

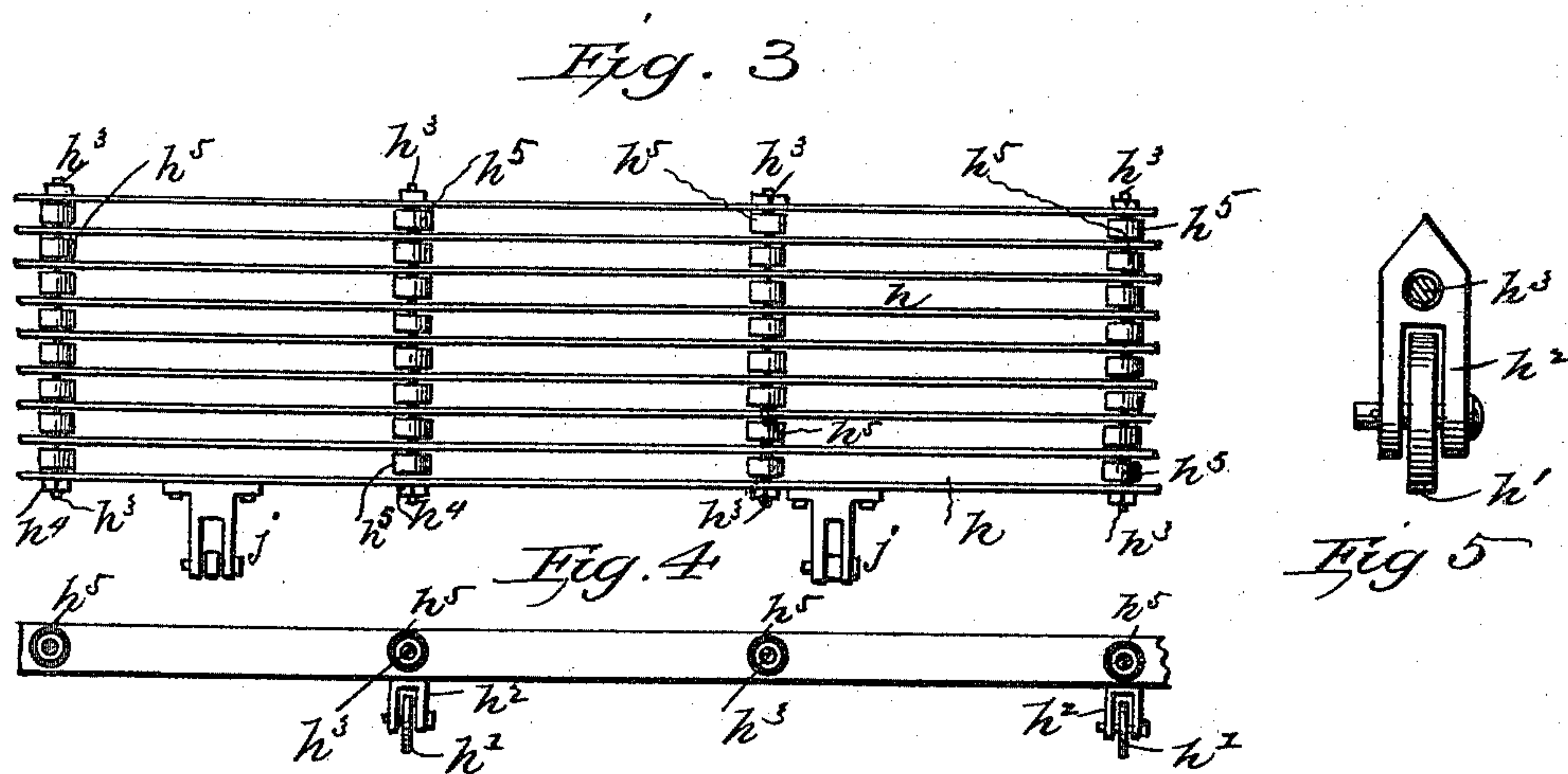
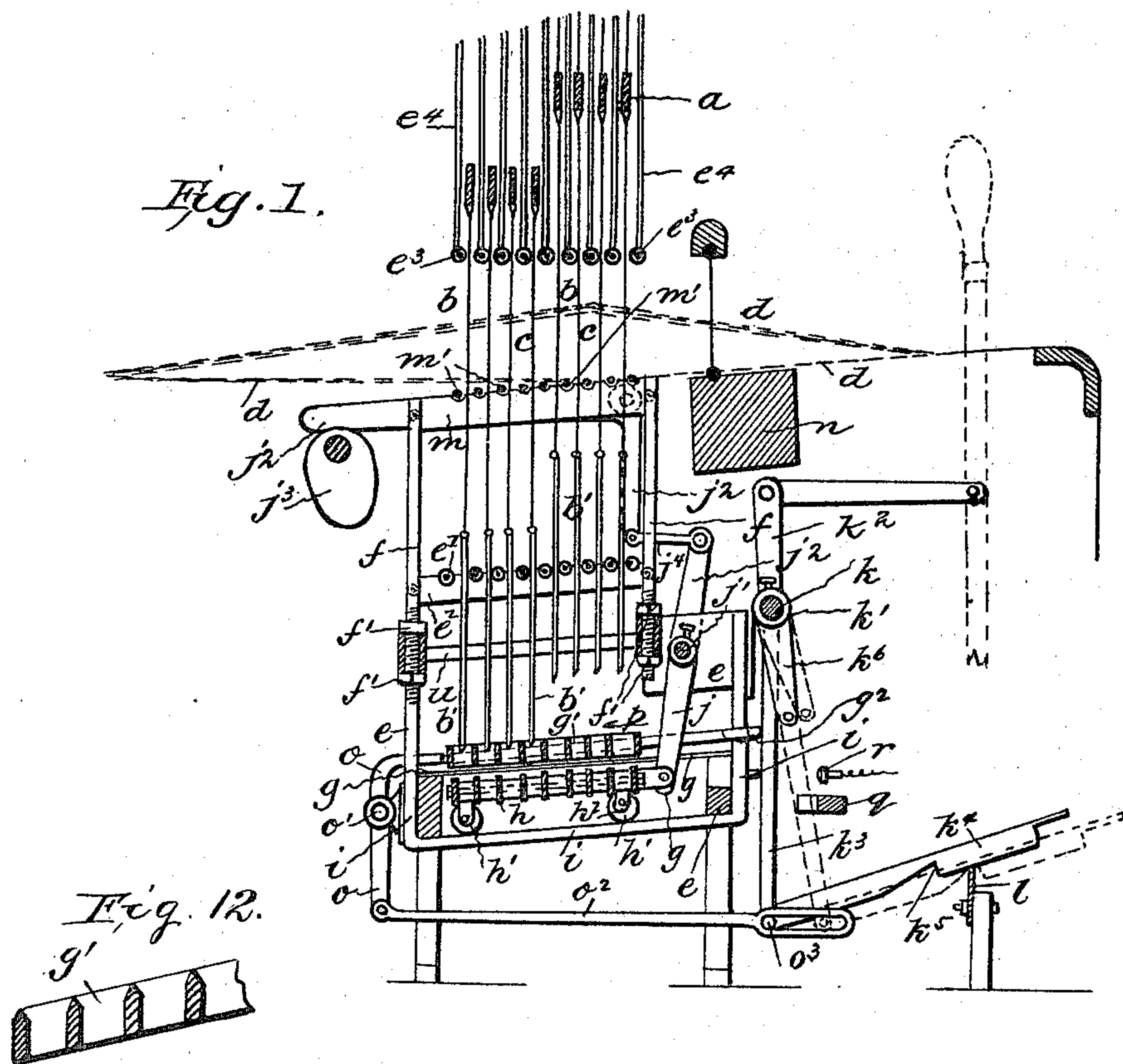
(No Model.)

3 Sheets—Sheet 1.

J. VICKERMAN.
WARP STOP MOTION FOR LOOMS.

No. 572,918.

Patented Dec. 8, 1896.



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W. L. Coombs

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(No Model.)

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Fig. 2.

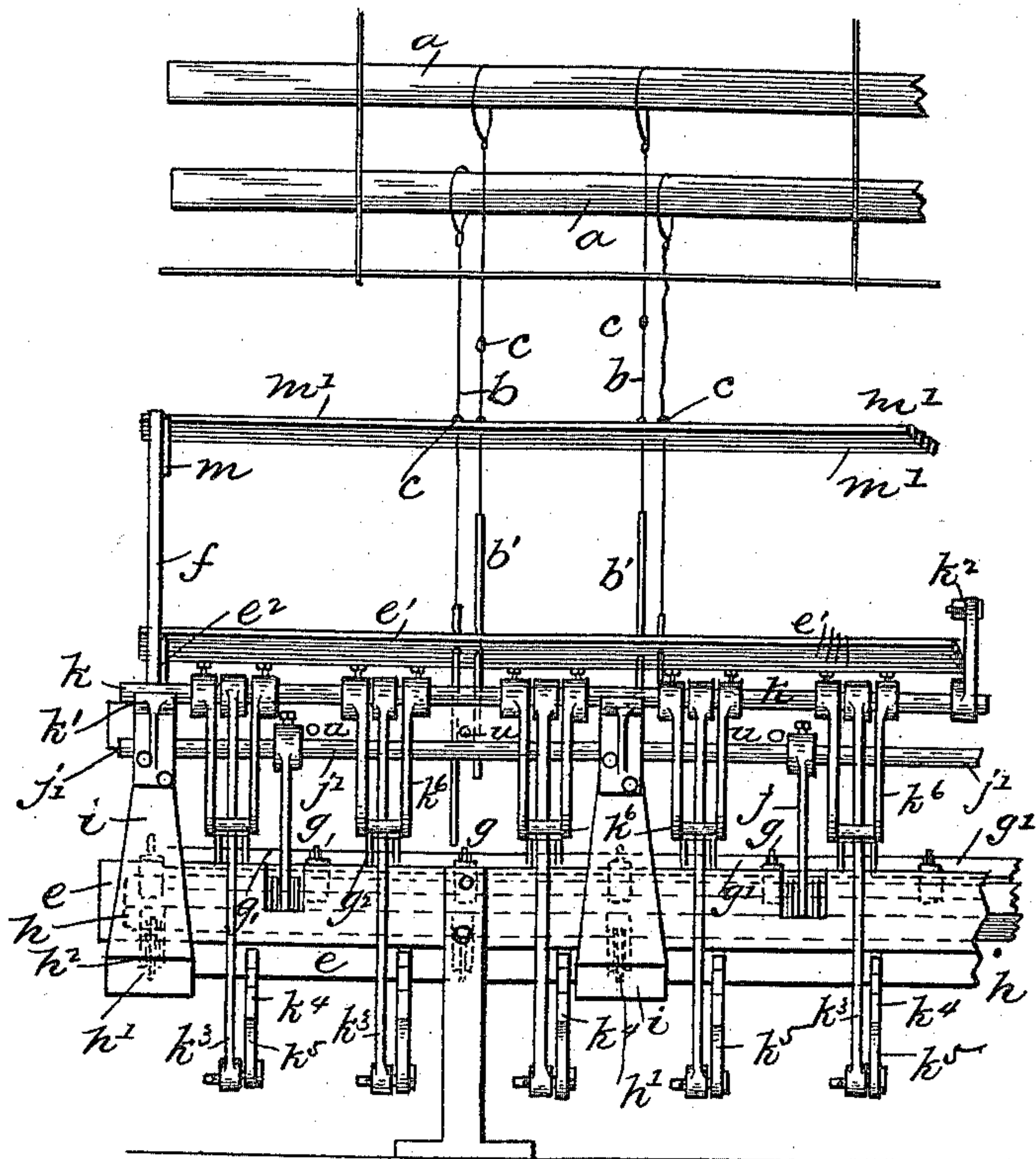


Fig. 6.

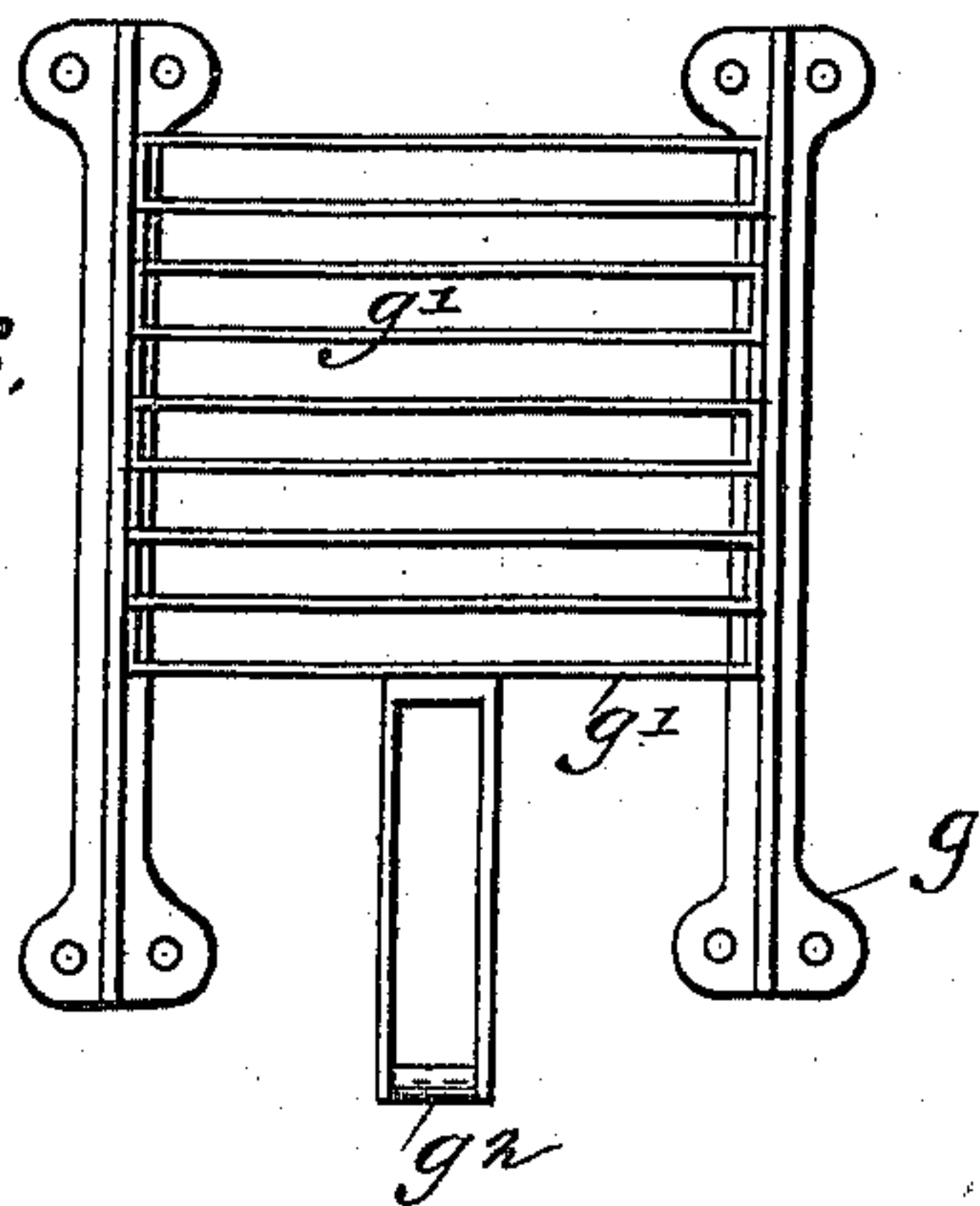
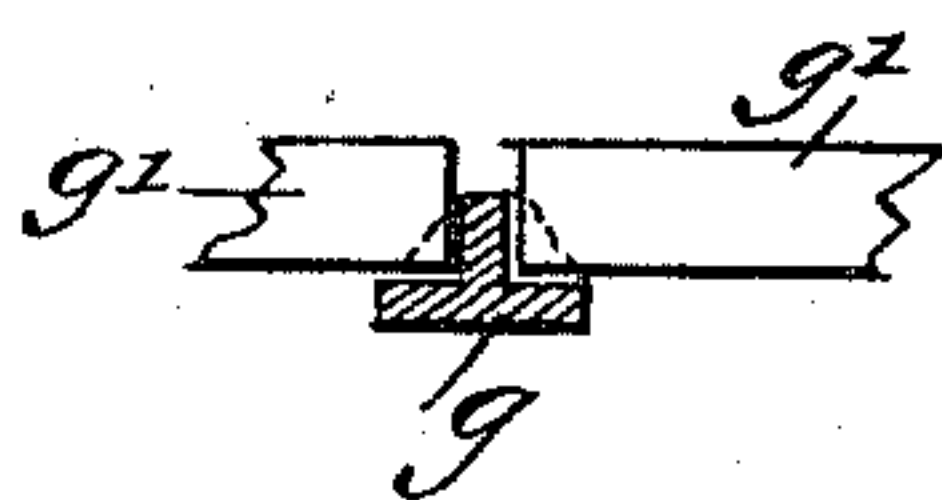


Fig. 7.



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Fig. 8.

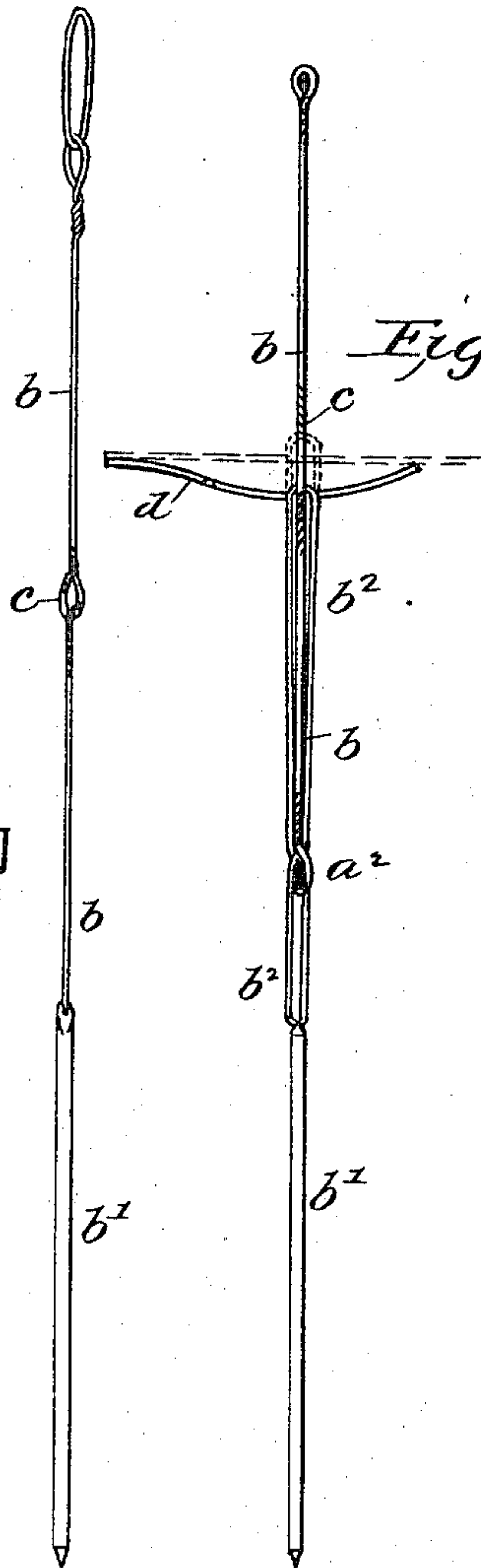
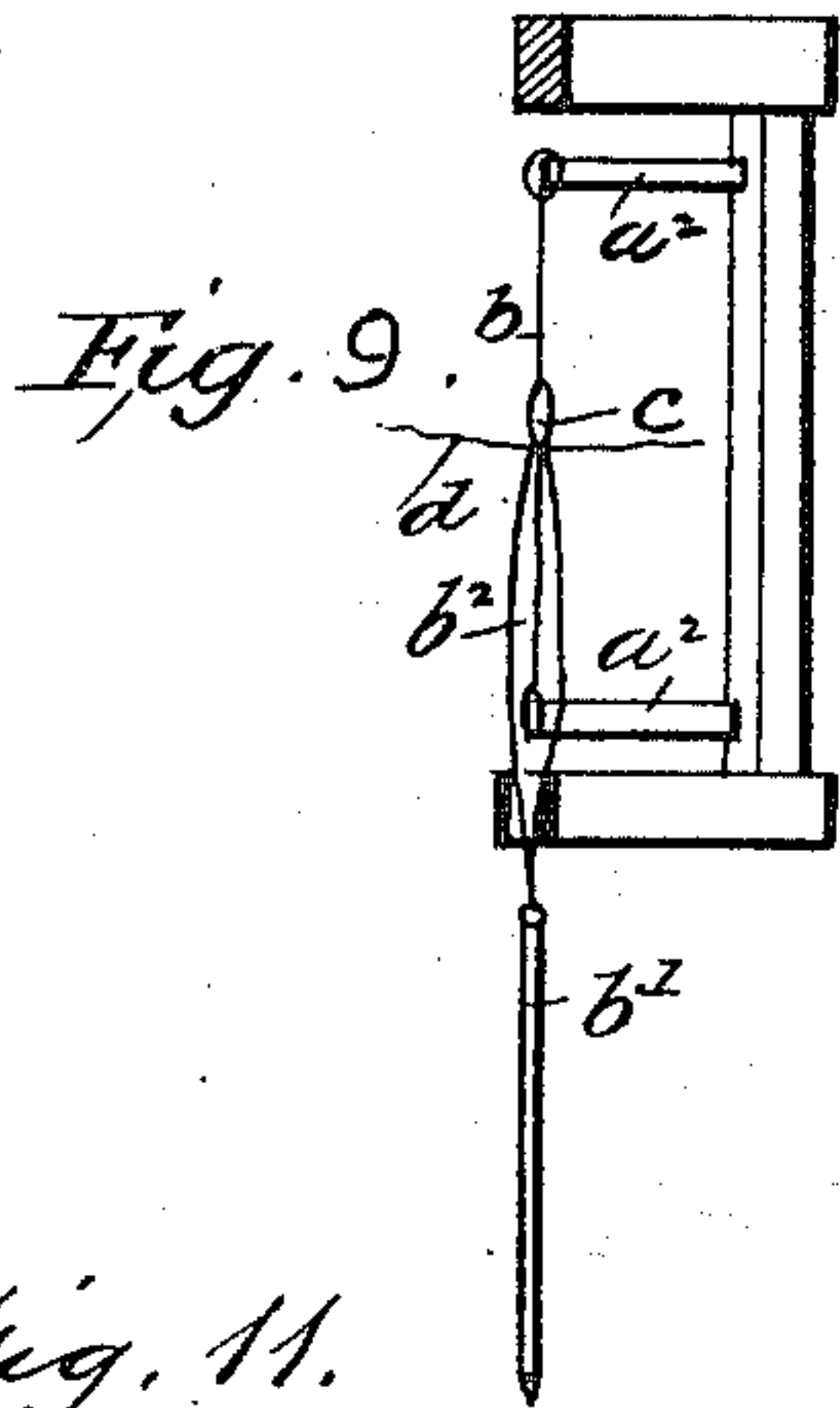
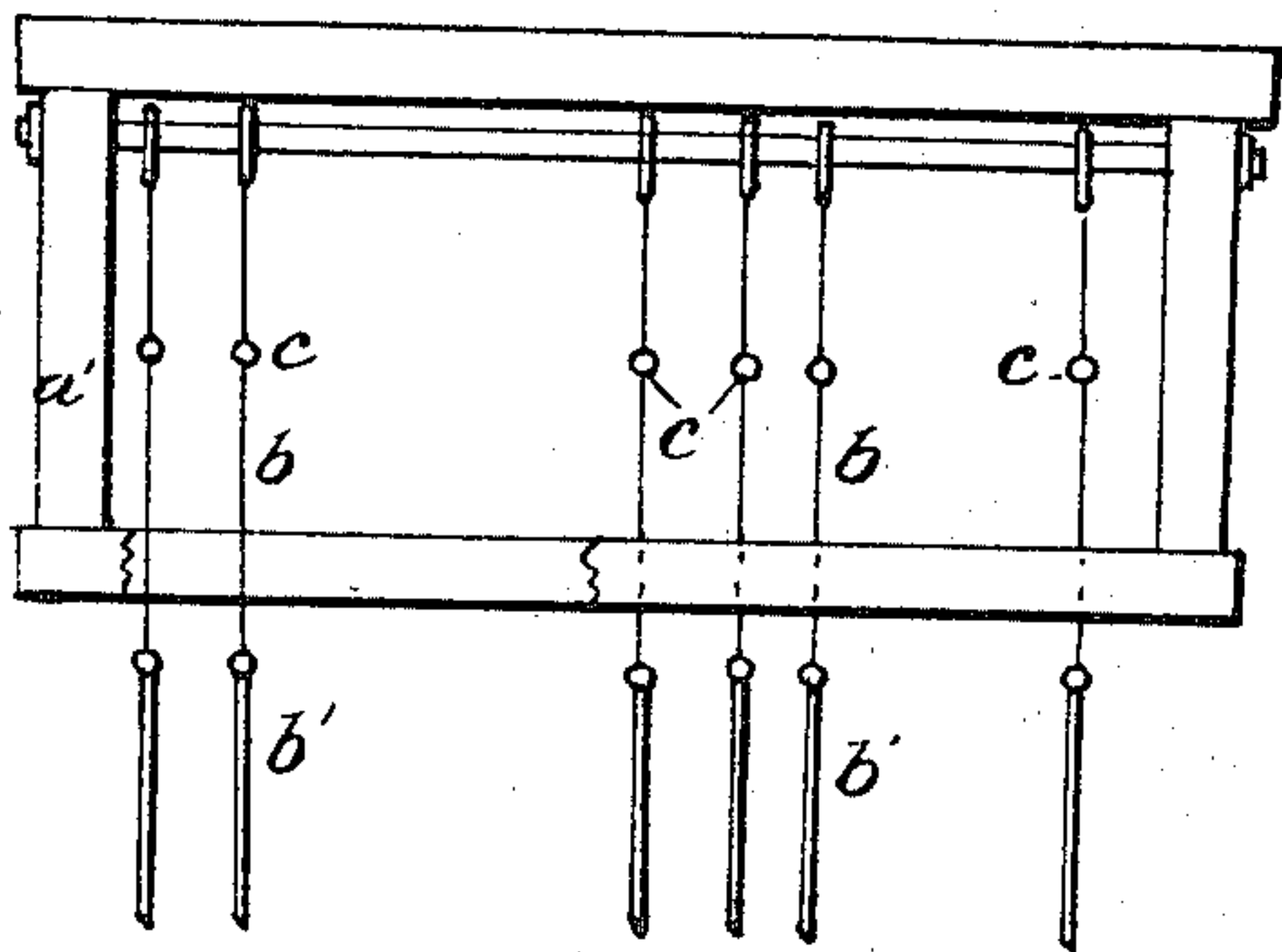


Fig. 11.



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UNITED STATES PATENT OFFICE.

JOHN VICKERMAN, OF LONGFORD, ENGLAND, ASSIGNOR TO PAUL WHITING,
OF LAMY, TERRITORY OF NEW MEXICO.

WARP STOP-MOTION FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 572,918, dated December 8, 1896.

Application filed June 22, 1895. Serial No. 553,653. (No model.) Patented in England July 20, 1892, No. 13,256, and June 7, 1893, No. 11,130; in France September 27, 1894, No. 228,690; in Germany September 28, 1894, No. 81,218; in Belgium September 28, 1894, No. 112,042, and in Austria September 29, 1894, No. 45/179.

To all whom it may concern:

Be it known that I, JOHN VICKERMAN, a subject of the Queen of Great Britain, and a resident of Longford, Minchinhampton, near Stroud, Gloucester, England, have invented certain new and useful Improvements in Warp Stop-Motions for Looms, (patented by me in Great Britain July 20, 1892, No. 13,256, and June 7, 1893, No. 11,130; in Germany September 28, 1894, No. 81,218; in France September 27, 1894, No. 228,690; in Belgium September 28, 1894, No. 112,042, and in Austria September 29, 1894, No. 45/179;) and I do hereby declare that the following is a full, clear, and exact description of the same.

This invention refers to stop-motions for power-loom; and the object thereof is to stop the loom on the breakage, failure, or undue slackness of an end or ends of warp and to indicate to the weaver the position or positions or sections of the warp in which the end or ends is or are down.

For the purposes aforesaid I employ suitable healds and "lingoes" or weighted heddles, through which the ends of the warp are threaded. The said heddles are steadied and kept apart by suitable cross rods, wires, or cords, and in the same plane or at the same angle as the lower half of the "shed," and supported by a heddle-case, are other cross rods, wires, or cords, on which the warp forming the lower half of the shed rests when intact. The position of the last-named rods does not permit the warp and heddles to descend to the full extent of the downward movement of the heald shafts or frames so long as the warp is at the proper tension and intact, but should an end break, fail, or become unduly slack its corresponding heddle is drawn down to its full extent by the weight of the lingoes, which lowers through a section-grate into a reciprocatory grate or carriage actuated by levers from the crank-shaft or other rotary part of the loom, whereby the section-grate is slid endwise and oscillates a section-lever which engages a corresponding section-frame fast on the stop or knocking-off rod and rocks said stop-rod so as to bring the loom to a standstill. The section-lever also

carries a pointer or locking-finger which is adapted to engage with a fixed cross-rail and hold the parts out of action until released by the weaver and to indicate to the weaver the section or portion of the warp in which the broken end is to be found.

In the accompanying drawings, Figure 1 is a sectional transverse elevation of the heddle frame or case, heddles or healds, and parts comprising my improved warp stop-motion. Fig. 2 is a front elevation of a part of same. Fig. 3 is a plan of the reciprocatory grate or carriage. Fig. 4 is a longitudinal section of same. Fig. 5 is a detail of one of the brackets carrying the pulleys by which the grate is supported. Fig. 6 is a plan of one of the section-grates and the angle-irons supporting same and forming ways in which the grates are capable of being slid. Fig. 7 is an enlarged section of the angle-iron, showing the section-grates resting thereon. Figs. 8, 9, 10, and 11 show the forms of heddles or healds I may use in connection with my invention. Fig. 12 is a detail view showing the tapered upper edges of the grates.

Referring to the drawings, *a* represents the heald or heddle shafts, from which are suspended the heddles *b*, preferably composed of wire and provided with mails or eyelets *c*, through which are passed the warp-threads *d*. The heddles are suspended from the shafts *a* by loops of string passed through eyelets or openings at the upper ends of the heddles and around the shafts, and said loops of string may be separate from each other or connected together by a string or knitted to a "rig-band," as in ordinary worsted or cotton healds. To the lower ends of the heddles are attached weights or lingoes *b'*, having tapered or pointed ends.

Instead of a single shaft a frame *a'* may be used, such as is shown in Fig. 11, the bottom rail or shaft being grooved or having a slot formed therein through which the heddles are passed and shielded and steadied thereby.

Another form of heddle is shown enlarged at Fig. 10. In this case the rectangular heald-frame *a'* is employed, and the wire healds *b* are passed over the thin rods *a²* of

said frame in the same way as ordinary wire
 healds and as shown at Fig. 9. The eyelet
c for the warp is elongated, and through it
 is passed a string *b*², secured at both ends to
 5 the weight or lingo *b*¹, which is suspended be-
 low the bottom shaft of the frame *a*¹. The
 warp *d* is threaded through the loop of string
*b*² and eyelet *c* of the heddle, and is held
 down in the bottom of said eyelet by the
 10 weight or lingo *b*¹, but should there be any
 obstruction, such as would prevent the warp
 traveling downward, the elongated eyelet
 will permit the heddle-frames to descend the
 proper distance and the obstructed warp to
 15 remain.

Although the form of heddle last described
 may be used and will act equally as well for
 the same purpose as the heddle first described,
 it possesses the disadvantage of requiring
 20 the warp to be threaded through the loop of
 string and also through the eyelet *c*, so that
 more time and labor are consumed in heald-
 ing the warp.

The heddle-case is represented at *e*, and is
 25 made to hold intact the whole of the hed-
 dles, which enter same and are steadied and
 kept apart by means of cross rods, wires, or
 cords *e*¹, supported by plates *e*², attached to
 the heddle-case or to the adjustable studs *f*,
 30 secured by nuts *f*¹ to the heddle-case. Above
 the shed the heddles are steadied and kept
 apart by cross wires or cords *e*³, suspended
 by wires *e*⁴ from the top rail of the loom, from
 which they may be easily removed. The
 35 heddle-case *e* is divided at equidistances
 apart into sections, each to accommodate an
 equal number of ends of warp by means of
 angle-iron or L-pieces *g*, secured at front
 and back to the heddle-case and adapted to
 40 receive and support the section-grates *g*¹, into
 which the weights or lingoes *b*¹, connected to
 each heddle in the corresponding section, are
 capable of entering, the said L-shaped bars
g also forming ways for the grates *g*¹ to
 45 slide in.

Under the section-grates and just clear of
 same is a reciprocary grate or carriage *h*,
 provided with pulleys *h*¹, journaled in brack-
 ets *h*², secured to said grate, which rest on
 50 and are adapted to ride over the under por-
 tions of brackets *i*, bolted at suitable dis-
 tances apart to the sides of the heddle-case *e*.
 The said reciprocary grate extends across
 the loom to accommodate the full width of
 55 warp and is constructed of bars or lengths of
 thin hoop-iron bored at distances apart equal
 to the width of each section to receive pins
 or bolts *h*³, which are passed therethrough
 and secured by nuts *h*⁴.

60 Hollow tubes or bushes *h*⁵ are placed on the
 pins *h*³ between each bar to hold said bars
 the proper distance apart.

The reciprocary grate and also the sec-
 tion-grates are divided into spaces corre-
 65 sponding in number to the healds which the
 loom is designed to work.

To the front of the reciprocary grate are

connected lever-arms *j*, secured on a rod or
 shaft *j*¹, journaled in bearings in the heddle-
 case and receiving an oscillatory or rocking
 70 motion by means of levers *j*², connected to-
 gether by a rod *j*³, from a cam or tappet *j*³,
 mounted on the crank-shaft or other suitable
 rotary part of the loom, which by a lever-
 arm *j* imparts a reciprocary motion to the
 75 grate *h*.

k is the stop or knocking-off rod, journaled
 at *k*¹ in the heddle-case and connected by arm
*k*² (see Fig. 2) to the ordinary knocking-off
 mechanism of the loom. On said knocking-
 80 off rod *k* and opposite each section-grate are
 loosely mounted section-levers *k*³, carrying
 at their lower ends pointers or indicating
 locking-fingers *k*⁴, provided on their under
 sides with a sneck or tooth *k*⁵, which is adapt-
 85 ed to engage with a fixed cross-rail *l* when
 moved in a forward direction. Resting
 against each section-lever *k*³ is a frame *k*⁶,
 secured by set-screws on the knocking-off
 rod *k*, with which it is movable, independ-
 90 ently of the warp stop-motion, when actuated
 in the ordinary manner for stopping the loom,
 but it is adapted to be moved, as hereinafter
 explained, by the warp stop-motion when the
 latter is actuated by the breakage or failure
 95 of an end or ends of the warp.

On the top of the heddle-case and secured
 to the adjustable studs *f* are plates *m*, which
 support cross-rods, wires, or cords *m*¹, extend-
 100 ing lengthwise across the heddle-case. The
 plates *m* are arranged at the angle assumed
 by the lower half of the shed and in line with
 the running-board *n*, and the warp-threads
 forming said lower half of the shed rest on
 and are supported by the said cross-rods *m*¹
 105 in a position a little above that to which the
 heald-shafts will permit the heddles to de-
 scend, so that the weights or lingoes *b*¹ at the
 lower ends thereof will when the warp is in
 tension and intact be held clear of the recip-
 110 rocary grate *h*.

The studs *f* by means of nuts *f*¹ can be ad-
 justed so as to alter or vary the angle at which
 the cross or shed rods *m*¹ shall be supported
 and to accord with the angle of the shed.
 115

The action of the motion is as follows: When
 the warp is intact and at proper tension, the
 shed-rods *m*¹ support the warp forming the
 lower half of the shed in line with the run-
 120 ning-board *n*, and as this position is a little
 above the limit to which the heald-shafts will
 permit the heddles to descend the lower or
 weighted ends of the latter are held above
 and clear of the reciprocary grate *h*, while
 the latter halves of the heddles remain slack,
 125 these conditions being maintained so long as
 no end of warp fails or breaks or becomes
 unduly slack. When this occurs, however,
 the support to the heddle concerned is im-
 mediately destroyed, and on the heald-shaft
 130 descending, if it is not already down, the
 weight or lingo *b*¹ on the end of the heddle
 lowers through the section-grate *g*¹, corre-
 sponding to the section of warp in which the

break or failure has occurred, into one of the spaces in the reciprocatory grate *h*, which engages said lingo as it moves forward, and thus locks the said grate and the section-grate together, whereby the continued movement of the reciprocatory grate causes the section-grate to be slid forward with it, in doing which the bracket or extension *g*² on the front of the section-grate abuts against the corresponding section-lever *k*³ and moves it on its pivot into the position indicated by dotted lines in Fig. 1, causing the pointer or finger *k*⁴ to advance and engage with the cross-rail *l* and lock the parts. The said movement of the section-lever *k*³ also forces its corresponding frame *k*⁶ into the position indicated by dotted lines in Fig. 1, and thereby rocks or oscillates the knocking-off rod *k*, which by means of the arm *k*² and connecting link or rod actuates the ordinary stopping mechanism of the loom and brings it to a standstill. The pointer or locking-finger *k*⁴, engaged with the cross-rail *l*, indicates to the weaver the section in which the end is down or slack, and he is thus enabled to speedily locate it and tie it up or restore it to its proper tension.

Levers *o*, pivoted at *o'* at the rear of the heddle-case *e* opposite each section-grate *g'* and connected by slotted rods or links *o*² with pins *o*³, secured to the lower ends of the section-levers *k*³, are employed for the purpose of oscillating the section-levers and stop-rod *k* in the same manner as above set forth to stop the loom when the section-grates happen to be slid in the direction of arrow *p* by the heddle or heddles engaging with the reciprocatory grate during its return or backward movement; but ordinarily this added mechanism would only be required for very fast-running looms, weaving, say, from two hundred to three hundred picks per minute and the reciprocatory grate *h* working at half the speed of the loom.

A stop-piece *q* is employed to limit the outward movement of the section-levers *k*³, and, if desired, a button *r*, adapted to be engaged and pressed by the section-levers when the latter are forced into the position shown in dotted lines in Fig. 1 and connected electrically with an indicating-board in the room or office, may be employed, so that on the loom being stopped by the failure or breakage of an end or ends of warp the button will be pressed and complete the circuit and the stop-page thereby indicated in the room or office.

Having thus fully described my invention, what I claim is—

1. In a stop-motion attachment for looms, the combination with the heddles, having eyes for the passage of the warp-threads, and the weights or lingoos, of the section-grates, the section-levers connected therewith, the knocking-off rod, the frames connected therewith against which the said levers are adapted to strike, and the reciprocating grate and means for operating the same, the stopping

mechanism and the connections between the same and the knocking-off rod, substantially as described.

2. In a stop-motion attachment for looms, the combination with the heddles, having eyes for the passage of the warp-threads and the weights or lingoos, of the section-grates, the section-levers connected therewith, the knocking-off rod, the frames secured thereto, the reciprocating grate, the levers connected therewith, and the cam for operating said levers, and the stopping mechanism and connections between the same and the knocking-off rod, substantially as described.

3. In a stop-motion attachment for looms, the combination with the heddles, provided with eyes for the passage of the warp-threads, and the weights or lingoos, of the section-grates, the section-levers connected therewith, the knocking-off rod, the frames secured thereto, the pivoted fingers formed with notches connected with said levers, the rail with which said notches are adapted to engage, the reciprocating grate, and means for operating the same, the stopping mechanism and connections between the same and the knocking-off rod, substantially as described.

4. In a stop-motion attachment for looms, the combination with the heddles, provided with eyes for the passage of the warp-threads, and the weights or lingoos, of the section-grates, the section-levers connected therewith, the knocking-off rod, the frames secured thereto, the pivoted fingers connected with said levers, provided with notches, the rail with which said notches are adapted to engage, the reciprocating grate, the levers connected therewith, and the cam for operating the same, and the stopping mechanism and connections between the same and the knocking-off rod, substantially as described.

5. In a stop-motion attachment for looms, the combination with the heddles, having eyes for the passage of the warp-threads, and the weights or lingoos, of the section-grates, the section-levers connected therewith, the knocking-off rod, the frames secured thereto, the pivoted fingers provided with notches, the rail with which said notches engage, the slotted rods connected with said fingers, the levers pivoted thereto, the reciprocating grate, and means for operating the same, and the stopping mechanism and connections between the same and the knocking-off rod, substantially as described.

6. In a stop-motion attachment for looms, the combination with the heddles, having eyes for the passage of the warp-threads, and the weights or lingoos, of the section-grates, the section-levers connected therewith, the knocking-off rod the frames secured thereto, the notched fingers pivoted to said levers, the rail, the slotted rod connected with said fingers, the levers pivoted thereto, the reciprocating grate, the levers connected therewith and the cam for operating the same, and the

stopping mechanism and connections between the same and the knocking-off rod, substantially as described.

7. In a stop-motion attachment for looms,
5 the combination with the heddles, having eyes for the passage of the warp-threads, and the weights or lingoes, of the section-grates, the section-levers connected therewith, the knocking-off rod, the frames secured thereto,
10 the notched fingers pivoted to said levers, the rail, the slotted rods connected with said fingers, the levers pivoted thereto and the trans-

verse guide wires or cords between which the heddle-wires pass, and the stopping mechanism and connections between the same and the knocking-off rod, substantially as described. 15

In testimony that I claim the foregoing as my own I have hereunto affixed my signature in presence of two witnesses.

JOHN VICKERMAN.

Witnesses:

A. J. FRANKLIN,
ARNOLD H. PALIN.