

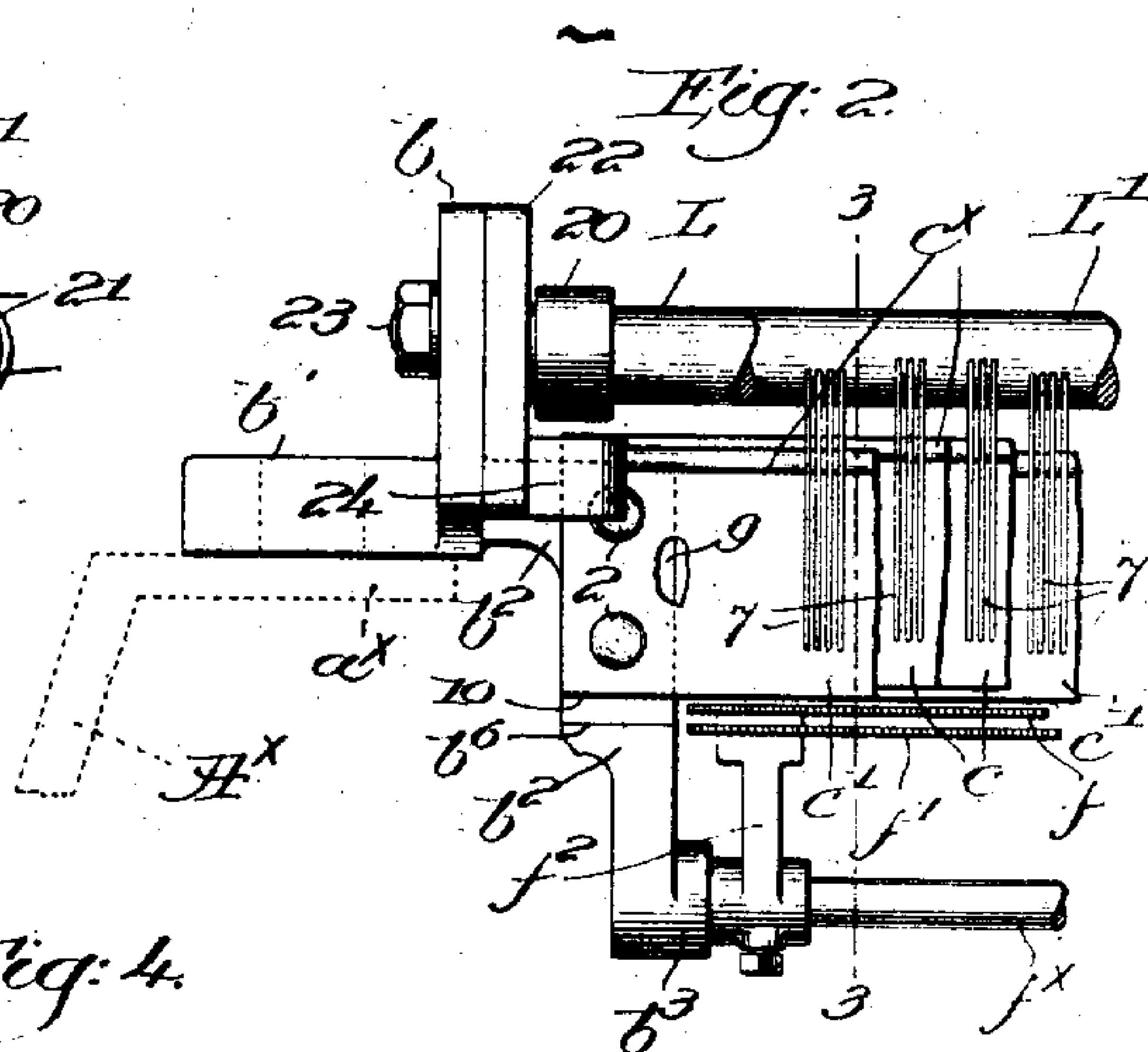
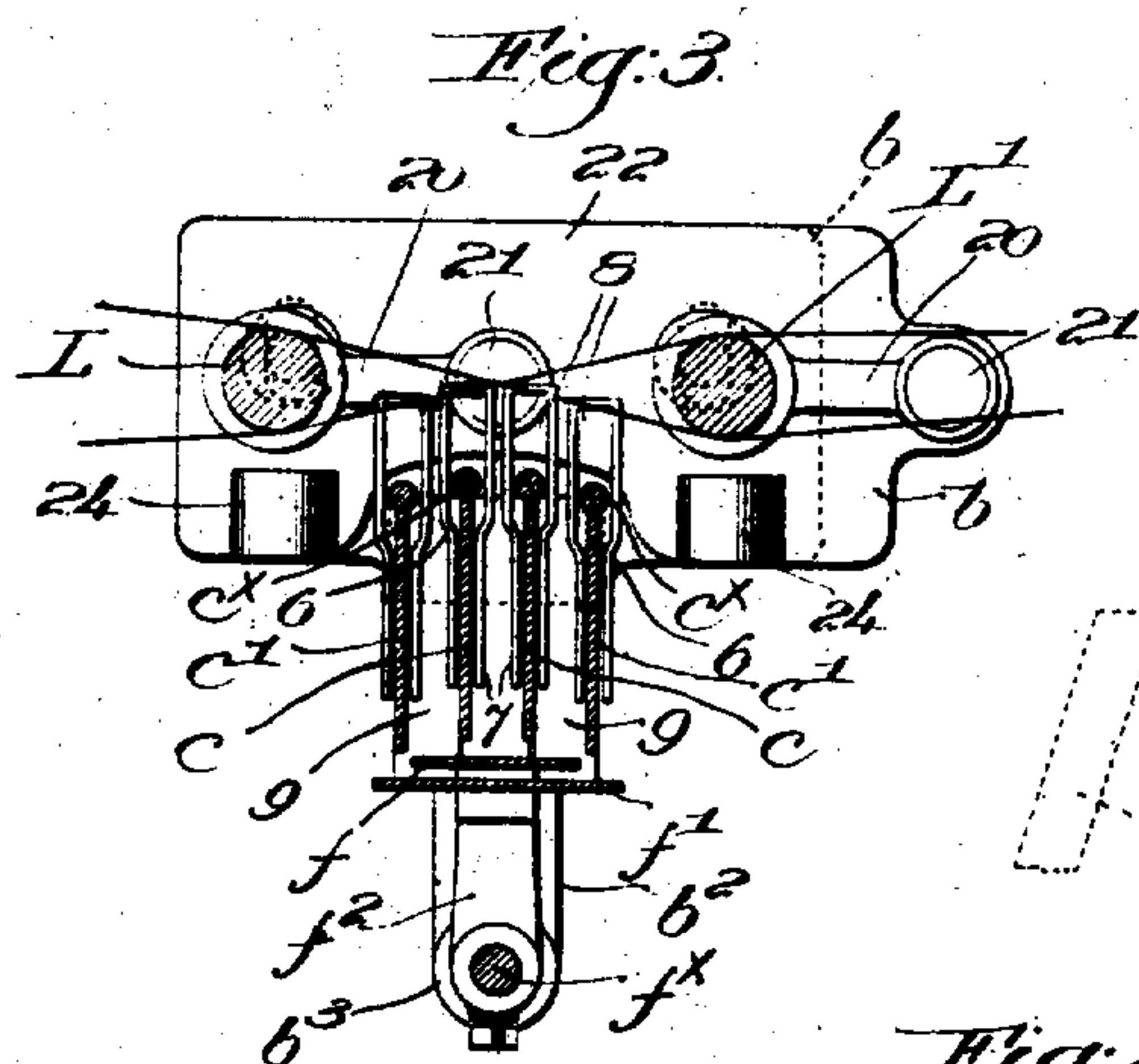
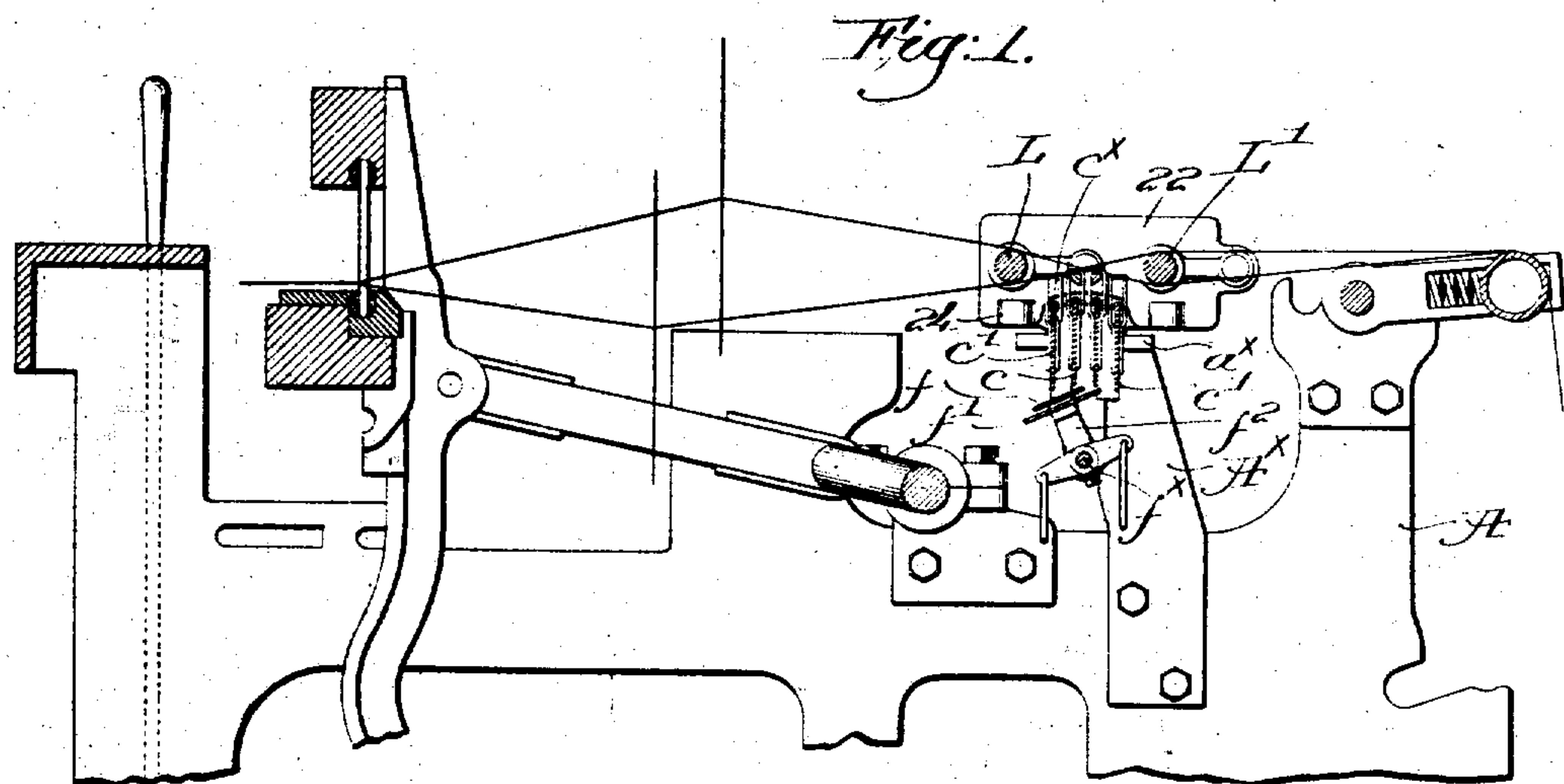
**No. 889,808.**

PATENTED JUNE 2, 1908.

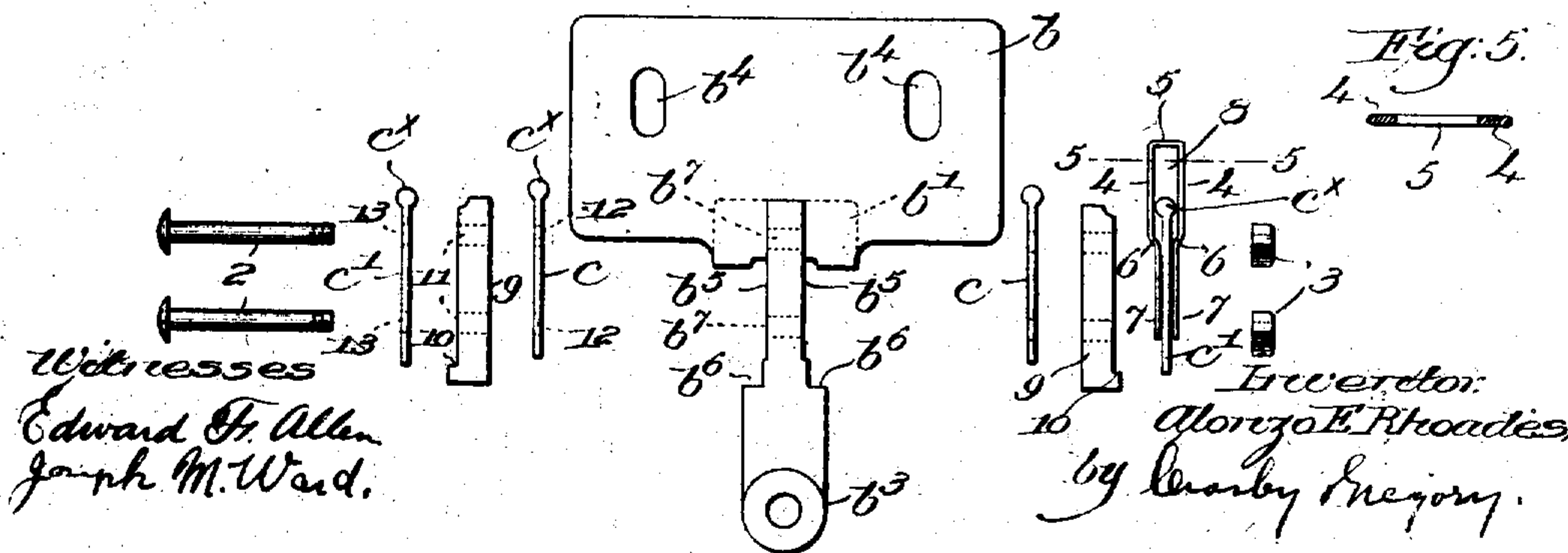
A. E. RHOADES.

## WARP STOP MOTION FOR LOOMS.

APPLICATION FILED AUG. 13, 1907.



*Fig: 4.*



Witnesses  
Edward F. Allen  
Joseph M. Ward.

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# UNITED STATES PATENT OFFICE.

ALONZO E. RHOADES, OF HOPEDALE, MASSACHUSETTS, ASSIGNOR TO DRAPER COMPANY, OF HOPEDALE, MASSACHUSETTS, A CORPORATION OF MAINE.

## WARP STOP-MOTION FOR LOOMS.

No. 889,808.

Specification of Letters Patent.

Patented June 2, 1908.

Application filed August 13, 1907. Serial No. 388,320.

*To all whom it may concern:*

Be it known that I, ALONZO E. RHOADES, a citizen of the United States, and resident of Hopedale, county of Worcester, State of Massachusetts, have invented an Improvement in Warp Stop-Motions for Looms, of which the following description, in connection with the accompanying drawing, is a specification, like letters on the drawing representing like parts.

This invention has for its object the production of a novel and efficient warp stop-motion for looms, whereby the operation is improved, and jumping of the detectors from the warp-threads obviated in a simple manner.

In my present invention the detectors are suspended each from a single warp-thread, said detectors being arranged in a plurality of banks or series, and herein I have shown them as cooperating with the warp-threads between the lease-rods.

Broadly speaking the detectors, which also form a part of this invention, are of the so-called "hair-pin" type, being so constructed that they may be dropped onto the warp-threads, which they straddle and by which they are suspended in inoperative position so long as the threads are intact.

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 transverse sectional view of a sufficient part of a loom, with a warp stop-motion applied thereto embodying one form of my invention; Fig. 2 is an enlarged front elevation of a portion of the mechanism illustrated in Fig. 1, taken at one side of the loom; Fig. 3 is a cross-sectional view thereof on the line 3—3, Fig. 2, looking toward the left; Fig. 4 is an inner side elevation of one of the stands upon which the major part of the stop-motion is mounted, with the separate parts shown adjacent thereto but moved away from each other; Fig. 5 is a cross-section, enlarged, of one of the detectors on the line 5—5, Fig. 4.

Referring to Fig. 1 the loom-sides A, have each erected thereon an upright standard  $A^x$  provided with an inturned flattened head  $a^x$ , Fig. 2, of usual construction, and upon each standard is bolted a stand, shown in side elevation in Fig. 4 and in front elevation Fig. 2.

Each stand is made as a casting and comprises an upright, broad and plate-like head  $b$ , a rearward extension or foot  $b'$  (which in practice rests upon and is bolted to the head  $a^x$  of the adjacent standard  $A^x$ ) and a depending extension  $b^2$  provided at its lower end with an inturned tubular bearing  $b^3$ . Upright slots  $b^4$  are formed in the head  $b$  for a purpose to be described.

The front and rear faces of the extension  $b^2$  are each stepped to form vertical seats  $b^5$ , and below the seats are horizontal shoulders  $b^6$ , as clearly shown in Fig. 4. Bolt-receiving openings  $b^7$  are made in said extension through which are passed bolts 2 which, by means of nuts 3 securely clamp in place the detector-supports and spacers, to be referred to.

I have herein shown the detectors of the hair-pin type, and I prefer to make them of wire, of circular cross-section, said detectors after being bent or formed to shape being flattened by pressure to bring the flat faces of the wire into the parallel planes of the opposite faces of the detector. This is shown in Fig. 5, the inner and outer edges of the wire being rounded, as shown, the convexity of the inner edge reducing to a minimum any abrading effect upon the warp-threads and decreasing the friction, while the flattening of the opposite faces decreases the thickness through of a detector and enables a large number to be assembled side by side without crowding.

As best shown in Fig. 4 at the right each detector comprises parallel sides 4, connected at their upper ends at 5, and bent inward to form opposite interior shoulders 6 between the top and bottom of the detector, the lower portions 7 of the sides being also parallel, but nearer together. Each detector thus presents a wide longitudinal warp-receiving opening 8 in its upper portion, and a narrower entrance leading thereto from the bottom of the detector between the parts 7, 7 of the sides, the shoulders 6 being located at the bottom of the opening 8. These detectors are arranged in a plurality of banks or series, each detector straddling and being suspended from a single warp-thread, and all between the lease-rods L, L'.

Upon the opposite seats  $b^5$  of the extensions  $b^2$  of the two stands I place detector supports  $c$ ,  $c$ , shown herein as relatively thin



plates, in practice made of metal, of such thickness as to easily pass between the portions 7 of the detector sides, and herein the top edge of each support is enlarged at  $c^x$ , to form a limiting stop, the width of the stop being greater than the normal width of the entrance to the warp-receiving opening 8 of a detector.

When the detectors are dropped upon the warp-threads they are pushed down upon the supports until the shoulders 6 pass below the stops  $c^x$ , the detector sides temporarily spreading for the purpose. Thereafter the detectors hang suspended from the threads, Figs. 1 and 3, and are freely movable up and down on the supports for a limited distance, upward movement being determined by the stops  $c^x$ .

Any tendency of a detector to jump up and off of its particular thread, either during the weaving operation or when the weaver is picking out, is obviated, for when the shoulders 6 are brought against the stop  $c^x$  the further upward movement ceases.

Herein I have shown two banks of detectors in the front of the crossing point of the warps and two banks at the rear thereof, Figs. 1 and 3, the supports  $c, c$ , serving for the two inner banks, and similar supports  $c'$ ;  $c'$  are provided for the two outer banks, also enlarged at their upper edges, at  $c^x$ , as explained.

To provide the requisite distance between the supports  $c$  and  $c'$  I use spacers 9, which are pieces of metal each having a horizontal shoulder 10 on its outer face, the spacers being placed against the faces of the supports  $c, c$ , and resting at their lower ends on the shoulders  $b^0$  of the extensions  $b^2$ .

The outer detector-supports  $c', c'$  are placed against the seats formed by the outer faces and the shoulders 10 of the spacers, and the bolts 2 are then applied, two of such bolts at each end of the supports, to firmly clamp all of the parts together. Each spacer is apertured at 11, see dotted lines Fig. 4, and the supports  $c$  are correspondingly apertured at 12, while registering apertures 13 are made in the supports  $c'$ .

It will be noticed that the apertures 13 are nearer the upper edges of the supports  $c'$  than are the apertures 12 in the supports  $c$ , which is to compensate for the slightly higher positioning of the latter supports upon the stands, this being necessary to bring the several supports into proper relation to the inclination of the warp-threads, as shown in Fig. 3.

Referring to Figs. 2 and 3 it will be seen that the lower edges of the supports  $c, c$  are in the same horizontal plane, and the lower edges of supports  $c', c'$  in a somewhat lower plane. This arrangement is provided so that the feeler device can properly cooperate with a released detector of any series, it being understood that the supports rigidly connect

the two stands and extend across the loom, with clear spaces between the supports except where the spacers 9 are interposed.

A rock-shaft  $f^x$  is mounted in the opposite bearings  $b^3$  and has secured to it arms  $f^2$ , one only being herein shown, to which arms the feeler is attached, the feeler herein being duplex and consisting of upper and lower metal plates  $f, f'$  the lower plate being wider than the upper one.

The duplex feeler is in practice normally vibrated by any suitable mechanism usual in warp-stop-motions of this general type, such for instance as is shown in United States Patent to Stimpson, No. 673824, granted May 7, 1901, and forming no part of this invention. The feeler member  $f$  moves in a curved path just clearing the bottoms of the supports  $c$ , and the member  $f'$  just clears the bottoms of the supports  $c'$ . Should a detector on one of the supports  $c$  be released it will drop and its lower end will cross the path of the feeler member  $f$ , arresting the feeler and effecting the stoppage of the loom. At such time the support serves as a back-stop to support the engaged detector close to the point of engagement with the feeler member, preventing any tendency to bend or distort the detector.

Should a detector on one of the supports  $c'$  be released its engagement by the feeler member  $f'$  would arrest feeler movement as before; and similarly the detector would be sustained against the feeler pressure.

By making the feeler duplex the amplitude of its vibrations is lessened, and a correct and accurate operation of the mechanism is attained.

The lease-rods  $L, L'$  are shown as supported at their ends by rocker-arms 20, two for each rod, said arms being fulcrumed at 21 on plates 22 which are connected to the heads  $b$  of the stands by bolts 23 extended through the slots  $b^4$ . When the bolts are loosened the plates 22 can be raised or lowered to adjust the height of the lease-rods, as such adjustment is desirable in producing different effects on the cloth being woven. Projections 24 on the plates 22 are arranged under the free ends of the rocker-arms, to limit descent of the lease-rods.

Various changes in details of construction and arrangement may be made by those skilled in the art without departing from the spirit and scope of my invention.

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

1. In a loom, in combination, a plurality of series of detectors, each detector being suspended from a single warp-thread and having opposite interior shoulders between its top and bottom, a support for and on which the detectors of each series are vertically movable, and an enlargement on each



support above the detector shoulders to limit upward movement of the detectors.

2. In a loom, in combination, a series of detectors each suspended from a single warp-thread and having a wide warp receiving opening and a narrower elongated entrance leading thereto longitudinally from the bottom of the detector, a fixed supporting bar on which the detectors are vertically movable, and a stop on the bar above the upper ends of the entrance openings of said detectors and of greater width than said entrance opening, to limit upward movement of the detectors.

3. In a loom, in combination, a series of detectors each suspended from a single warp-thread and formed of wire bent inward between the top and bottom of the detector to form opposite interior shoulders, leaving a wide opening at the top of the detector and a narrower elongated entrance thereto from its bottom, a fixed support on which the detectors are vertically slidable, and an enlargement on the support above the detector shoulders, to cooperate with the latter and limit upward movement of the detectors.

4. In a loom, in combination, a plurality of series of detectors, each detector being suspended from a single warp-thread and having opposite interior shoulders between its top and bottom, a support for and on which the detectors of each series are vertically movable, an enlarged head on the top of each support, to cooperate with the shoulders of and limit upward movement of a detector, and a normally vibrating feeler to engage a released detector, the bottom of the detector support extending close to the feeler path, to support the released detector adjacent the point of engagement by the feeler.

5. In a loom, in combination, a series of detectors each suspended from a single warp-thread and having a wide warp receiving opening and a narrower elongated entrance leading thereto longitudinally from the bottom of the detector, a fixed supporting bar on which the detectors are vertically movable, and an enlarged head on the top of the bar of greater cross-section than the width of the entrance openings in the detectors, said head cooperating with the lower ends of the warp receiving openings to limit upward movement of the detectors, the bar below the head extending through the entrance openings of the detectors.

6. In a loom having lease-rods, in combination, a plurality of series of detectors, each detector being suspended from a single warp-

thread between the lease-rods and having a longitudinal opening extended from the bottom of the detector upward and widened at its upper end, a normally vibrating, duplex feeler one member of which is adapted to engage a dropped detector of certain series and the other member to engage a dropped detector of the other series, fixed supports for the several series of detectors, and means on the supports to engage the bottom of the widened part of a detector opening to limit upward movement of the detector.

7. The combination, in a loom, of a plurality of series of detectors, each detector being suspended from a single warp-thread, a duplex, normally vibrating feeler, each member cooperating with a dropped detector in certain series and not in other series, supports on which the detectors are mounted and vertically movable, and means to limit upward movement of the detectors.

8. The combination, in a loom provided with lease-rods, of a plurality of banks of detectors in front of the crossing point of the warps and a plurality of banks behind it, each detector being suspended from a single warp-thread between the lease-rods, and having its sides intumed to form interior opposite shoulders below a wide warp receiving opening, a support for each series of detectors, having an enlargement to enter such opening above the shoulders, and a normally vibrating, duplex feeler, one member thereof cooperating with a released detector in the two inner series and the other member cooperating with a released detector in the two outer series.

9. In a loom, stands on opposite sides thereof, each stand having a depending extension provided at its lower end with a bearing, a feeler rock-shaft mounted in said bearings, a vertical seat on the front and rear of the extensions, a transverse detector-support carried by each seat, spacers adapted to bear against the ends of said supports and having each a vertical seat on its outer face, a detector-support carried by each of said seats, and bolts extended through each extension, the spacers and the detector-supports, to fixedly clamp all of said parts in position upon the standards.

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

ALONZO E. RHOADES.

Witnesses:

FRANK J. DUTCHER,  
J. L. REMINGTON, Jr.