I have shown the binder 26 as it is used with the lever locking device 28, which is the lever part 10 of my patent of August 5, 1902, No. 706,190, but with the impact-strap arranged at the under side of the lay.

I claim—

1. In a loom and in combination, the lay, the shuttle-box thereon, the picker and the picker-stick, a strap to receive the impact of the shuttle upon the picker-stick arranged at the under side of the lay, crossing the path of the picker-stick and connected to the lay, and means connecting the other end of the strap at the under side of the lay constituting lever connections for imparting contacting pressure directly upon the shuttle to stop and to lock it at the end of its flight.

2. In a loom and in combination, the lay, the shuttle-box thereon, the picker and picker-stick, a strap to receive the impact of the shuttle upon the picker, arranged at the under side of the lay crossing the path of the picker-stick and connected to the lay, and lever members on the lay one of said members of bell-crank form pivoted at the under side of the lay, having one arm connected to the strap, the other lever member pivoted in vertical position on the lay having free connection with the other arm of the bell-crank lever.

3. In a loom and in combination, the lay, the shuttle-box thereon, the picker and picker-stick, a strap to receive the impact of the shuttle upon the picker, arranged at the under side of the lay passing around the picker-stick and having one end connected to the lay, and lever members connected to the other end of the strap and arranged to transmit the force of the impact on the strap to the shuttle to stop and to lock it.

4. In a loom and in combination, the lay, the shuttle-box thereon, the picker and picker-stick, a strap to receive the impact of the shuttle upon the picker arranged at the under side of the lay, lever members pivoted on the lay one of which is connected to the free end of the strap, the other end of the strap crossing the path of the picker-stick and connected to the lay, the other lever member terminating in a pressure-hand in an opening in the side of the shuttle-box and in line with its inner wall for engagement with the side of the shuttle to stop and to lock it.

5. In a loom a shuttle-box having a side opening, a lever vertically pivoted on the lay, its upper end formed with a pressure-hand normally maintained with its acting face in

line with the inner wall of the box and adapted to be forced with an impact pressure against the incoming shuttle, the lower end of said lever hanging free beneath the lay, a bell-crank lever pivoted at the under side of the lay, one arm standing in line with the lay at right angles to and in contact with the hanging lever-arm, the other bell-crank-lever arm extending transversely of the lay, and an impact-strap fastened to this transverse arm and passing around the picker-stick is fastened to the lay, for operation as stated.

6. In a loom, the lay, a shuttle-box thereon, a picker and picker-stick, lever members on the lay, one standing vertical at the side, pivoted medially of its length, its upper arm terminating in a pressure-hand within an opening in the side of the shuttle-box, the lower arm of said lever extending below the lay, a horizontal lever pivoted to the under side of the lay having an arm standing in line with the lay in free engagement with the hanging end of the vertical lever, the other arm of the said lever crossing the lay and a strap connected to this end of the lever, passing around the picker-stick and having its end fastened to the lay, whereby the force of the impact of the shuttle is caused to be transmitted to the pressure-hand to force it in direct contact with the side of the shuttle to lock it and prevent rebound.

7. In a loom and in combination with the lay, the picker-stick, the shuttle-box having an opening in its side wall, lever members consisting of a pair of coacting levers, one standing vertically and loosely pivoted to rock at the side of the lay, provided with a pressure-hand standing in the shuttle-box opening with its acting face normally in line with the inner wall of the box, the lower end of said lever terminating in a face-bearing below the lay, the second lever loosely pivoted to rock horizontally at the under side of the lay, having one arm terminating in a face-bearing in contact with the lower face-bearing of the vertical lever, and the other arm extending across the picker-stick bunter at the inner end of the lay-slot, the meeting ends of the levers and the strap-lever being longer than the shuttle-pressing end of the vertical lever, and a strap beneath the lay connecting the transverse lever-arm, passing around the picker-stick and fastened to the lay.

8. In a loom and in combination, a lay, a shuttle-box thereon, the picker-stick, a plate fastened to the lay, a lever pivoted to rock vertically on said plate, a bell-crank lever pivoted to rock horizontally on said plate beneath the lay, arms of the levers meeting in contact beneath the lay, a strap connected to an arm of the bell-crank lever and crossing the path of the picker-stick a clamp whereby the strap is fastened by a clamp to said plate, whereby the impact of the shuttle upon the picker and the picker-stick upon the strap is transmitted

to the vertical lever to drive its upper end against the shuttle to lock it.

9. In combination in a loom, the lay, the shuttle-box, the picker and picker-stick, a strap to receive the impact of the shuttle upon the picker, arranged at the under side of the lay and passing around the picker-stick, a clamp for connecting the strap to the lay consisting of a seat standing oblique on the lay, a plate across the end of the strap and a bolt passing through each end of the plate and engaging the seat, to bind the strap thereon, and means on the lay connected to the other end of the strap for transmitting the force of the impact thereon to stop and to lock the shuttle.

10. In a loom, the lay, the shuttle-box thereon, the picker and picker-stick, a strap to receive the impact of the shuttle upon the picker arranged at the under side of the lay, passing around the picker-stick and having one end connected to the lay, and means on the lay connected to the other end of the strap at the under side of the lay for transmitting the force of the impact thereon to stop and to lock the shuttle.

11. In a loom, the lay, the shuttle-box, the picker and the picker-stick, a strap connected to a lever device and passing around the picker-stick to receive the impact of the incoming shuttle upon the picker and picker-stick, means for adjusting and clamping the strap consisting of a seat-clamp standing obliquely from the lay, a plate crossing the end of the strap and a bolt passing through each end of the plate and engaging the seat-bracket to permit the adjustment and clamping of the strap to stop the shuttle at a desired position in the shuttle-box and for the purpose stated.

12. In a loom and in combination, the lay, the shuttle-box thereon, a picker and picker-stick, an impact-strap, an adjustable plate on the lay, an oblique seat on the plate, a clamp securing one end of the impact-strap upon the seat, lever members pivotally mounted in bearings on the plate and to one of which the other end of the impact-strap is attached whereby all the shuttle-locking parts are carried by said plate.

13. In a loom and in combination, the lay, the shuttle-box thereon, a picker and picker-stick, an impact-strap beneath the lay, a clamping device on the lay to fasten and permit the adjustment of the strap, a lever mounted horizontally beneath the lay having one arm connecting the other end of the strap, and means connecting another arm of said lever for transmitting the locking action of the impact-strap to lock the shuttle.

14. In combination, the lay, the shuttle-box thereon, a picker and picker-stick and a bunter to limit the inward throw of the latter, a lever pivoted on the under side of the lay crossing the bunter and terminating at the opposite side of the picker-stick slot, an impact-strap beneath the lay connected to the end

of the lever, extending along one side of the picker-stick slot, crossing it and adjustably connected to the lay, and means connected to said lever and actuated by it for checking and locking the shuttle.

15. In a loom and in combination, the lay, the shuttle-box thereon, the picker and picker-stick, a strap to receive the impact of the shuttle upon the picker and picker-stick arranged at the under side of the lay, and connected to the lay, means connecting the other end of the strap at the under side of the lay and constituting lever connections at one side of the box for imparting contacting pressure directly upon the shuttle to stop and lock it, a shuttle-binder at the other side of the box,

and the protection-finger pressing the binder inward, for operation as described.

16. In a loom and in combination, the lay, the shuttle-box thereon, the picker and picker-stick, a shuttle, a spring-pressed binder, and means for pressing the shuttle against the spring-pressed binder, whereby the shuttle is frictionally locked under the yielding function of the spring-pressed binder.

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

FRANCIS ARTHUR MILLS.

Witnesses:

DUNCAN WOOD,
ALFRED DOBSON.