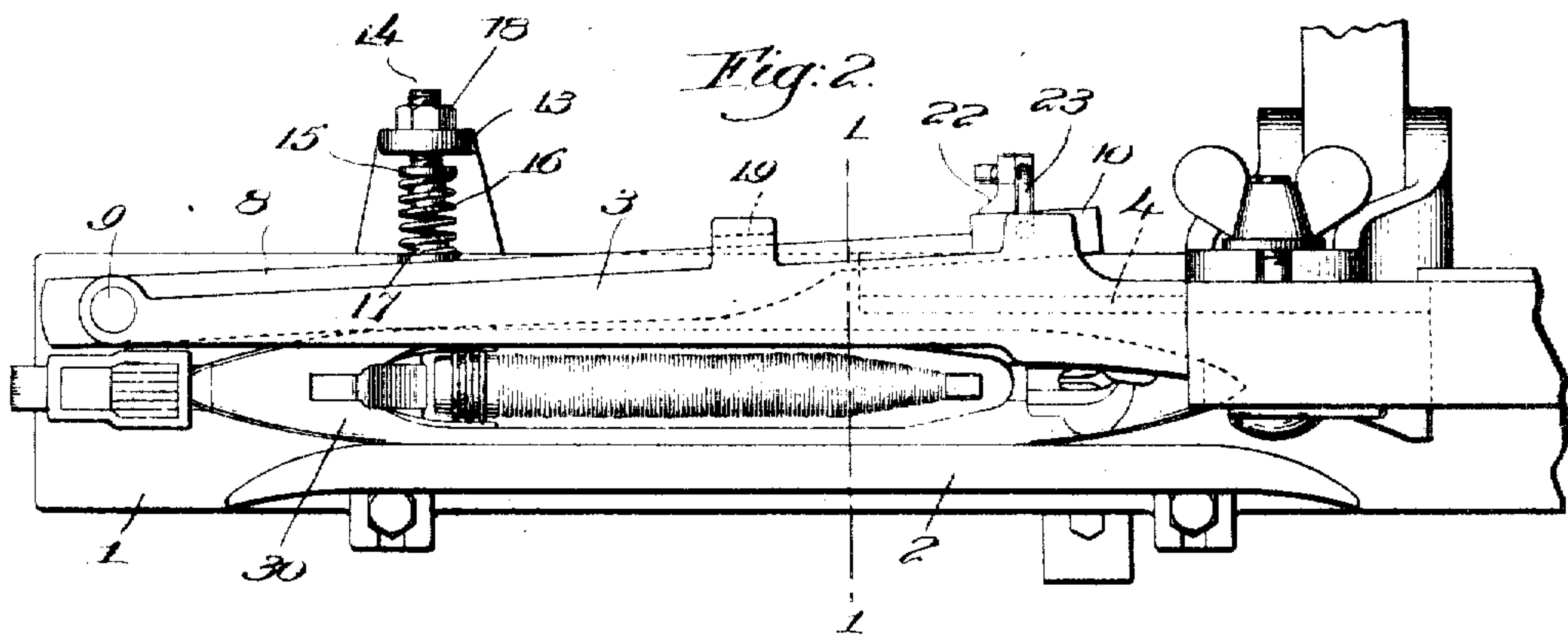
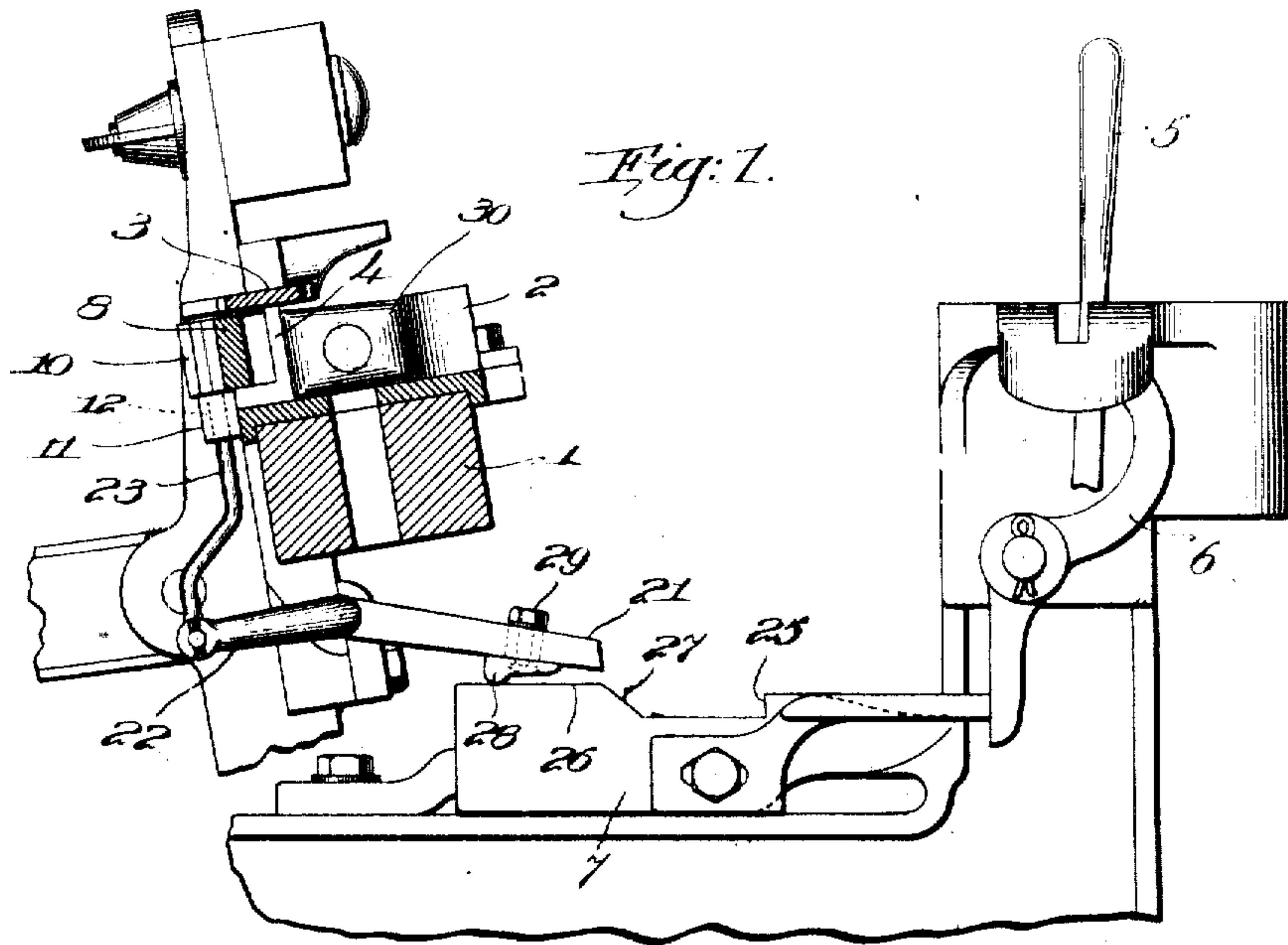


J. NORTHROP.
PROTECTION MECHANISM FOR LOOMS.
APPLICATION FILED MAR. 14, 1908.

908,418.

Patented Dec. 29, 1908.

2 SHEETS—SHEET 1.



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Barrie A. Krey

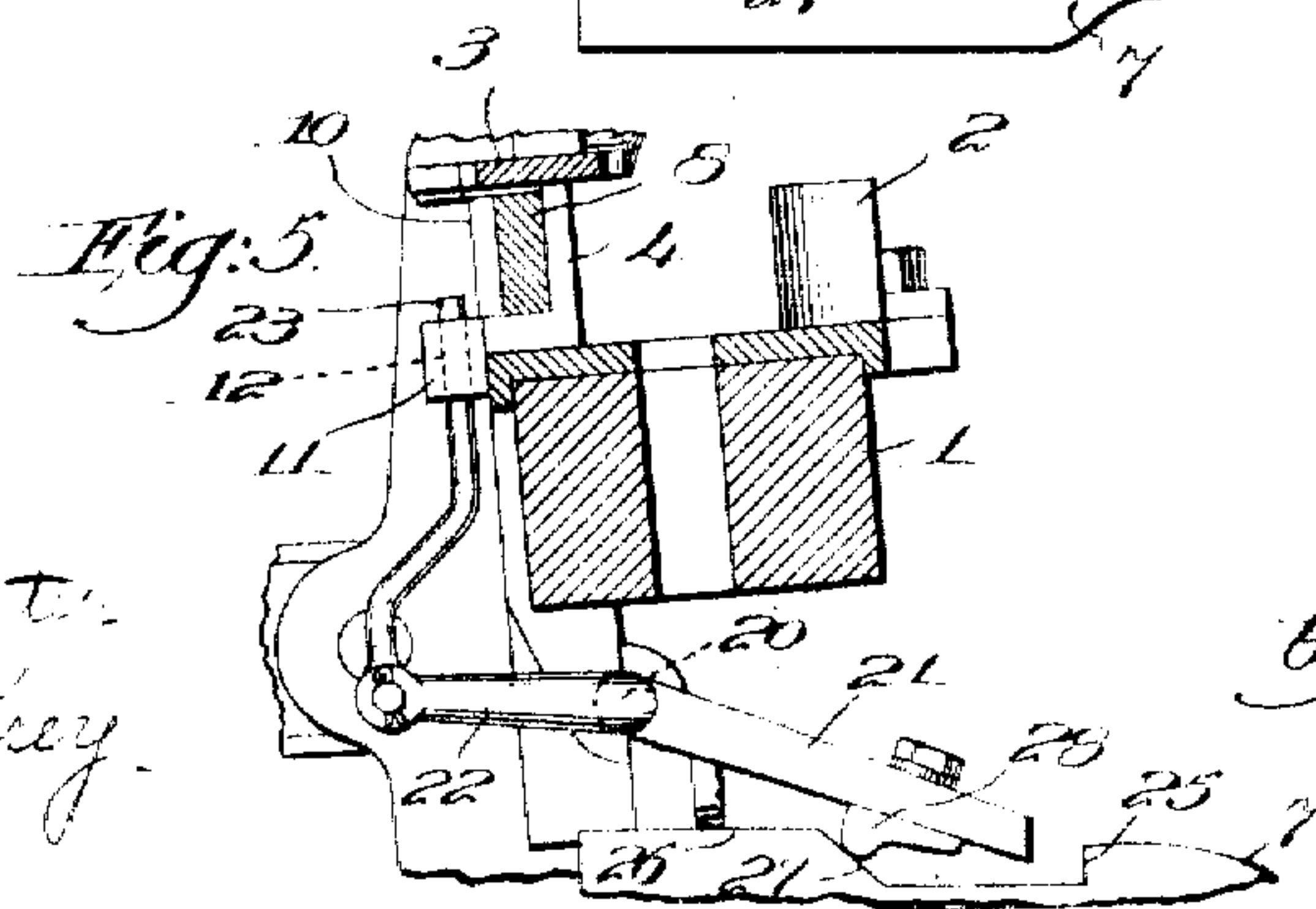
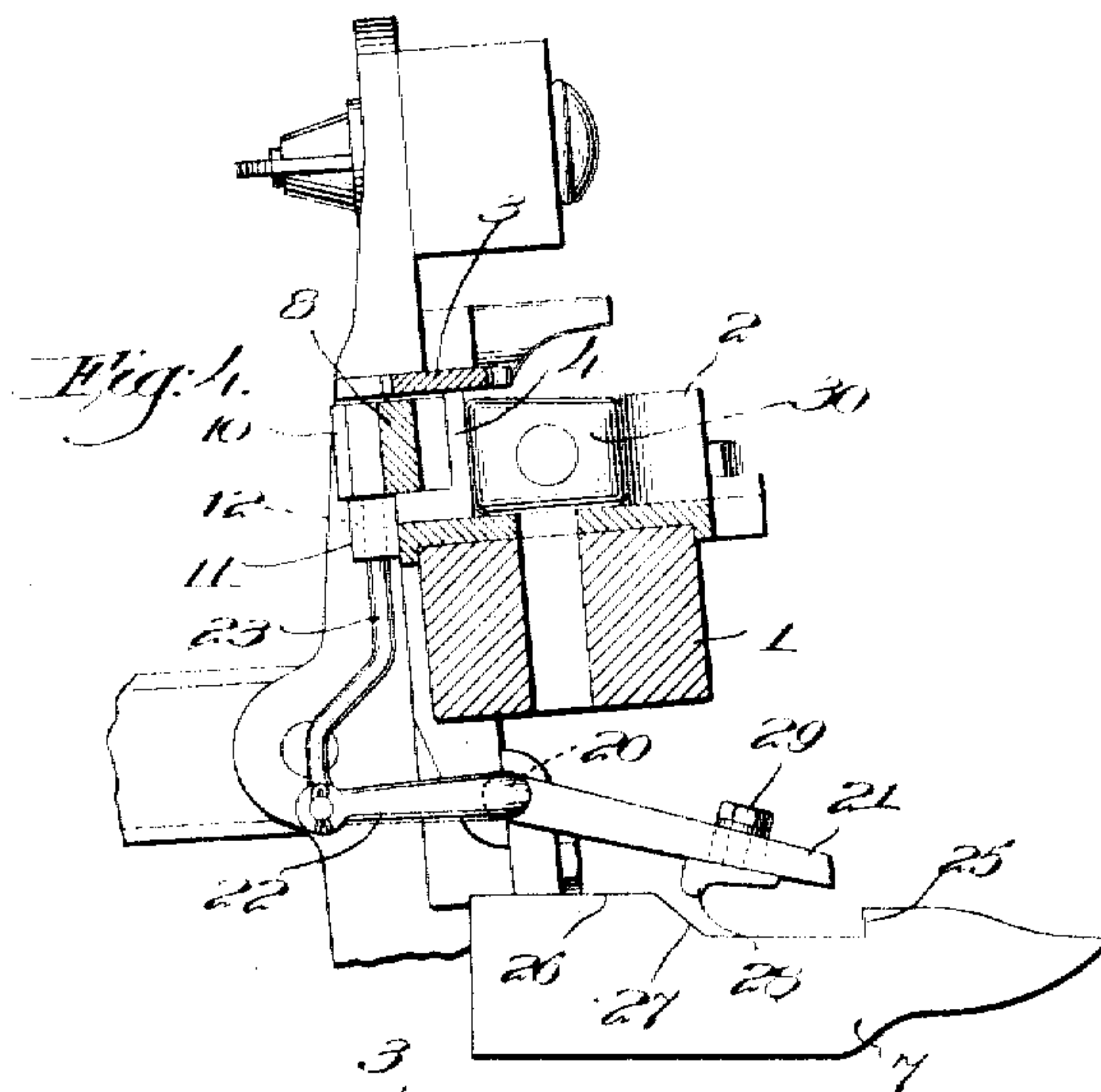
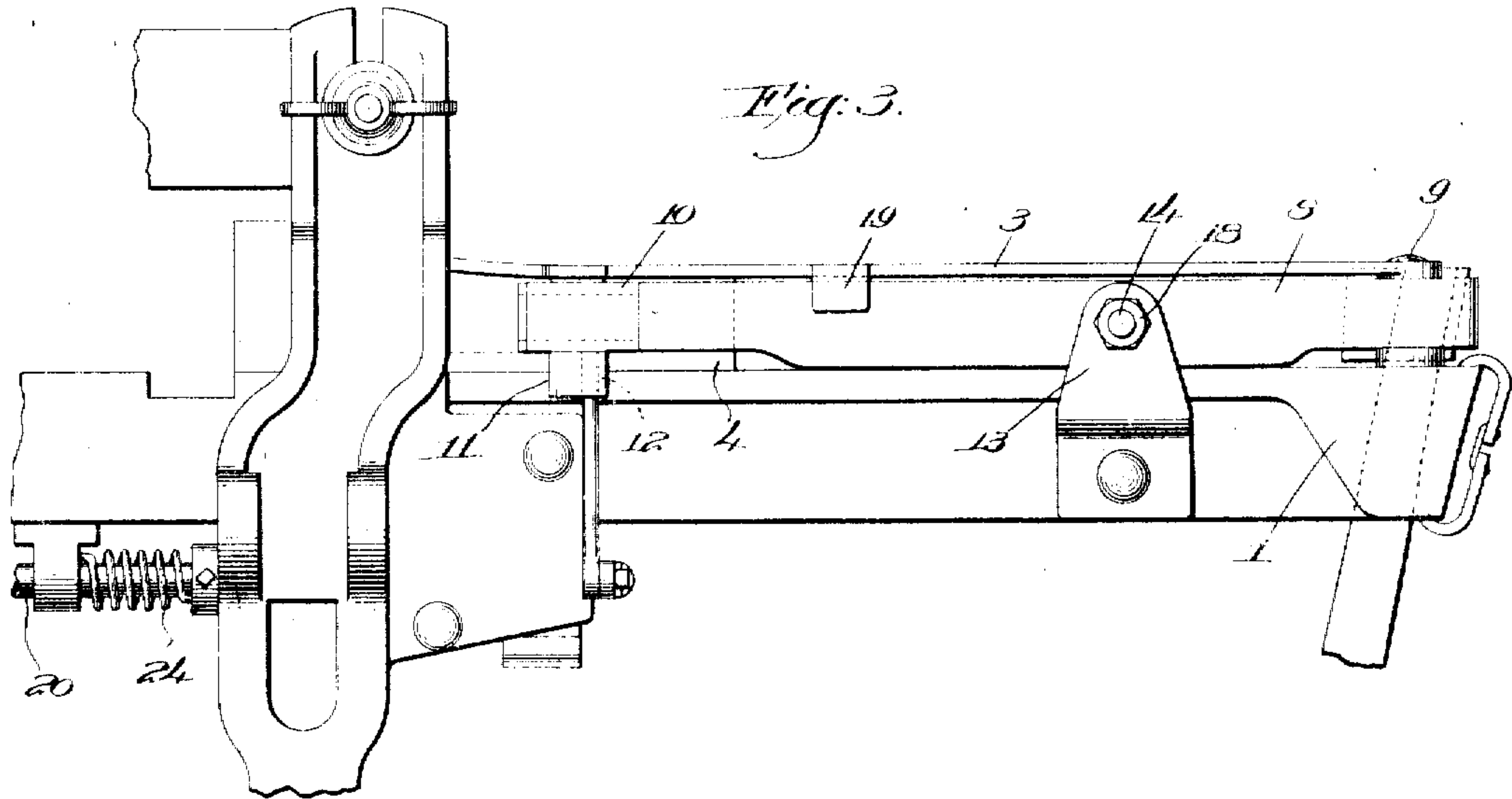
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

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PROTECTION MECHANISM FOR LOOMS.

No. 908,418.

Specification of Letters Patent.

Patented Dec. 29, 1908.

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To all whom it may concern:

Be it known that I, JONAS NORTHROP, a citizen of the United States, and resident of Hopedale, county of Worcester, State of Massachusetts, have invented certain new and useful Improvements in Protection Mechanism for Looms, of which the following is a full, clear, and exact specification.

To those skilled in the art of weaving it is well understood that the protection mechanism of a loom serves to stop the loom when for any reason the shuttle fails to box, thus preventing warp "smashes" or breakage of parts under such conditions.

In power weaving protection mechanism is a necessity unless its place is taken by a loose or spring-reed which can yield to the shuttle, but the use of the latter device is infrequent in this country.

With the object of reducing parts the protection mechanism has been so interconnected with the shuttle checking or binding means that the adjustment of one affects the other disadvantageously.

The shuttle binding means *per se* serves the purpose of checking the shuttle when it enters the box, and must be adjusted to meet variations in size, weight and speed of this rapidly moving member of a loom structure. If the shuttle comes home too rapidly the checking action of the binder must be increased. If the shuttle moves too slowly into the box the checking action must be decreased by setting the binder outward, increased action consequent upon setting the binder inwards resulting in increased outward movement of the binder by the incoming shuttle, whereas with decreased checking action there will be a decreased outward throw of the binder. Were the binder free to perform its own functions of checking the shuttle such variations in its adjustment and movement would be unobjectionable, but the interconnection between the binder and the protection mechanism causes variations in the movement of the binder to effect the relation of the dagger with its frog, in some cases causing smashes of the warp or breakage of parts, and in others causing unnecessary stoppage of the loom. Moreover, with the usual direct connection between the binders and the protection mechanism, the shuttle on entering either box must necessarily

rotate the protection shaft and its attached parts, the inertia of which is very considerable, and such rotation must be effected against the resistance of a spring of sufficient strength to cause return movement of the shaft and its attached parts surely and promptly upon the exit of the shuttle from the box. This necessitates additional power in picking the shuttle and results in excessive wear and breakage of the shuttle itself.

It is manifestly desirable to use as light a spring on the protection shaft as is compatible with safety, and hence the spring is adjustably applied, but any variation in the strength of such spring causes a corresponding variation in the checking action of the binder, so that the boxing of the shuttle must always be attended to after an adjustment of this spring has been made. Yet another trouble arises from the pressure of the binder against the shuttle when the loom is stopped by the projection mechanism, and with the shuttle partially in the box. At such times the binder may be moved outward slightly by the shuttle, and the dagger will be correspondingly lifted but not sufficiently to clear the shoulder of the frog. With the loom running at full speed the engagement of the dagger with the frog instantly forces the former to its lowest or operative position and the inner end of the binder must and does necessarily return to its normal position. Under these circumstances either the binder or the rear shuttle-wall, or both, must bend, and if the shuttle is old it is very liable to break, although it might otherwise have lasted indefinitely. These are very practical and real troubles on every loom, requiring more work and greater skill on the part of loom fixers, and increasing the number of loom fixers required for a given number of looms.

My present invention has for its object the production of protection mechanism so constructed and arranged that the dagger shall be maintained normally in an inoperative position during normal running conditions of the loom and wherein adjustment or change in the action of the shuttle-checking or binding means in no way varies the operation or adjustment of the protection mechanism, the functions of the latter being separated from those of the shuttle checking

means. Conversely, the protection-shaft spring may be adjusted at will without affecting the boxing of the shuttle, but in this invention the necessity for changing the effective strength of this spring does not exist, as ample spring-pressure may be always maintained, so that after the first adjustment the spring requires no further attention. As a result the binder is left free to attend to its own particular duty of checking the incoming shuttle, while the protection mechanism attends to its proper function of stopping the loom when the shuttle fails to box properly, the dagger at other times remaining in normal inoperative position and the governing of the protection mechanism by or through the binder being so arranged as to admit of the proper functional action by each instrumentality.

The binder requires more or less frequent adjustment, according to circumstances, but in my invention after the protection mechanism has been set in the first instance no further changes are needed.

As will appear hereinafter the dagger is normally inoperatively positioned, that is, it runs in such a position that it will not stop the loom, and it is moved from this position only when the shuttle is improperly boxed and the loom is to be stopped, consequently the raising and lowering of the dagger on each lay movement is avoided. This arrangement differs from the usual construction, wherein the protection mechanism is so arranged that unless the dagger is moved to inoperative position on each beat of the lay it will operate to stop the loom.

The various novel features of my invention will be fully described in the subjoined specification and particularly pointed out in the following claims.

Figure 1 is a left hand side elevation of a sufficient portion of a loom, the lay and shuttle-box being shown in section on line 1—1, Fig. 2, illustrating one practical embodiment of my invention; Fig. 2 is a top plan view of the left hand end of the lay and its shuttle-box, with some of the adjacent mechanism, the shuttle being shown properly boxed; Fig. 3 is a rear elevation thereof, showing a part of the protection mechanism; Fig. 4 is a detail similar to Fig. 1 but showing the lay as nearing front center, the shuttle being properly boxed, so that the protection mechanism is inactive; Fig. 5 is a similar view but showing the protection mechanism about to cause loom stoppage, owing to failure of the shuttle to box.

It will be understood that both of the shuttle-boxes will be of substantially the same construction, though only one is herein illustrated, and the lay 1, front box-plate 2, cover-plate 3, back-wall 4, the shipper 5, Fig. 1, knock-off lever 6 therefor, and the main por-

tion of the frog 7 may be and are all substantially of well known or usual construction. A suitable binder 8 pivotally and adjustably mounted near its outer end on the lay at 9 preferably has its inner end provided with a metallic shoe 10, which is movable in and out across the top of a boss or guide 11 fixedly mounted on the lay at the back, and having an upright hole 12, see dotted lines Figs. 1, 3, 4 and 5. The guide is so positioned with relation to the binder that when the latter is forced outward by a properly boxed shuttle the shoe 10 covers the upper end of the hole, see Figs. 2 and 4, but if the shuttle fails to box properly the hole 12 will be left uncovered by the shoe, as in Fig. 5, as the lay moves forward.

Any suitable pressure producing means for the binder may be used, and herein I have shown a bracket 13 fast on the lay carrying a threaded stud 14 provided with an annular shoulder 15, Fig. 2, against which rests one end of a spring 16, the other end being positioned on a lug 17 on the binder. By setting the screw-stud 14 in or out the binder pressure is increased or decreased, as required, and the adjustment maintained by a check-nut 18, a depending guard 19 on the cover-plate overhanging the binder and preventing undue outward movement thereof when the shuttle impinges upon the binder.

The protection shaft 20 is mounted in suitable bearings on the lay and has an attached dagger 21, said shaft in practice having at each end a rearwardly extended arm 22 pivotally connected with the lower end of an up-turned link 23, constituting a controller, the upper straight end of the controller slidably entering the hole 12 in the guide 11. A suitable spring 24, fixed at one end and at its other end adjustably attached to the shaft, serves to lift the link 23 when it is free to rise and depress the point of the dagger 21 to cooperate with the shoulder 25 of the frog when the loom is to be stopped owing to the shuttle failing to box.

The frog is provided with a riser 27 and a dwell or support 26, which cooperates at times with a follower 28 adjustably mounted on the dagger at 29, as will now be explained.

Let it be assumed that the loom has been stopped by the action of the protector mechanism and is to be started again, the parts being in position substantially as indicated by Fig. 5. As the lay moves back, the follower 28 rides up the riser 27, lifts the dagger, and lowers the link 23, so that when the shuttle is picked, the binder will be moved outward by the incoming shuttle as it is boxed and the shoe 10 will cover the opening or hole 12 above the end of the controller 23, thus maintaining the dagger in raised or inoperative position as the lay moves forward to "beat up". As the lay again moves to the rear, the shoe 10 continues to cover the opening or hole 12 above the controller until

the shuttle is picked, which takes place when the lay has carried the dagger to position the follower 28 above the dwell or support 26 of the frog. Thus as the shuttle moves through the shed and the hole 12 is uncovered by the inward movement of the binder, the dagger is still held in its inoperative or raised position by the follower riding over the dwell or support 26, and when the shuttle passes into the box on the other side, the shoe 10 of that binder moves over the hole or opening 12 on that end of the lay, and, as the lay moves forward, prevents the controller 23 on that end of the lay from rising, thus the dagger continues to be held in its raised or inoperative position so long as the loom continues in normal working condition. It is to be noted that the dagger is not raised and lowered on each round of lay movement, as heretofore, but under normal working condition when the shuttle is properly boxed on each pick, the dagger remains in its raised or inoperative position, and is only lowered or moved from that position when a shuttle fails to box. For instance, assume that during the working of the loom as above outlined, the shuttle failed to box or properly enter its shuttle box, thereby endangering "a smash". Such action would take place as the lay moves forward from its back position, and the shoe 10 would fail to cover the hole 12 above the controller 23, so that as the follower moves from the dwell or support 26, the dagger would drop into operative position, Fig. 5, under the action of its spring 24 and "knock off" or stop the loom. On starting the loom again, the follower 28 lifts the dagger into its inoperative position as the lay moves back, and the dagger continues to be held in this raised or inoperative position, as hereinbefore pointed out, so long as the shuttle continues to be properly boxed.

It will be perfectly evident that the usual inward or outward adjustment of the binder by adjustment of its pivot 9, or the tightening or loosening of the binder spring 16, will not have the slightest effect upon the protection mechanism, but will operate entirely upon or through the binder to vary the checking action upon the incoming shuttle, and conversely the effective strength of the spring 24 has no effect upon the checking action. In other words, the binder performs the functions of a binder, while the protection mechanism performs its own functions, but at a certain point in the forward stroke of the lay one or the other binder assumes control of the said mechanism through its cooperation with the corresponding controller 23. Whether the checking action be heavy or light, or the outward movement of the binder be slightly more or less, according to circumstances, proper boxing of the shuttle will always move the binder outward far enough for the shoe to act upon the con-

troller, the shoe being made of metal to prevent undue wear. If, however, the shuttle is improperly boxed, the controller is left free to move far enough to permit operative positioning of the dagger to effect loom stoppage.

The mechanism is very simple, its operation is smooth and automatic, the dagger is not lowered or moved from its inoperative position except when required to stop the loom, and after the protection mechanism is once properly set no subsequent adjustment thereof is required, no matter how often or in what way the action of either or both of the binders is varied by necessary adjustments.

My invention is not restricted to the precise construction and arrangement herein shown which is an illustration of one practical embodiment of my invention, and those skilled in the art may make various modifications without departing from the spirit and scope of my invention as set forth in the following claims.

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

1. In a loom, the combination of a lay, a shuttle-box disposed at each end of the lay, a dagger carried by the lay, and means including a spring actuated binder carried by the shuttle-box to maintain the dagger normally in fixed inoperative position during the entire lay movement.

2. In a loom, the combination of a lay, a shuttle-box disposed at each end of the lay and provided with a spring actuated binder, a dagger carried by the lay, means tending normally to move the dagger into operative position, and means including the binder acting throughout the lay movement during normal working condition of the loom to restrain the dagger from any movement responsive to its actuating means.

3. In a loom, the combination of a lay, a shuttle-box disposed at each end of the lay and provided with a spring actuated binder, a dagger carried by the lay, means tending to move the dagger into operative position, means other than the binders for moving the dagger into inoperative position, and means controlled by the binders for holding the dagger from movement towards operative position when the shuttle is properly boxed.

4. In a loom, the combination of a lay, a shuttle-box disposed at each end of the lay and having a binder, a dagger carried by the lay, means to maintain the dagger in its inoperative position during the flight of the shuttle from one box to the other, and means controlled by the binders for preventing any movement of the dagger towards operative position when the shuttle is properly boxed.

5. In a loom, the combination of a lay, a shuttle box at each end of the lay provided with a binder, a dagger mounted on the lay,

means normally tending to move the dagger into operative position, and means including a part on the shuttle box, to prevent rising or falling movement of the dagger during lay movement when a shuttle is properly boxed.

6. In a loom, the combination of a lay having a shuttle-box, a binder therefor, a binder spring, means to vary the action of the binder upon the shuttle, a dagger mounted on the lay, and means to effect a uniform fixed inoperative positioning of the dagger throughout lay movement independent of variations in the checking action of the binder upon the shuttle.

7. In a loom, the combination of a lay having a shuttle-box and shuttle checking means, a dagger mounted upon the lay, and means including a part on the shuttle box to effect a uniform control of said dagger during the entire lay movement and fixed positioning irrespective of variable action of the shuttle checking means.

8. In a loom, a lay having a shuttle-box, a binder to check the incoming shuttle, and an adjustable binder-spring, combined with protection mechanism, including a dagger, a device independent of the binder to inoperatively position the dagger during a portion of the forward stroke of the lay, and means governed by the binder independently of variations in its checking action to retain the dagger without movement in its inoperative position during the completion of the forward stroke of the lay when the shuttle is properly boxed, whereby adjustment of the binder action has no effect on the operation of the protection mechanism.

9. In a loom, protection mechanism including a dagger, means to normally hold said dagger from movement towards operative position during the entire cycle of lay movement, and means including a spring controlled binder to effect operative positioning of the dagger when the shuttle is properly boxed.

10. In a loom, a lay having a shuttle-box, a binder therefor, and adjustable pressure-producing means for the binder, combined with protection mechanism for the loom including a dagger carried by the lay, and means to effect uniform control of said dagger by or through the binder to prevent movement of the dagger towards operative position upon proper boxing of the shuttle irrespective of variations in the adjustment of the binder.

11. In a loom, a lay having a shuttle-box, an adjustable spring controlled binder therefor, protection mechanism for the loom, means independent of the binder to render said mechanism inoperative prior to the entrance of the shuttle into the box, and means governed by the binder to cooperate with and retain said protection mechanism in a fixed inoperative position when the shuttle is properly boxed.

12. In a loom, a lay having a shuttle-box, a binder therefor, means to vary the pressure of the binder upon the shuttle, protector mechanism including a dagger carried by the lay, and means independent of variations in binder movement due to variation of binder pressure for controlling operative and inoperative positioning of the dagger.

13. In a loom, a lay, protection mechanism, including a rock-shaft carried by the lay and having an attached dagger, a frog with which the dagger cooperates to effect loom stoppage, means independent of the binder to move the dagger to inoperative position for a fixed part of each forward stroke of the lay, a spring cooperating with the rock-shaft to operatively position the dagger, shuttle-checking means, and a controller operatively connected with the rock-shaft and cooperating with the shuttle-checking means whenever the shuttle is properly boxed, to retain the dagger without movement in its inoperative position during the remainder of the forward stroke of the lay.

14. The combination, with a lay having a shuttle-box, a binder therefor, and an adjustable binder-spring, of protection mechanism for the loom, a controller operatively connected therewith, a guide on the lay in which the controller is movable, the binder moving across the guide and acting as a detent for the controller whenever the shuttle is properly boxed, and means to act upon the protection mechanism and render it inoperative prior to boxing of the shuttle, thereby retracting the controller out of the binder path, the binder uncovering the guide and permitting return movement of the controller if the shuttle is improperly boxed, to thereby enable the protection mechanism to effect loom stoppage.

15. The combination, with a lay having a shuttle-box, a binder, and means to vary the action thereof upon an incoming shuttle, of protection mechanism for the loom including a dagger, means to inoperatively position said mechanism when the shuttle is picked, and a controller retracted by such positioning of the protection mechanism, outward movement of the binder by a properly boxed shuttle maintaining the controller retracted and the dagger in fixed inoperative position thereby preventing the operation of the protection mechanism to stop the loom.

16. In a loom, a lay, an adjustable binder to cooperate with and check the flight of a shuttle, protection mechanism including a dagger on the lay adapted to effect stoppage of the loom, and means acting in conjunction with the binder to maintain said mechanism inoperative, and the dagger in fixed position irrespective of binder adjustment, when the shuttle is properly boxed.

17. In a loom, in combination, adjustable shuttle-checking means, protection mechanism-

ism for the loom, means to render said mechanism inoperative as the shuttle is picked, and other means governed by the checking means to retain said protection mechanism in fixed inoperative position with respect to the lay when the shuttle is properly boxed both said means coacting to maintain the protection mechanism inoperative throughout lay movement.

18. In a loom, in combination, shuttle checking means, protection mechanism for the loom, means to render said mechanism inoperative as the shuttle is picked, and a controlling member operatively connected with and moved into predetermined position by the protection mechanism when the latter is rendered inoperative, the checking means cooperating with said controlling member and maintaining it in such predetermined fixed position only when the shuttle is properly boxed.

19. In a loom, protection mechanism including a dagger, and a controlling member movable automatically into and out of operative position upon similar movements of the dagger, combined with means to inoperatively position the dagger at a predetermined point on each pick, and shuttle checking means to cooperate with said controlling member and retain it and the dagger in a fixed inoperative position relative to the lay only when the shuttle is properly boxed.

20. In a loom, protection mechanism including a dagger, and a spring to operatively position it, a controller operatively connected with said mechanism and moved into and out of operative position as the dagger is moved into and out of operative position, and means to inoperatively position said controller and dagger on each pick, combined with a shuttle binder, and an adjustable pressure-producing spring cooperating therewith, outward movement of the binder by a properly boxed shuttle effecting cooperation between the binder and controller to retain the latter, and thereby the dagger, in their inoperative positions without movement relative to the lay as the pick is completed.

21. In a loom, a lay having a shuttle-box, and shuttle-checking means, combined with protection mechanism for the loom including a dagger, and means to effect uniform control of said mechanism during the entire forward and backward movement of the lay by or through the checking means irrespective of variable action of the latter to maintain the dagger from movement towards operative position.

22. In a loom, in combination, shuttle-checking means, protection mechanism for the loom, means to render said mechanism inoperative prior to the entrance of the shuttle into the box, and other means governed by the checking means to co-

operate with and retain said protection mechanism inoperative without movement when the shuttle is properly boxed.

23. In a loom, a lay having a shuttle-box, and a binder, combined with protection mechanism, including a dagger, means to inoperatively position the dagger prior to the entrance of the shuttle into the shuttle-box, and separate means governed through the binder to retain the dagger without movement inoperatively positioned when the shuttle is boxed properly.

24. In a loom, a lay having a shuttle-box, and a binder cooperating therewith, combined with protection mechanism including a dagger and a frog, means to lift the dagger above the frog prior to the entrance of the shuttle into the shuttle-box and separate means rendered operative by cooperation of the binder and shuttle to retain the dagger in fixed lifted position when the shuttle is properly boxed.

25. In a loom, the combination of a lay, a shuttle-box disposed at each end thereof and provided with a binder, a dagger carried by the lay, means to maintain the dagger without movement in its inoperative position during the flight of the shuttle from one box to the other, and other means to continue the dagger in its inoperative position when the shuttle is properly boxed, such other means including controlling members moved out of the binder paths by inoperative positioning of the dagger, proper boxing of the shuttle disposing a binder across the adjacent controlling member and acting through it to retain the dagger inoperatively positioned until the shuttle is picked.

26. In a loom, the combination of a lay having a shuttle-box, a binder therefor, a binder spring, a dagger mounted on the lay, a spring to operatively position the dagger, means to maintain the dagger inoperative and without movement during the flight of the shuttle, and other means to continue the dagger in inoperative position when the shuttle is properly boxed, such other means including a controlling member movable into and out of the binder path and retracted therefrom by the first mentioned means, proper boxing of the shuttle moving the binder over the end of and retaining the controlling member retracted to continue the dagger in inoperative position until the shuttle is picked, whereby the dagger and binder springs are prevented from working against each other.

27. In a loom, the combination of a lay having a shuttle-box, a binder therefor, a binder spring, a dagger mounted on the lay, a spring to operatively position the dagger, means to maintain the dagger inoperative and without movement during the flight of the shuttle, and other means to continue the dagger in inoperative position when the

shuttle is properly boxed, such other means including a member to cooperate with the binder and retain the dagger inoperatively positioned while preventing the dagger and binder springs from acting against each other.

In testimony whereof I have signed my

name to this specification in the presence of two subscribing witnesses.

JONAS NORTHROP.

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