

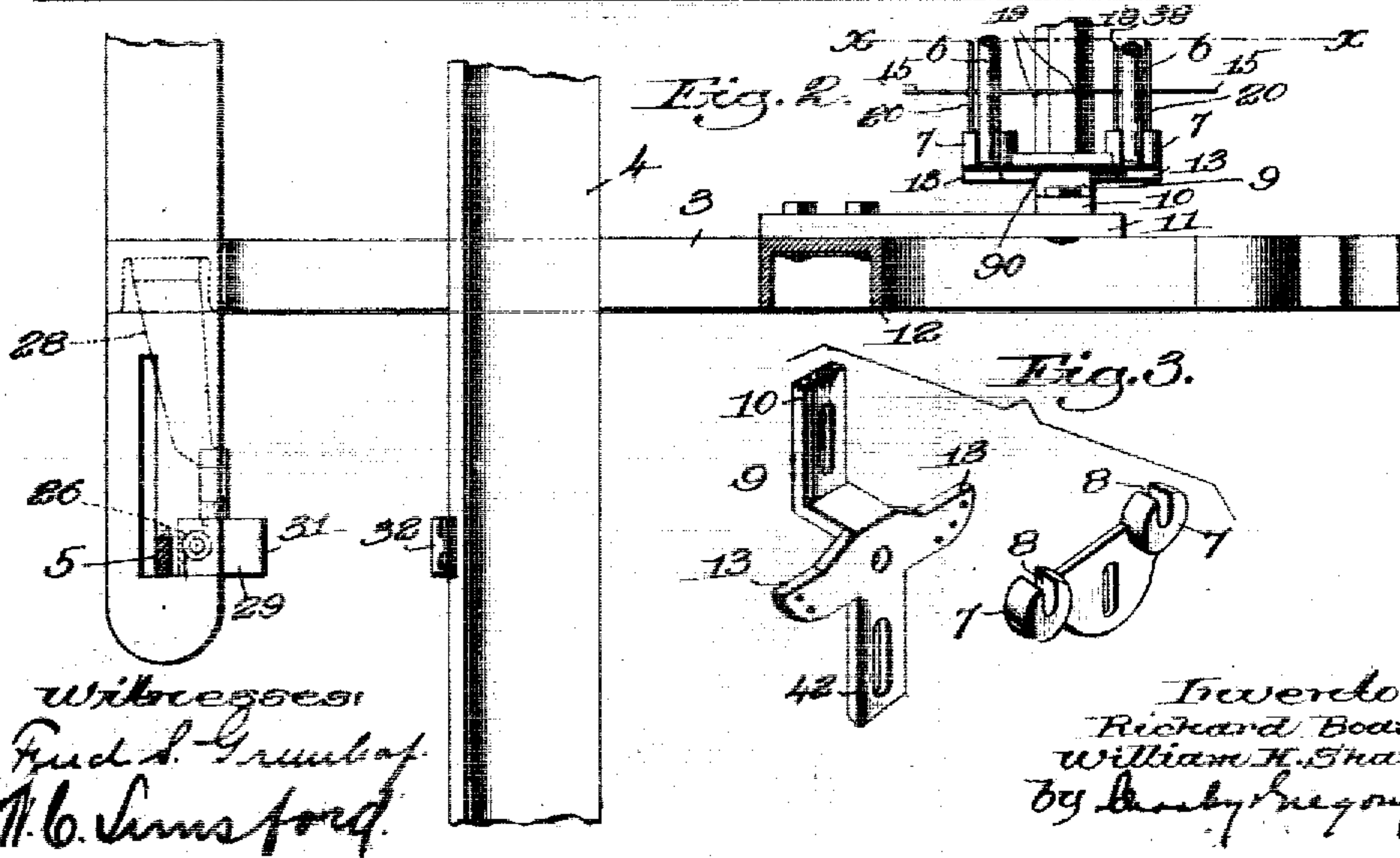
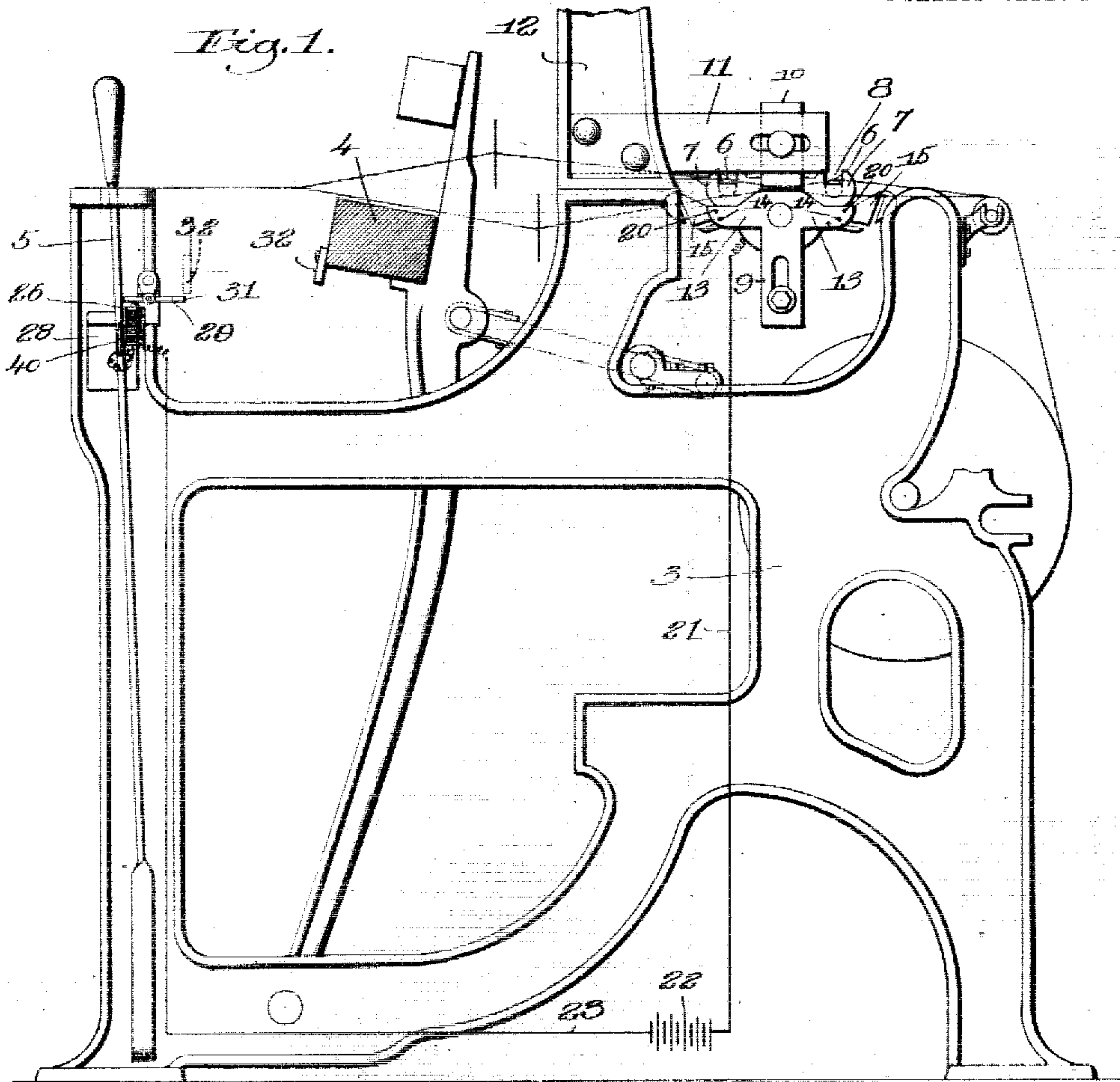
No. 815,789.

PATENTED MAR. 20, 1906.

R. BOARDMAN & W. H. SHARPLES.
ELECTRICAL WARP STOP MOTION.

APPLICATION FILED MAY 14, 1904.

2 SHEETS—SHEET 1



Witnesses:
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Inventors,
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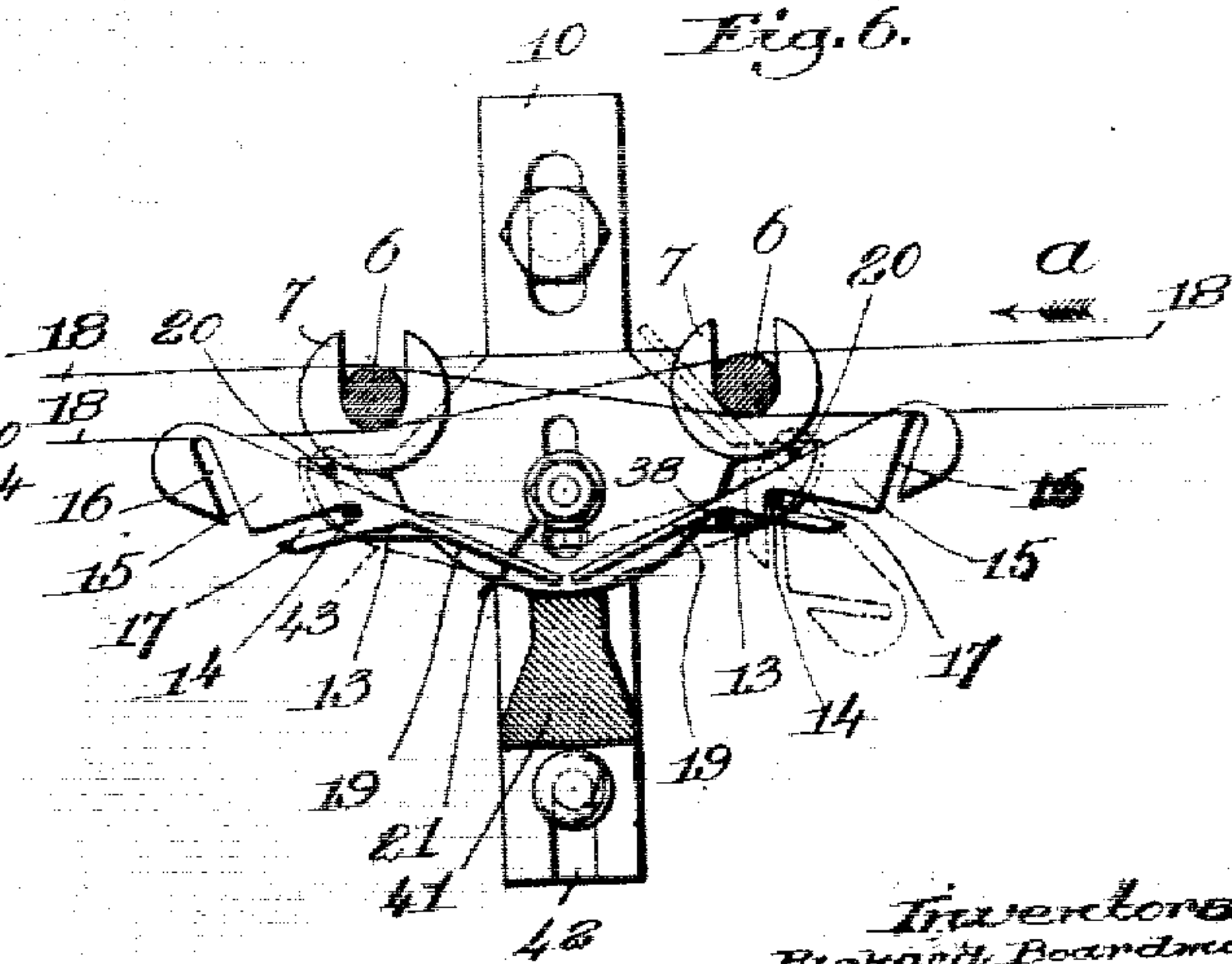
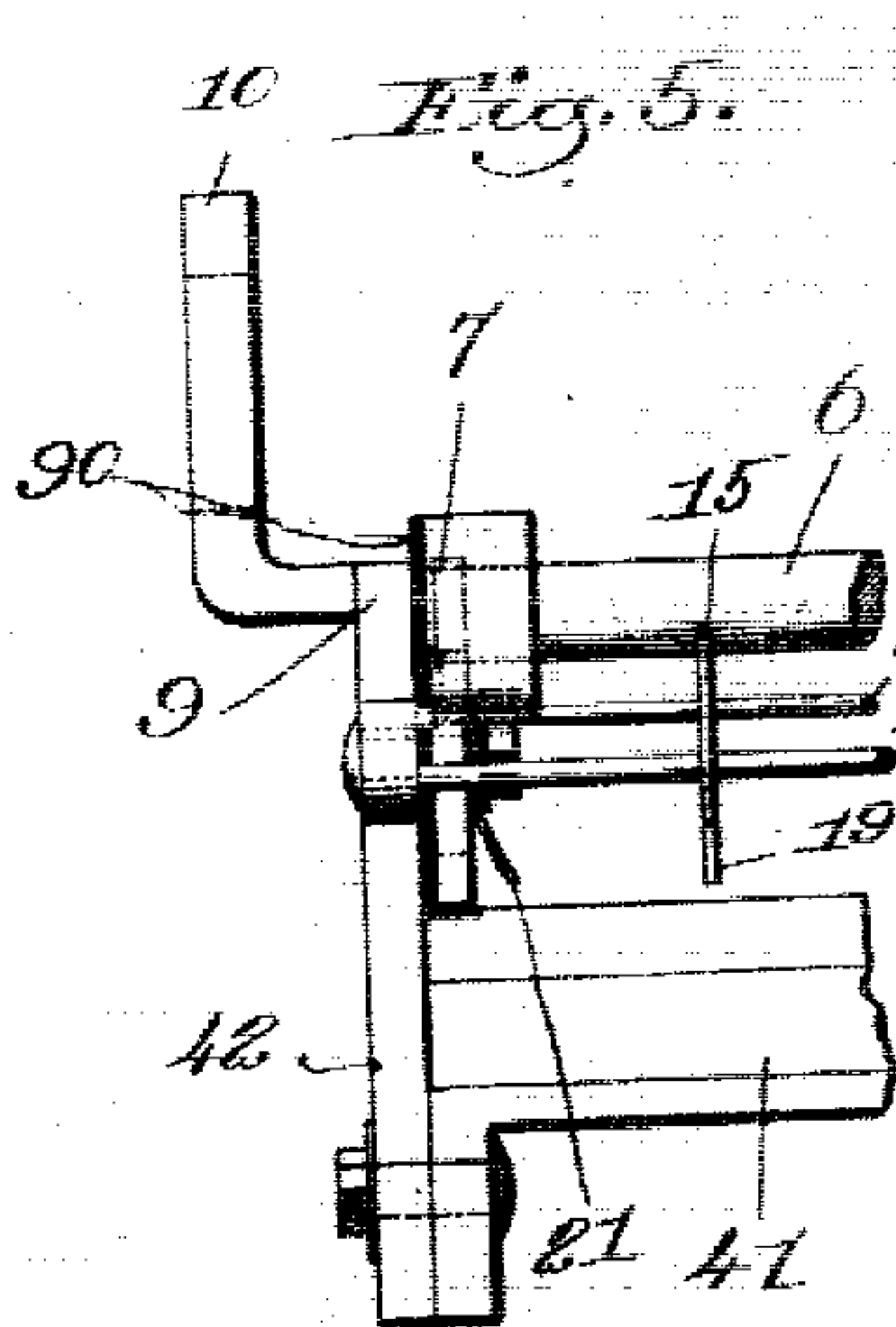
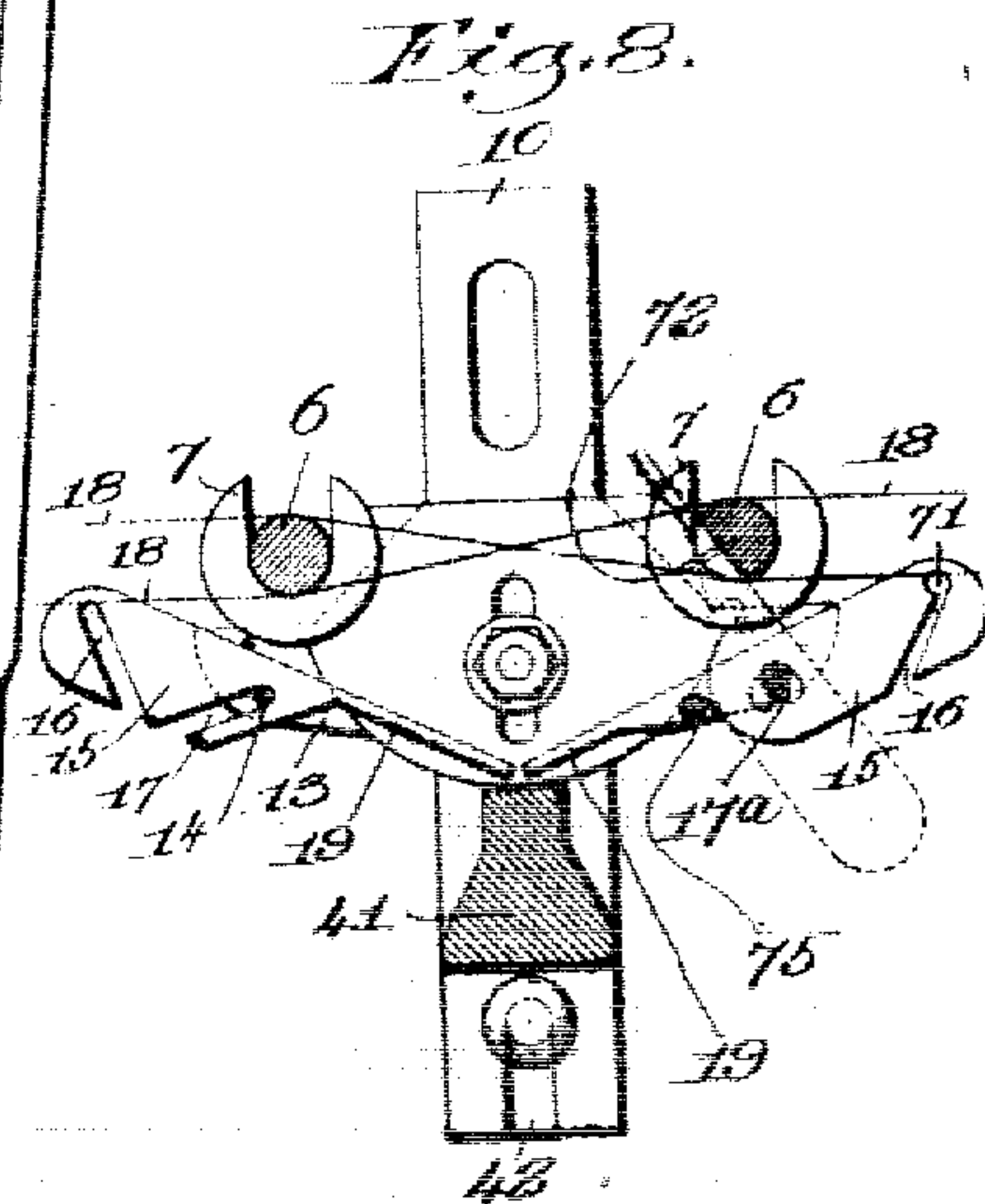
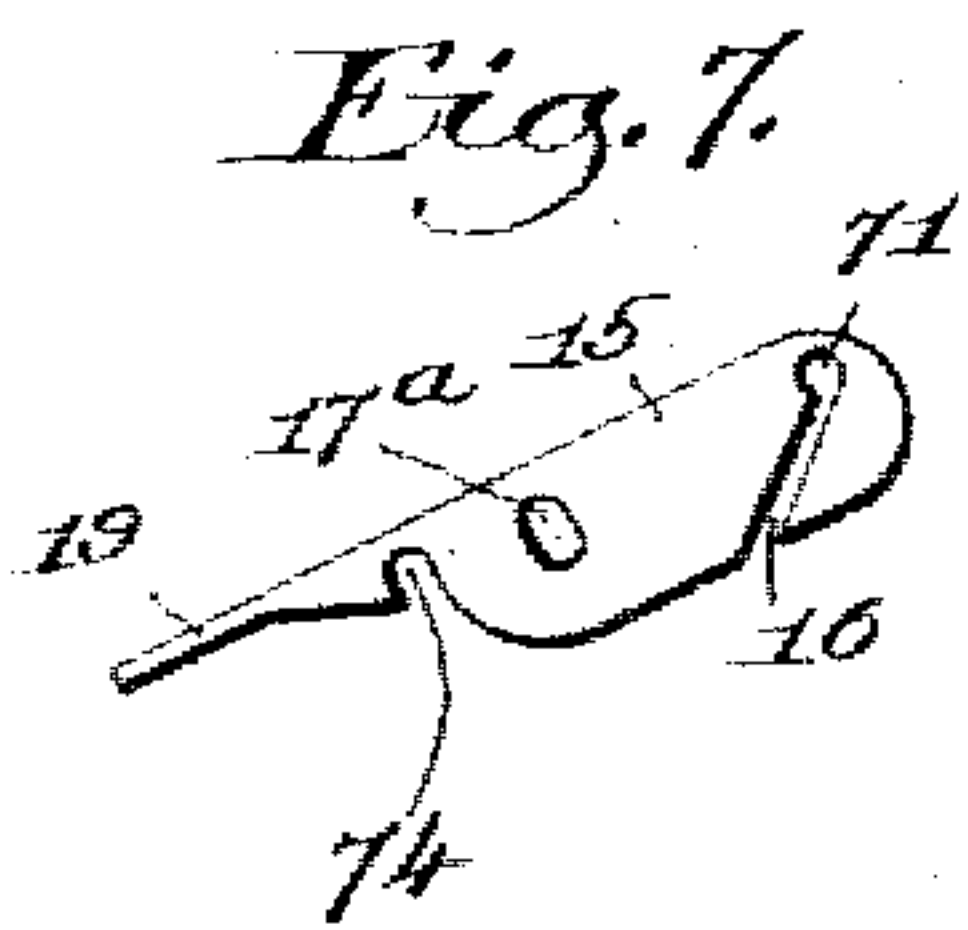
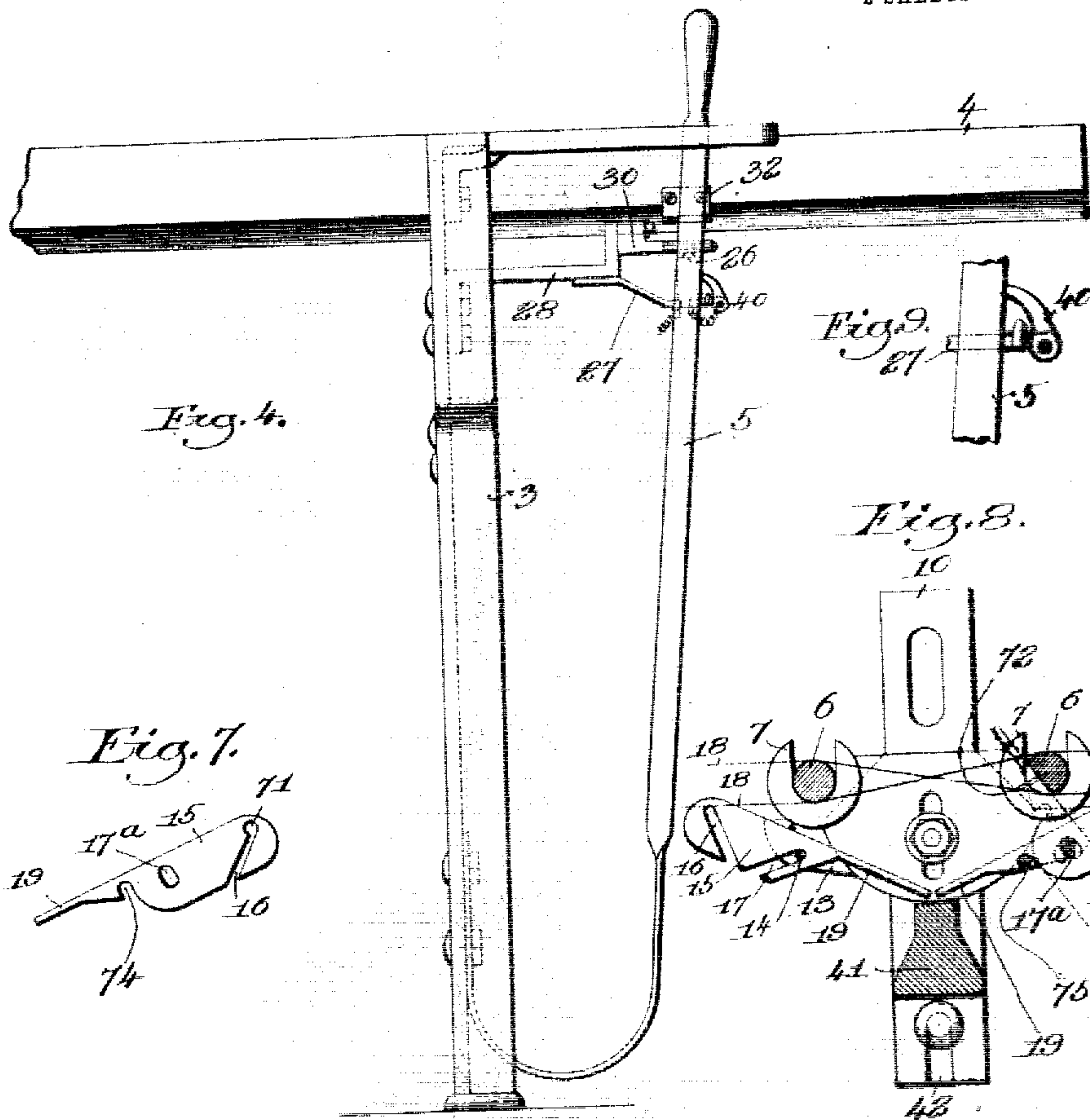
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APPLICATION FILED MAY 14, 1904.

2 SHEETS-SHEET 2.



Witnesses:
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UNITED STATES PATENT OFFICE.

RICHARD BOARDMAN, OF TIVERTON, RHODE ISLAND, AND WILLIAM H. SHARPLES, OF FALL RIVER, MASSACHUSETTS.

ELECTRICAL WARP STOP-MOTION.

No. 816,789.

Specification of Letters Patent.

Patented March 20, 1906.

Application filed May 14, 1904. Serial No. 207,996.

To all whom it may concern:

Be it known that we, RICHARD BOARDMAN, residing at Tiverton, county of Newport, State of Rhode Island, and WILLIAM H. SHARPLES, residing at Fall River, county of Bristol, State of Massachusetts, citizens of the United States, have invented an Improvement in Electrical Warp Stop-Motions, of which the following description, in connection with the accompanying drawings, is a specification, like figures on the drawings representing like parts.

This invention relates to electrical warp stop-motions, and has for its object to simplify devices of this class and to make their operations more effective and sure.

In accordance with our invention we use the lease-rods of the loom as the contact rods or terminals of a circuit including the stop mechanism, said lease-rods being insulated from the loom-frame, and employ pivoted circuit-closers which are electrically connected with the loom-frame and are supported by the lower plane of warp-threads and pivoted beneath the said lease-rods in such a way that when any warp-thread breaks the heavy end of the corresponding circuit-closer falls and its tail is brought into contact with one of the lease-rods, thereby closing the circuit and stopping the loom. The circuit-closers are of special construction, each one having an elongated tail which is normally below the warp-threads, but which swings up above the said threads when the circuit-closer falls into abnormal position, thereby indicating to the loom attendant just where the broken thread is located.

Other features of our invention will be more particularly hereinafter described and then pointed out in the claims.

In the drawings, Figure 1 is a side view of a loom having our improved warp stop device applied thereto. Fig. 2 is a plan view. Fig. 3 is a detail view showing in perspective the separate parts of the supports for the lease-rods, guard-rods, and circuit-closer-supporting rod. Fig. 4 is a front view of a portion of the loom, showing part of the stop mechanism. Fig. 5 is a detail view showing the manner of supporting the lease-rods and circuit-closing devices. Fig. 6 is a section on the line x x, Fig. 2. Fig. 7 shows a modified form of circuit-closer. Fig. 8 shows such a circuit-closer

in operation, and Fig. 9 is a detail hereinafter referred to.

3 designates the loom-frame, 4 the lay, and 5 the shipper-lever. These parts may be of any suitable or usual construction.

6 designates the lease-rods of the loom, which divide the warp into two levels, as usual. In our invention we make these lease-rods of metal and insulate them from the loom-frame in order to permit us to use them as the contact rods or terminals of an electric circuit. As herein shown, said rods are supported at their ends in insulated brackets 7, which preferably have the open slots 8, in which the lease-rods may be removably sustained. Each bracket 7 is supported by a second bracket 9, which in turn is suitably secured to some portion of the loom-frame, preferably the arch thereof, said bracket 7 being insulated from its bracket 9 by suitable insulating material 90. As illustrated in the drawings, each bracket 9 has the upwardly-extending arm 10, which is secured to a supporting-arm 11, shaped at one end to be bolted to the arch 12 of the loom. Preferably the arms 11 and 10 will both be slotted so that the bracket 9 may be adjusted both vertically and longitudinally. Said brackets 9 are each provided with the wings or arm portions 13, and extending across from each wing or arm 13 of one bracket to the corresponding arm of the other bracket is a circuit-closer-supporting rod 14, said rods forming the supports to which the circuit-closers 15 are pivotally mounted.

We have herein shown in Figs. 6 and 7 two different forms of circuit-closers. In Fig. 6 each circuit-closer has two open inclined slots 16 and 17, which extend inwardly from the same side of the circuit-closer and preferably diverge from each other. The slot 16 at the outer end of the circuit-closer is the one in which the warp-thread 18 enters, and the other slot 17 receives the supporting-rod 14. We may use this form of circuit-closer at both the front and rear banks, or we may use the form of circuit-closer shown in Fig. 7 at the rear bank, as shown in Fig. 8. In Fig. 7 the circuit-closer has the open slot 16 at its outer or heavy end, which slot terminates in an eye 71, through which the warp-thread 18 passes, and the closed slot 17, through which the supporting-rod 14 passes. The reason

for making the circuit-closers of the forms herein shown will be referred to later. The circuit-closers are hung on the lower plane or level of the warp-threads, and their point of suspension is outside of the lease-rods, as plainly shown in Fig. 6. Said circuit-closers are therefore entirely below the lease-rods and the warp-threads and are situated outside of the lease-rods, where there is more room for them to work without danger of chafing adjacent threads. Each circuit-closer is provided with a tail portion 19, which serves two purposes—first, as a means for contacting with one of the lease-rods 6, and thus closing the circuit when a warp-thread breaks, and, second, as an indicator to indicate to the operator the location of the broken thread, as will be more fully hereinafter described.

One of the brackets 7 is connected by a suitable wire 21 and with a battery 22 or other source of electrical energy, and said battery is connected by another suitable wire 23 with an electromagnet 26, forming part of the mechanism which coöperates with the shipper to stop the loom. The stop mechanism which we have herein illustrated comprises the magnet 26, supported by an arm 27 of a suitable bracket 28, carried by the loom-frame, and a tappet 29, which is controlled by the magnet and which operates to disengage the shipper-lever from its locking-notch when the circuit is closed by the breaking of a warp-thread. We prefer to pivotally mount the tappet 29 upon the same bracket which supports the magnet, and for this purpose have formed said bracket with a second arm 30, on which the tappet is pivotally mounted. The tappet is in the vertical plane of the shipper-lever, and when said lever is in its notch one end of the tappet is adjacent the lever. The tappet is so balanced and poised that normally its outer end 31 stands below the plane of a suitable bunter 32, carried by the lay, so that as the lay beats up said bunter 32 passes over the end 31 of the tappet, as shown in dotted lines, Fig. 1. The opposite end of the tappet is over the magnet 26 and acts as the armature of said magnet, so that when the magnet is energized the tappet is rocked and its free end 31 thrown up into position to be struck by the bunter 32 as the lay beats up. When this occurs, the tappet is forced against the lever and the latter disengaged from its notch, thus stopping the loom.

In making the circuit connections in our improved device we connect one of the brackets 7, and thus the ordinary lease-rods 6, which, it will be remembered, are insulated from the loom-frame, to the battery or other source of electrical supply by means of the wire 21 and connect said battery with the

coils of the magnet by means of the wire 23. From the magnet the circuit is completed through the loom-frame and the circuit-closers, the latter being supported by the brackets 9, which are connected directly to the loom-frame, and are therefore electrically connected with said frame, but insulated from the lease-rods 6 so long as the warps remain unbroken.

The operation of our device will be apparent from the above description, and, briefly stated, is as follows: So long as the warp-threads remain intact the circuit-closers 15 are held in the full-line position, Fig. 6. Whenever a warp-thread breaks, however, the corresponding circuit-closer swings into its abnormal position, as shown in dotted lines, Fig. 6, (said circuit-closer being so constructed that its outer end is heaviest,) and its tail 19 is brought up against the side of the corresponding lease-rod or contact-rod, thus closing the circuit and causing the magnet 26 to be energized. As soon as this occurs the tappet 29 is thrown into its operative position by the magnet, and upon the next forward movement of the lay the shipper-lever is disengaged from its notch. The tails 19 of the circuit-closers are purposely made longer than is necessary to contact with the lease-rods, so that when any one has swung into abnormal position its tail is thrown up above the level of the warp-threads, thus furnishing an indicator, which locates the place where the break has occurred.

We have also provided means in connection with our warp stop mechanism whereby the circuit is broken as soon as the shipper-lever is thrown out of its notch, thereby saving the energy of the battery or other source of electrical supply after the loom has been stopped. We accomplish this by connecting the wire 23, leading from the magnet 26, to a gravity-finger 40, which is pivoted on a stud and carried by but insulated from the bracket 28 and which lies against the shipper-lever 5 when the latter is in its locking-notch; as shown in Fig. 9. With this construction the circuit is closed by the finger 40 when the shipper-lever is in its locking-notch, but as soon as the lever has been disengaged from the notch the circuit is broken at this place. We prefer the gravity-actuated finger 40 rather than a spring-finger, because the latter is very apt to get bent, so that it will not contact with the shipper-lever when the latter is in its locking-notch. The gravity-actuated finger is free from this objection and the closing of the circuit is always insured at this point when the shipper is in operative position.

41 designates a brace which extends across between the lower branches 42 of the brackets 9 and is adjustably connected thereto. Said

brace carries arms 43, (see dotted lines, Fig. 6,) through which the supporting-rods pass and which serve to sustain said rods intermediate their ends and hold them in proper position.

In Fig. 6 the arrow *a* designates the direction in which the warp-threads are drawn from the loom-beam, and the circuit-closers at the right of said figure constitute, therefore, the rear bank of circuit-closers, while those at the left constitute the front bank. To prevent the circuit-closers from being thrown off from the supporting-rods 14 by the up-and-down movement of the warp-threads, due to the shedding motion, we prefer to employ guard-rods 20, which extend across above the circuit-closers and are carried by the wings 13 of the brackets 9. The forward movement of the warp-threads in the direction of the arrow *a*, Fig. 6, will by their friction with the circuit-closers of both banks tend to draw the circuit-closers forwardly or in the direction of said arrow, and upon referring to said figure it will be seen that any forward movement of the circuit-closers of the front bank will tend to seat them more firmly on their supporting-rod 14, while the same movement of the circuit-closers of the rear bank will tend to disconnect them from their supporting-rod. To prevent any of the rear bank of circuit-closers from thus becoming disconnected from the supporting-rod 14, we prefer to use the additional guard-rod 38 beneath said circuit-closers, which, together with the guard 20, prevents said circuit-closers from being drawn off from the rod-14. It is unnecessary to employ a guard-rod 38 for the circuit-closers of the front bank, although such rod may be used, if desired.

In Fig. 7 we have illustrated a slightly different form of circuit-closer, which can be used at the rear bank, said circuit-closers being constructed so that they cannot become dislodged from the supporting-rod 14. In this form of circuit-closer the slot 17^a, in which the supporting-rod 14 is received, is a closed slot, so that after the circuit-closers are threaded onto said rod it will be impossible for them to be dislodged. The form of circuit-closer shown in Fig. 7 has the supplemental positioning-notch 74, which is utilized while the circuit-closers are being applied to the loom. During such operation the circuit-closers are hung over the warp-threads 18, and the notch 74 of each circuit-closer is dropped onto a positioning-rod 75, said rod thus operating to correctly position all of the circuit-closers and bring the slots 17^a thereof into alignment, so that the supporting-rod 14 may be inserted through said aligned slots.

If desired, the lease-rods may be made

with the flattened portion 72, as shown in Fig. 8, against which the tail of the circuit-closer contacts, thus making a more extended contact-surface than is possible where the lease-rod is round.

There are several points about our method of supporting the circuit-closers to which we desire to call attention. It will be noted that the circuit-closers are located entirely below the warp-threads and are supported by the lower level thereof outside of the lease-rods, and the pivotal points of the circuit-closers are such with relation to the lease-rods that when the circuit is closed the tail of the circuit-closer contacts with the side of the lease-rod which is free from any lint. The circuit-closers are placed below the warp-threads and are suspended on the lower planes or levels thereof, and are therefore entirely out of the way of the loom attendant and do not interfere in any way with the ordinary operation of the loom. Said circuit-closers, however, are so constructed that whenever a defect occurs in any warp-thread the corresponding circuit-closer swings into abnormal position and not only stops the loom, but of itself indicates the point where the break has occurred, thus materially saving the time of the attendant in repairing the defect. The circuit-closers are suspended from the warp-threads on the outside of the lease-rods. This is of material advantage, because of the comparative ease with which the circuit-closers can be applied to the warp-threads. Where the circuit-closers are supported on the warp-threads between the lease-rods, the space in which the operator can work in putting the circuit-closers into position is very much restricted, while where said circuit-closers are supported outside of the lease-rods their application to the warp-threads is greatly facilitated. The position of the slots 16, 17, and 17^a in the circuit-closers and the position of the circuit-closers with relation to the lease-rods are such that each circuit-closer has to fall a considerable distance before its tail is brought into contact with the lease-rod and the circuit is closed. This construction obviates the possibility of the circuit being closed when any warp-thread becomes slackened somewhat, but not broken.

Another important point in our invention which we desire to emphasize is that the ordinary lease-rods of the loom are used as the terminals of the circuit including the loom-stopping mechanism, and therefore no special contact-rod separate from the lease-rods has to be employed to cooperate with the circuit-closers. The device is such that it can be applied to any ordinary loom by simply removing the lease-rods and placing suitable metal lease-rods (which constitute contact-rods) in the brackets 7, which brack-

ets are suitably supported from the loom-frame. The lease-rods 6 therefore have two functions—first, the usual functions of a lease-rod, and, second, the function of a contact-rod terminal of a controlling-circuit.

While we have shown herein one embodiment of our invention, we do not wish to be limited to the exact form and arrangement of the parts shown, as these may be varied in many ways without departing in any way from the invention, which is pointed out in the appended claims.

Having described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. In a loom, a lease-rod insulated from the loom-frame, said rod forming one terminal of an electric circuit which includes loom-stopping mechanism, a circuit-closer-supporting rod beneath the lease-rod, said supporting-rod also being in said circuit, and a plurality of circuit-closers pivotally mounted on said rod, each circuit-closer having an open slot in which a warp-thread is received, and an extension which is adapted to be brought into contact with the lease-rod when said circuit-closer assumes its abnormal position by the breaking of the warp-thread.

2. In a loom, a lease-rod insulated from the loom-frame, a controlling-circuit including a loom-stopping mechanism, said lease-rod forming one terminal of said circuit, a rod extending across the loom beneath said lease-rod, said rod being in said circuit, and a plurality of circuit-closers pivotally mounted on the rod, each circuit-closer being held in normal position by a warp-thread and having an extension which is adapted to contact with the lease-rod when the circuit-closer swings into abnormal position.

3. In a loom, a lease-rod insulated from the loom-frame, said rod forming one terminal of an electric circuit which includes loom-stopping mechanism, a circuit-closer-supporting rod beneath the lease-rod, said supporting-rod also being in said circuit, and a plurality of circuit-closers pivotally mounted on said rod, each circuit-closer having an open slot in which a warp-thread is received, and an extension which is adapted to be brought into contact with the lease-rod when said circuit-closer assumes its abnormal position by the breaking of the warp-thread, said extension being of such a length that it projects above the warp-threads and thus acts as an indicator whenever the circuit-closer is in abnormal position.

4. In a loom, a lease-rod insulated from the loom-frame, a controlling-circuit including a loom-stopping mechanism, said lease-rod forming one terminal of said circuit, a rod extending across the loom beneath said lease-rod, said rod being in said circuit, and a plurality of circuit-closers pivotally mounted

on the rod, each circuit-closer being held in normal position by a warp-thread and having an extension which is adapted to contact with the lease-rod when the circuit-closer swings into abnormal position, said extension being of such a length that it projects above the warp-threads and thus acts as an indicator whenever the circuit-closer is in abnormal position.

5. In a warp stop-motion, a contact-rod insulated from the loom-frame and located in the plane of the warp-threads, said rod forming one terminal of a controlling-circuit, and a plurality of circuit-closers beneath said rod and warp-threads, each circuit-closer being held in normal position by a warp-thread and having an extension to engage the contact-rod when in abnormal position, said extension being of a length to project above the warp-threads when the circuit-closer is in such position.

6. In an electric warp stop-motion, a contact-rod insulated from the loom-frame and supported in the plane of the warp, said contact-rod forming a terminal of a controlling-circuit, a supporting-rod beneath the contact-rod, said supporting-rod also being in said circuit, a plurality of circuit-closers beneath the warp-threads and pivotally mounted on said supporting-rod, each circuit-closer being held in normal position by a warp-thread and having an extension which is brought into engagement with the contact-rod when the circuit-closer is in abnormal position, such extension being of a length to project above the warp-threads and therefore act as an indicator when the circuit-closer is in said abnormal position.

7. In a loom, a pair of brackets supported by and insulated from the loom-frame, said brackets having open slots, lease-rods removably supported in said open slots, said lease-rods dividing the warp-threads into two levels and forming terminals of a controlling-circuit including loom-stopping mechanism, supporting-rods extending across the frame beneath the warps, circuit-closers pivotally mounted on said supporting-rods and coacting with the lease-rods to close the circuit and thus stop the loom whenever a warp-thread breaks.

8. A circuit-closer for electric warp stop-motions, said closer having at one end an open inclined slot leading from one side thereof, an indicating extension at the other end, and an oppositely-inclined slot between said extension and first-named slot.

9. A circuit-closer for electric warp stop-motions, said circuit-closer having at one end an open inclined slot to receive a warp-thread, an indicating extension at the other end, and a supporting-rod-receiving slot between the thread-receiving slot and extension.

10. A circuit-closer for electric warp stop-

motions having two diverging open slots leading from the same side of the circuit-closer and an extension at one end.

11. In an electric warp stop-motion, a contact-rod insulated from the loom-frame and forming the terminal of a controlling-circuit, a plurality of circuit-closers cooperating with said rod, each circuit-closer having at one end an open thread-receiving slot, and a supporting-rod-receiving slot, a supporting-rod beneath the contact-rod and on which said circuit-closers are pivotally supported, and guard-rods above the circuit-closers to prevent the latter from being thrown off from their supporting-rod.

12. In an electric warp stop-motion for looms, a bracket adapted to be secured to the loom-frame at each side thereof, a supporting-rod extending across the loom and supported by said brackets, a lease-rod also supported by said brackets but insulated therefrom, said lease-rod being above the supporting-rod and forming one terminal of a controlling-circuit, and a plurality of circuit-closers pivotally mounted on the supporting-rod beneath the warps, said circuit-closers coacting with the lease-rod to close the circuit when the warp-thread breaks.

13. In an electric warp stop-motion for looms, a bracket adapted to be secured to the loom-frame at each side thereof, a supporting-rod extending across the loom and supported by said brackets, a lease-rod removably supported by said brackets but insulated therefrom, said lease-rod being above the supporting-rod and forming one terminal of a controlling-circuit, and a plurality of circuit-closers pivotally mounted on the supporting-rod beneath the warps, said circuit-closers coacting with the lease-rod to close the circuit when the warp-thread breaks.

14. In an electric warp stop-motion for looms, a bracket adapted to be secured to the loom-frame at each side thereof, a supporting-rod extending across the loom and supported by said brackets, a lease-rod supporting bracket adjustably secured to but insulated from each of said first-named brackets, lease-rods supported by the lease-rod-supporting brackets, said lease-rods forming the terminals of a controlling-circuit, and a plurality of circuit-closers pivotally mounted on the supporting-rods and coacting with the lease-rods to close the circuit when any warp-thread breaks.

15. In a loom, a lease-rod insulated from the loom-frame and forming one terminal of an electric circuit which includes loom-stopping mechanism, a pivotally-mounted circuit-closer beneath the lease-rod, said circuit-closer being in said circuit and supported in normal position out of contact with the lease-rod by a warp-thread.

16. In a loom, a loom-frame, a lease-rod

supported thereby but insulated therefrom, an electric circuit including said lease-rod, loom-stopping mechanism operated by the closing of said circuit, and a circuit-closer held in normal position out of contact with the lease-rod by a warp-thread.

17. In a loom, a pair of lease-rods insulated from the loom-frame and forming one terminal of an electric circuit which includes loom-stopping mechanism, a plurality of pivotally-mounted circuit-closers beneath each lease-rod, said circuit-closers being in said circuit and supported on the lower plane of the warp-thread outside of the lease-rods.

18. In a loom, a loom-frame, a pair of lease-rods supported thereby but insulated therefrom, an electric circuit including said lease-rods, loom-stopping mechanism operated by the closing of said circuit, and a plurality of circuit-closers beneath each lease-rod and held out of contact therewith by the warp-threads, the point of suspension of said circuit-closers being outside of the lease-rods.

19. In a loom, a pair of metallic lease-rods supported by but insulated from the loom-frame and forming one terminal of an electric circuit, said lease-rods dividing the warp-threads in two planes or levels, and a plurality of circuit-closers beneath each lease-rod, each circuit-closer having an open slot in which a warp-thread is received, said circuit-closers being supported on the lower plane of warp-threads at points outside of the lease-rod.

20. In a loom, a lease-rod insulated from the loom-frame and forming one terminal of an electric circuit which includes loom-stopping mechanism, a pivotally-mounted circuit-closer beneath said lease-rod and supported in normal position by a warp-thread, said lease-rod being flattened whereby when the circuit-closer drops into abnormal position, it engages the flattened portion of said rod.

21. In a loom, a contact-rod insulated from the loom-frame and forming the terminal of a controlling-circuit, a supporting-rod beneath the contact-rod, a plurality of circuit-closers pivotally mounted on said supporting-rod, guard-rods, and means to support the supporting-rods and guard-rods intermediate their ends.

22. In an electric warp stop-motion for looms, a bracket adapted to be secured to the loom-frame at each side thereof, a supporting-rod extending across the loom and supported by said brackets, a lease-rod also supported by said brackets but insulated therefrom, said lease-rod forming one terminal of a controlling-circuit, a plurality of circuit-closers pivotally mounted on the supporting-rod, a brace extending between said brackets and arms carried by the brace and sustaining the supporting-rod intermediate its ends.

23. In a loom, a lease-rod insulated from the loom-frame, a circuit-closer normally held out of contact from said lease-rod by a warp-thread, a controlling-circuit including
5 said lease-rod and circuit-closer combined with a loom-stopping mechanism comprising a bracket secured to the loom-frame, a tappet pivotally mounted to said bracket adjacent the shipper-lever, and a magnet also carried
10 by said bracket, said magnet being in said circuit and when energized throwing the tap-

pet from its inoperative to its operative position, and a bunter carried by the lay to strike the tappet when it is in its operative position.

In testimony whereof we have signed our 15 names to this specification in the presence of two subscribing witnesses.

RICHARD BOARDMAN.

WILLIAM H. SHARPLES.

Witnesses:

GEORGE HARTLEY,

AQUILLA E. HEALEY.