

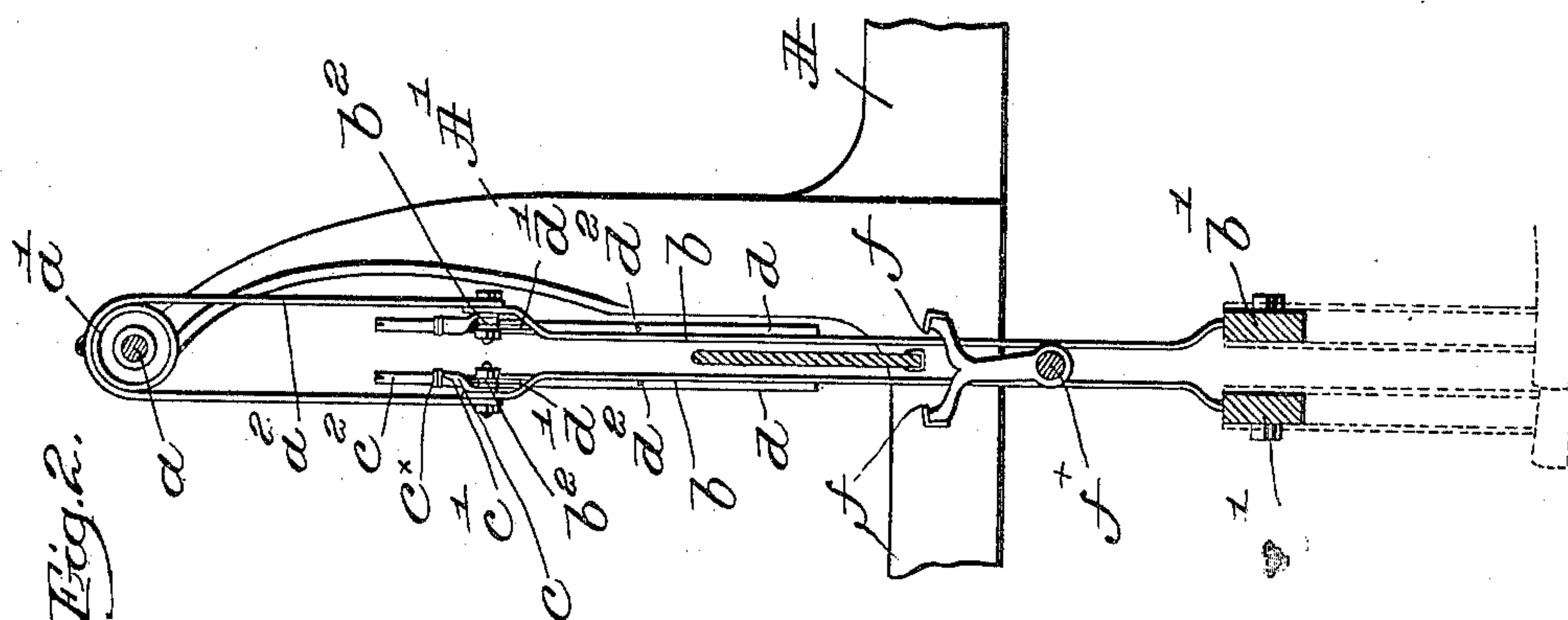
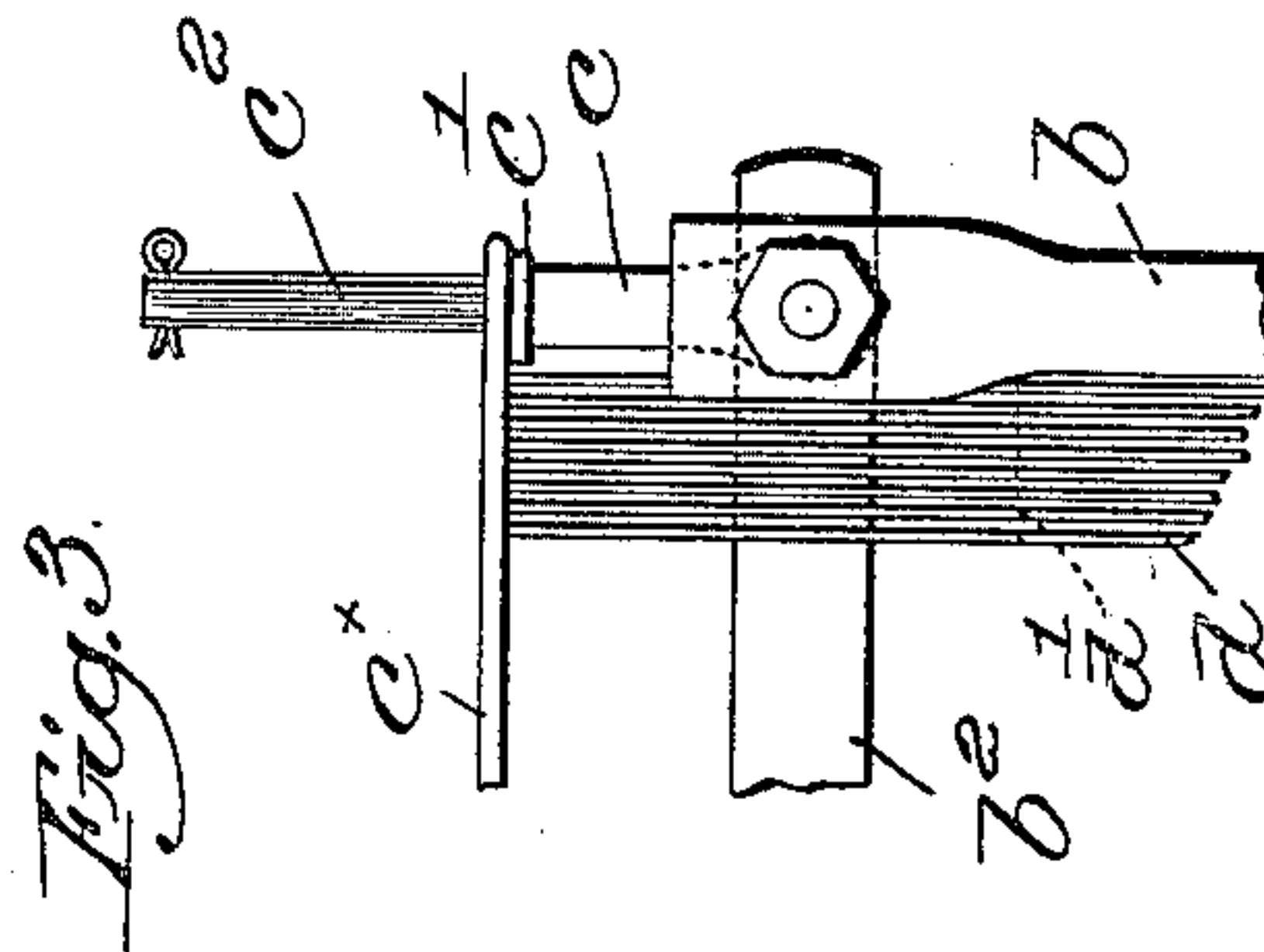
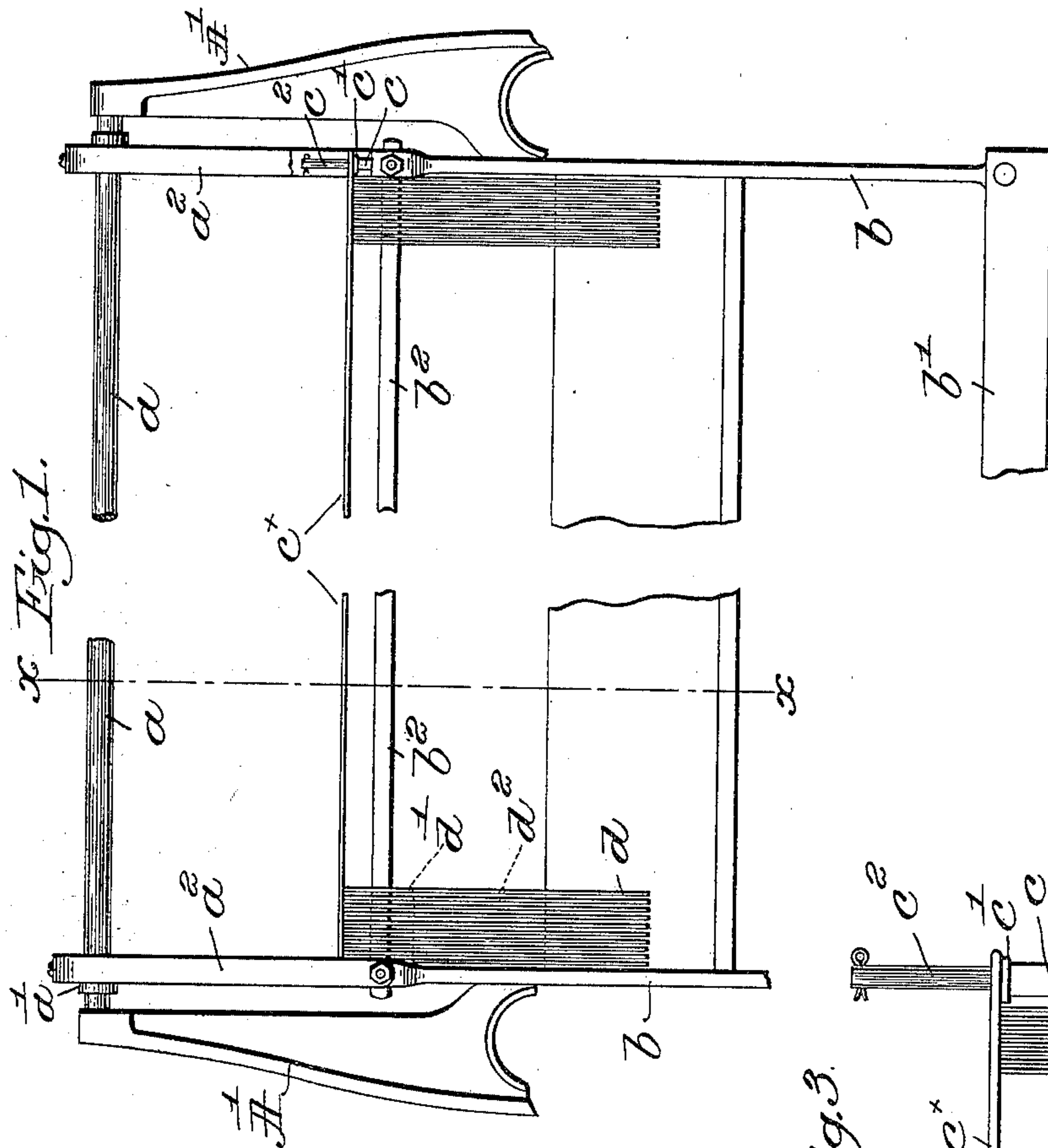
No. 622,462.

Patented Apr. 4, 1899.

J. A. GRAF.
WARP STOP MOTION FOR LOOMS.

(Application filed Nov. 4, 1898.)

(No Model.)



Witnesses:

Fred S. Grunke.

James M. Wigham.

Inventor:
Johann A. Graf.
by Lewis R. Gregory.
attys

UNITED STATES PATENT OFFICE.

JOHANN ADAM GRAF, OF MANCHESTER, NEW HAMPSHIRE.

WARP STOP-MOTION FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 622,462, dated April 4, 1899.

Application filed November 4, 1898. Serial No. 695,424. (No model.)

To all whom it may concern:

Be it known that I, JOHANN ADAM GRAF, of Manchester, county of Hillsborough, State of New Hampshire, have invented an Improvement in Warp Stop-Motions for Looms, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

In that type of warp-stop-motion mechanism for looms wherein the automatic stoppage of the loom is effected by or through the movement into abnormal position of one or more detectors the latter are controlled by and held normally in inoperative position by the unbroken and properly taut warp-threads. One form of such a stop-motion apparatus is shown in United States Patent No. 536,969, dated April 2, 1895, wherein each harness or heddle frame is provided with a series of thin flat sheet-metal detector-heddles having each a warp-eye and a longitudinal slot, a transverse bar of the frame passing through these slots. As is well known, the detector-heddles have a limited vertical movement independent of the heddle-frame owing to the slots being longer than the depth of the bar, so that upon breakage or undue slackening of a warp-thread its detector-heddle will drop into abnormal operative position to engage and stop the movement of a normally-vibrating feeler to thereby effect through suitable means the stoppage of the loom. In practice the detector-heddles are preferably made of hardened steel to secure combined light weight and strength and to resist the wear induced by the friction of the warp-threads passing through them. A very peculiar and objectionable feature results from the use of such detector-heddles—viz., their magnetization to a greater or less extent producing certain faults in the cloth unless corrected. Heretofore it has been necessary to remove the heddles and demagnetize them when the effect on the cloth due to magnetism manifests itself, a proceeding at once inconvenient, expensive, and productive of great loss of time in weaving.

When the heddles become magnetized, their movements become very irregular, so that some of those in the series will lag or drag behind their fellows as the frames are recip-

rocated to change the shed and the warp-threads of the lagging heddles will be subjected to greater tension than the other threads, so that the face of the cloth will present a wavy or irregular appearance due to the fact that the filling-threads are more tightly bound by some of the warp-threads than by others, and the value of the cloth varies correspondingly with the irregularity in appearance referred to.

My present invention has for its object the production of means for effecting the movement of the heddles in unison and in alignment at every stroke, whereby it is impossible for a heddle to lag and so subject its warp-thread to additional and improper tension either as the result of magnetization of the heddles or from any other cause.

By my invention I also reduce to a minimum the use of the demagnetizing operation.

Figure 1, in front elevation and centrally broken out, represents a sufficient portion of the warp-stop-motion mechanism of a loom to be understood with one embodiment of my invention applied thereto. Fig. 2 is a cross-sectional view of said mechanism on the line x , Fig. 1, looking toward the left; and Fig. 3 is an enlarged detail, to be referred to.

The stands A' , erected on the loom-frame A , the rock-shaft a , mounted in suitable bearings on said stands and provided with sheaves a' , the flexible connections or straps a^2 , connecting said sheaves with the harness-frames, comprising upright side bars b , bottom bars b' , and upper bars b^2 , the normally-vibrating feelers $f f$, and the rock-shaft f^x , on which they are mounted, may be and are all of well-known construction in the type of warp-stop-motion mechanism referred to.

On the upper bar b^2 of the harness-frame the series of metallic detectors d are strung, said bar passing through the longitudinal slots d' in the heddles, the latter being provided with warp-eyes d^2 , as usual.

In the present embodiment of my invention I have attached to the upper ends of the side bars b of the frames upright guides or standards c , shouldered at c' and preferably cylindrical in cross-section above the shoulders, as at c^2 , and on these standards I place an evener (shown as a bar c^x) having holes through which the ends c^2 of the standards pass.

The shoulders c' are at such a distance above the supporting-bar b^2 that the evener c^x will rest upon the upper ends of the heddles when the upper ends of their slots d' are in engagement with the top of the supporting-bar, and as the heddles rise or fall relatively to such supporting-bar the evener c^x will move with the heddles and preserve them in alinement from end to end of the series.

10 In Figs. 1 and 2 the frames are shown in position to close the shed, and it will be obvious that when one frame rises its supporting-bar b^2 will lift all of its heddles to move their warps into the upper plane of the shed.
 15 Now when this frame thereafter descends magnetization of its heddles would tend to cause some of them to lag behind the others, and thereby unduly stretch their warp-threads, so that when the shed was closed the
 20 latter would be looser than others; but by my invention the evener follows the heddles and compels such as tend to lag to move in complete unison and alinement with all their fellows, so that all warp-threads arrive at the
 25 crossing-point of the shed under the same tension. Again, from the position shown, when the frame descends its transverse bar will move down independently of the heddles until it engages the bottoms of the heddle-slots,
 30 the heddles being held up by the tension of the warp-threads, and during such movement the parts c^2 of the guides or standards slide through the holes in the evener c^x , the latter resting on the tops of the heddles. After the
 35 frame has completed its downstroke and begins to rise the tension of the warp-threads usually maintains the heddles up against the under edge of the supporting-bar for part of the take-up stroke, and while the said bar
 40 is traveling from the bottom to the top of the slots the evener prevents any heddle from reaching the center of the shed before its fellows.

The weight of the evener will of course
 45 vary according to circumstances; but it is never more than enough to act upon the heddles with sufficient pressure to maintain them in alinement.

When the frame descends, the weight of the
 50 evener will prevent lagging of heddles; but it will not press so heavily as to depress the heddles against warp tension, and thereby interfere with their drop into detaching position upon failure or undue slackness of one
 55 or more warp-threads.

It will be obvious from the foregoing that the detectors will be uncontrolled by their supporting-bar for a short period during each stroke of said bar, and at such period the
 60 evener assumes control of the detectors for the purpose set forth.

My invention is not restricted to the precise construction and arrangement herein shown,

for so far as I am aware it is broadly new to provide warp-stop-motion detectors with means to maintain them in alinement and effect their movement in unison when uncontrolled by their support.

I have shown my invention as applied to detectors serving also as heddles; but it will be obvious that my invention is equally applicable in those constructions where the detectors have a reciprocating movement imparted to them corresponding to the shed formation, even though the detectors are entirely independent of the heddles.

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

1. In a warp stop-motion for looms, a series of detectors longitudinally movable into operative position by breakage or undue slackness of the warp-threads, a reciprocating support for said detectors and relatively to which they have a limited independent vertical movement, and means movable relatively to said support, to act upon and insure movement of the detectors in unison and maintain them in alinement when uncontrolled by their support.

2. In a warp stop-motion for looms, a series of longitudinally-slotted detectors normally held in inoperative position by the warp-threads, a reciprocating supporting-bar extended through the slots of the detectors and relative to which they have a limited independent longitudinal movement, upright guides movable with the supporting-bar, and an evener mounted to slide on said guides and rest upon the upper ends of the detectors, to thereby maintain them in alinement.

3. In a warp stop-motion for looms, a reciprocating heddle-frame, a series of metallic stop-motion detectors also serving as heddles and mounted in said frame, said heddles having a limited independent vertical movement, and means carried by said frame to act upon the detectors and insure their movement in alinement, to thereby obviate unequal strain upon the warp-threads due to lag of one or more detectors.

4. In a loom, shed-forming mechanism, including vertically-reciprocating frames, series of steel detector-heddles carried thereby and having limited vertical movement relative to the frames, and an evener rod or bar movable independently of the frame, to rest on the upper ends of and maintain said detector-heddles in alinement.

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

JOHANN ADAM GRAF.

Witnesses:

JAMES P. TUTTLE,
 HARRY W. SPAULDING.