

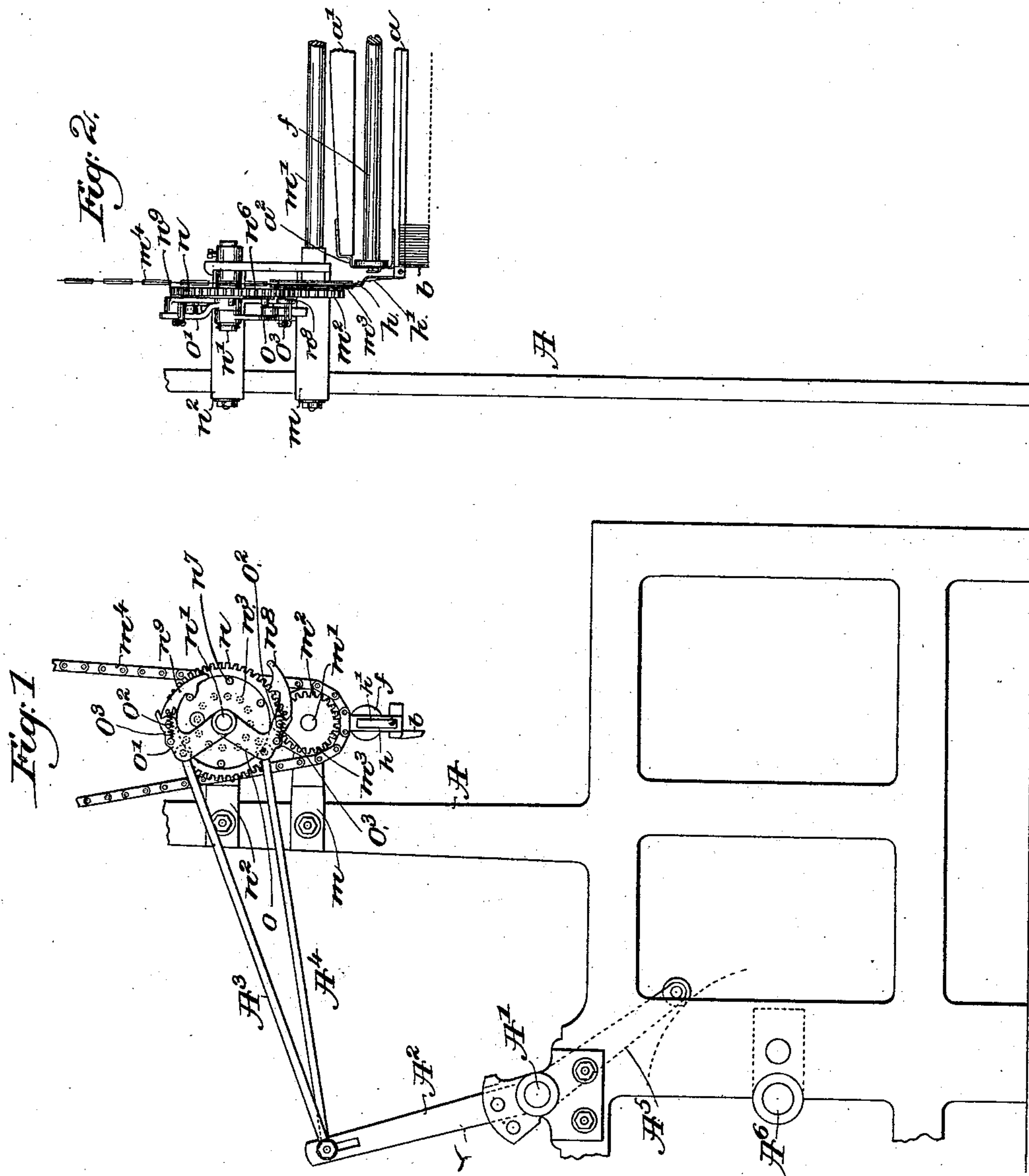
(No Model.)

2 Sheets—Sheet 1.

H. WYMAN.
LOOM FOR WEAVING TUFTED FABRICS.

No. 543,820.

Patented July 30, 1895.



Witnesses
Thomas J. Drummond.
John P. L. Printz.

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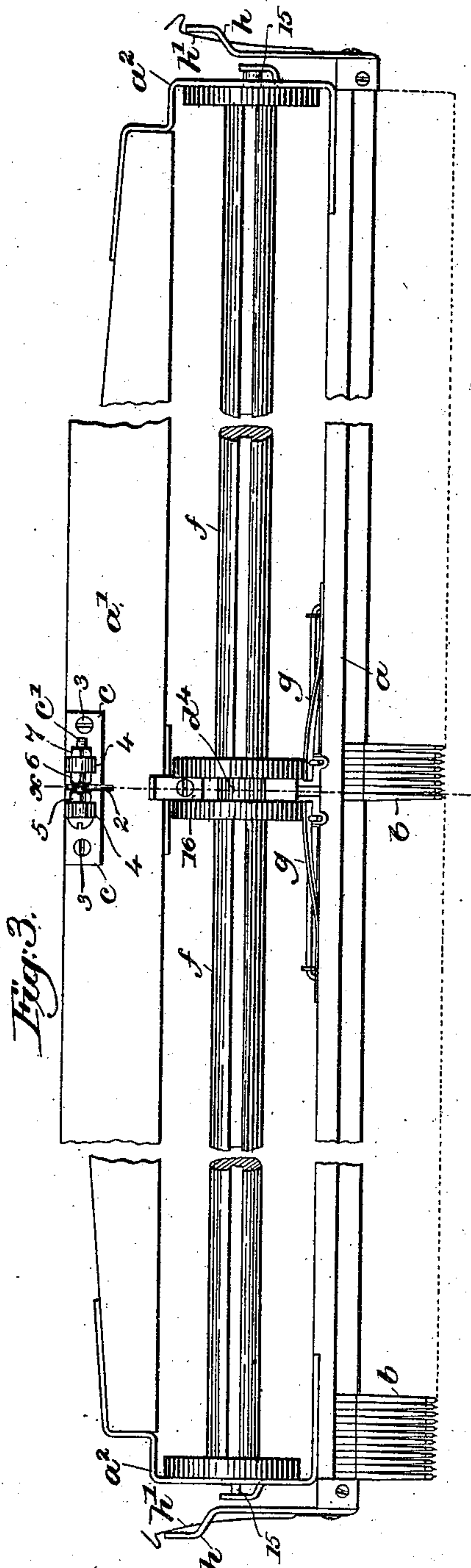
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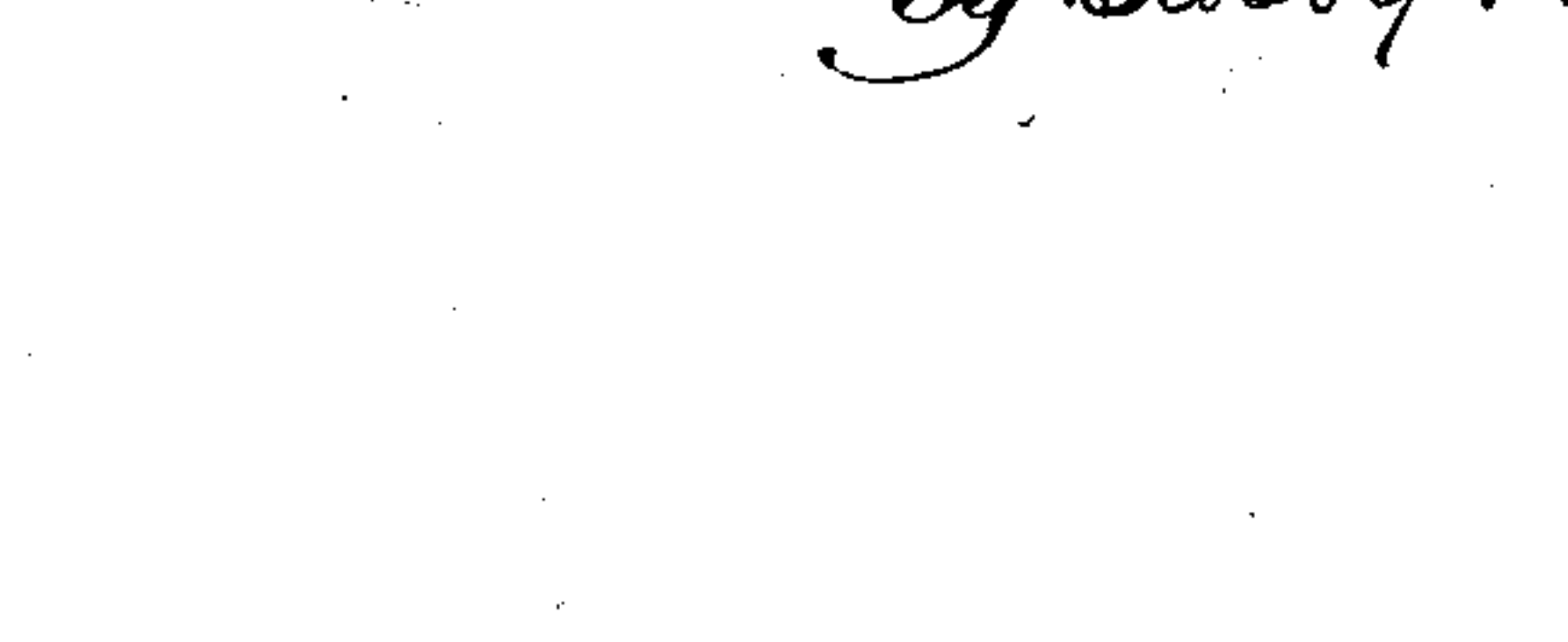
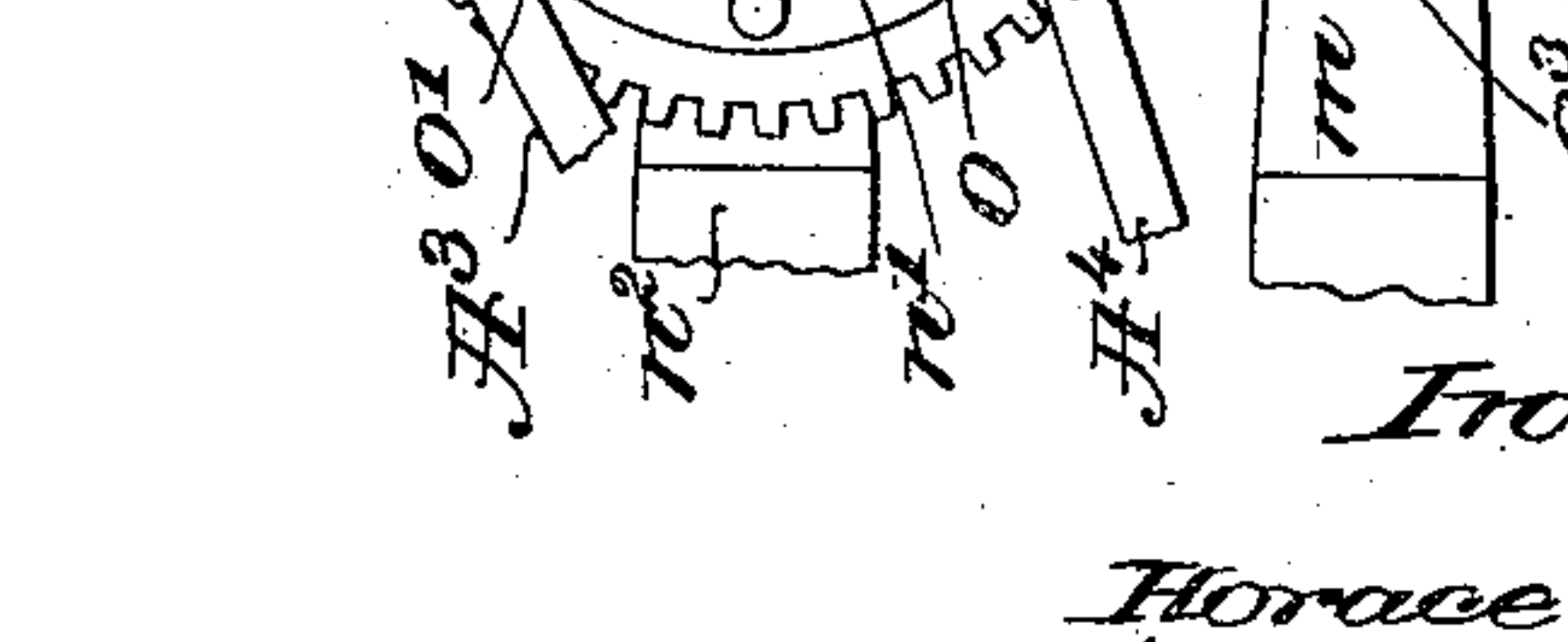
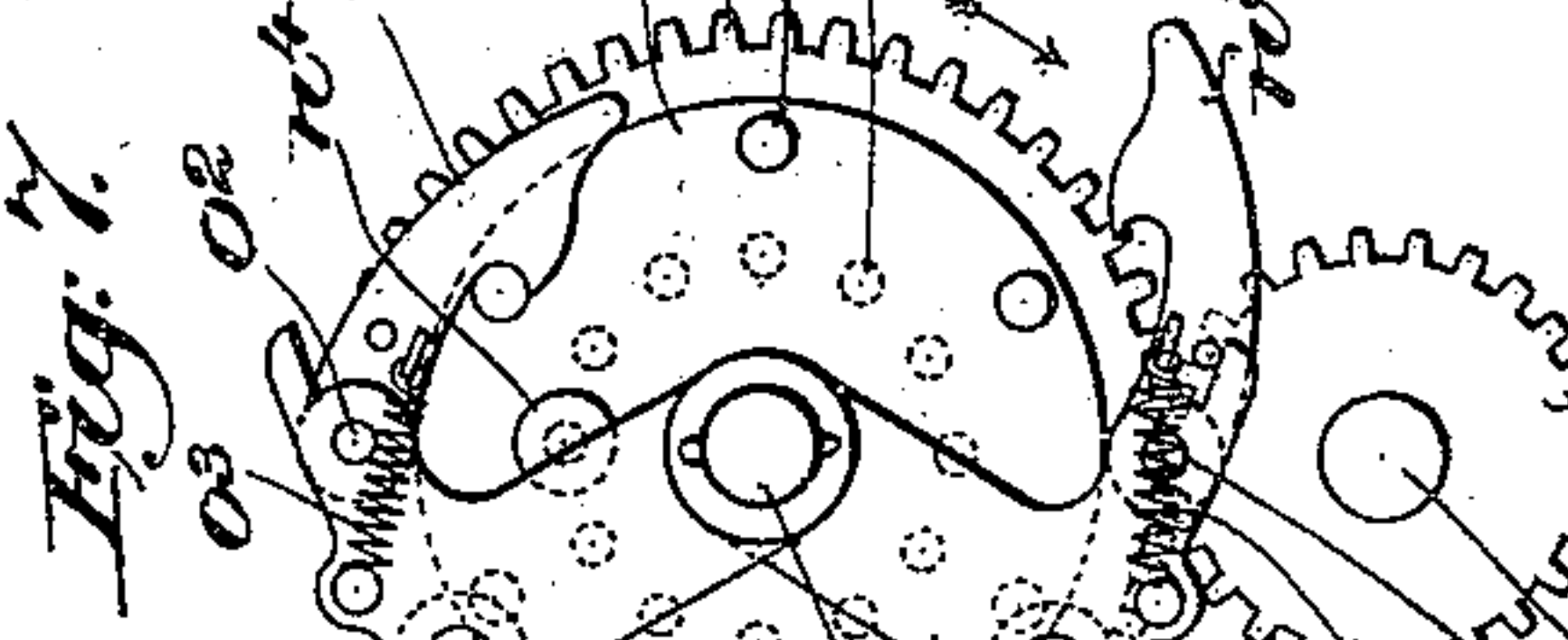
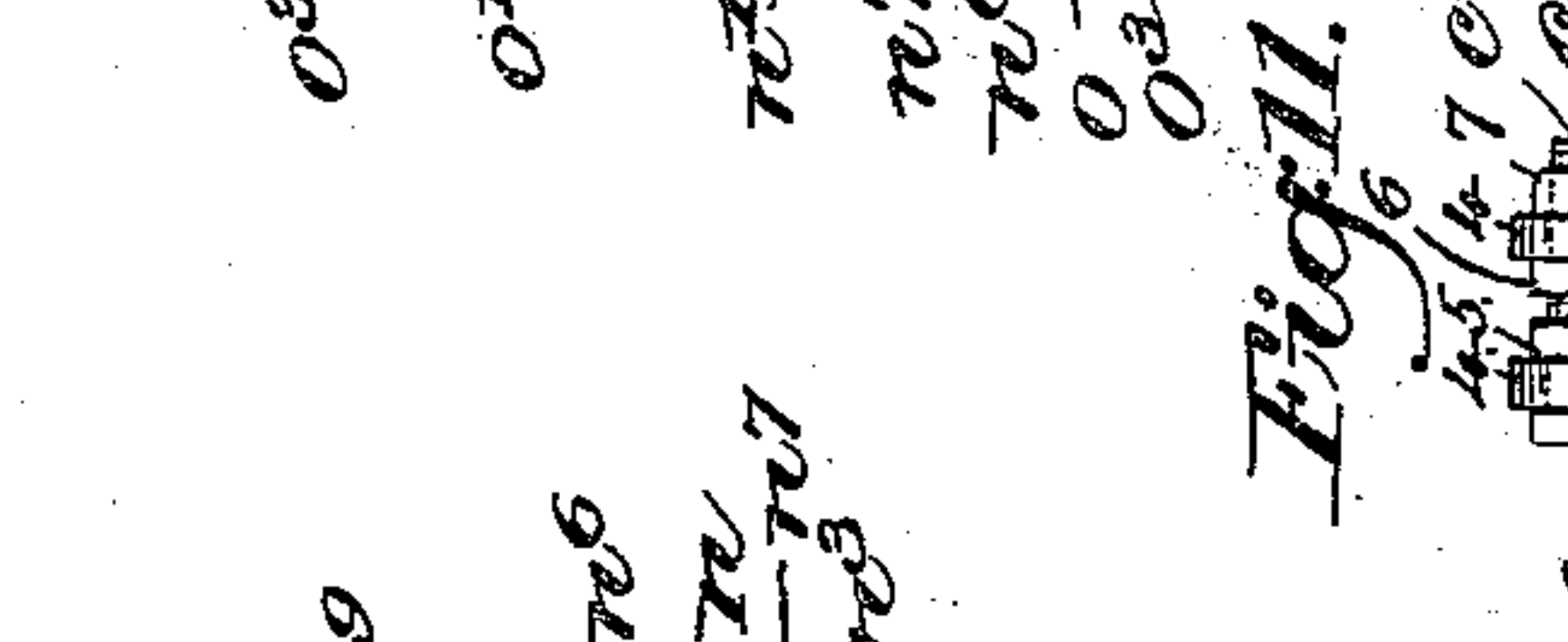
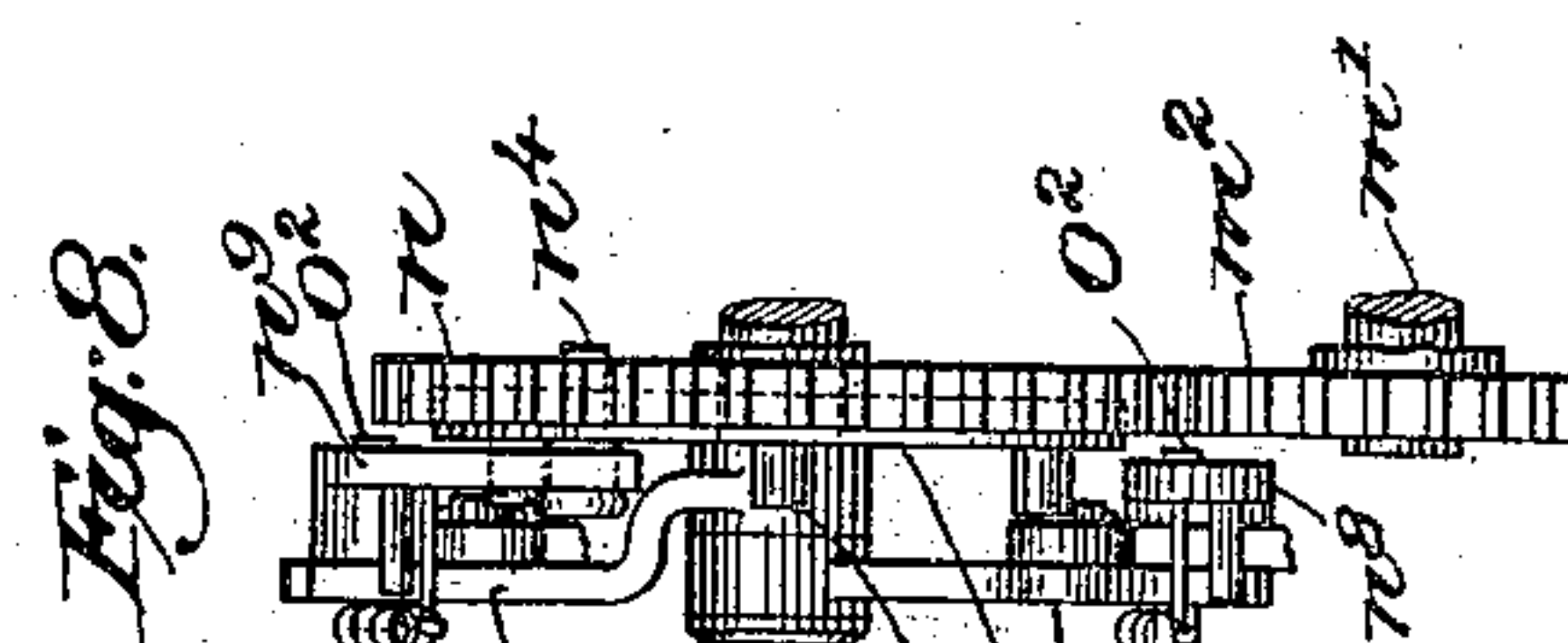
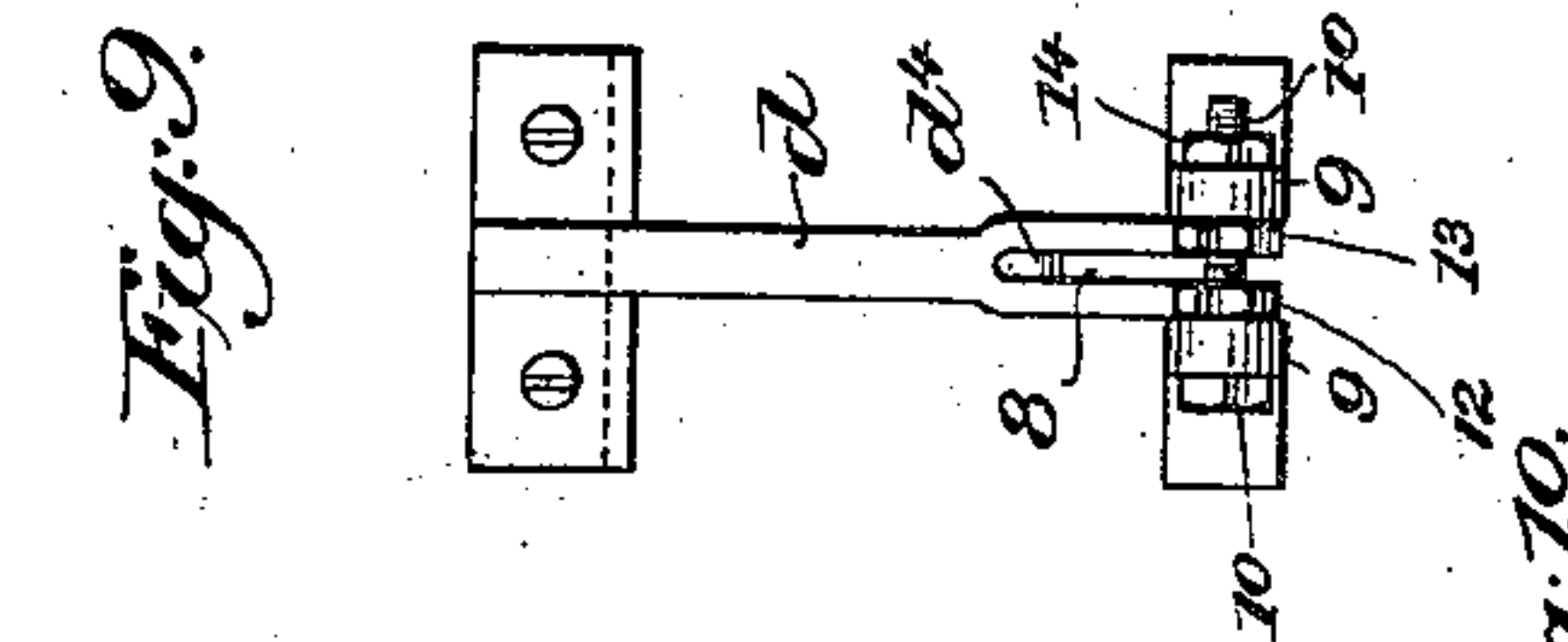
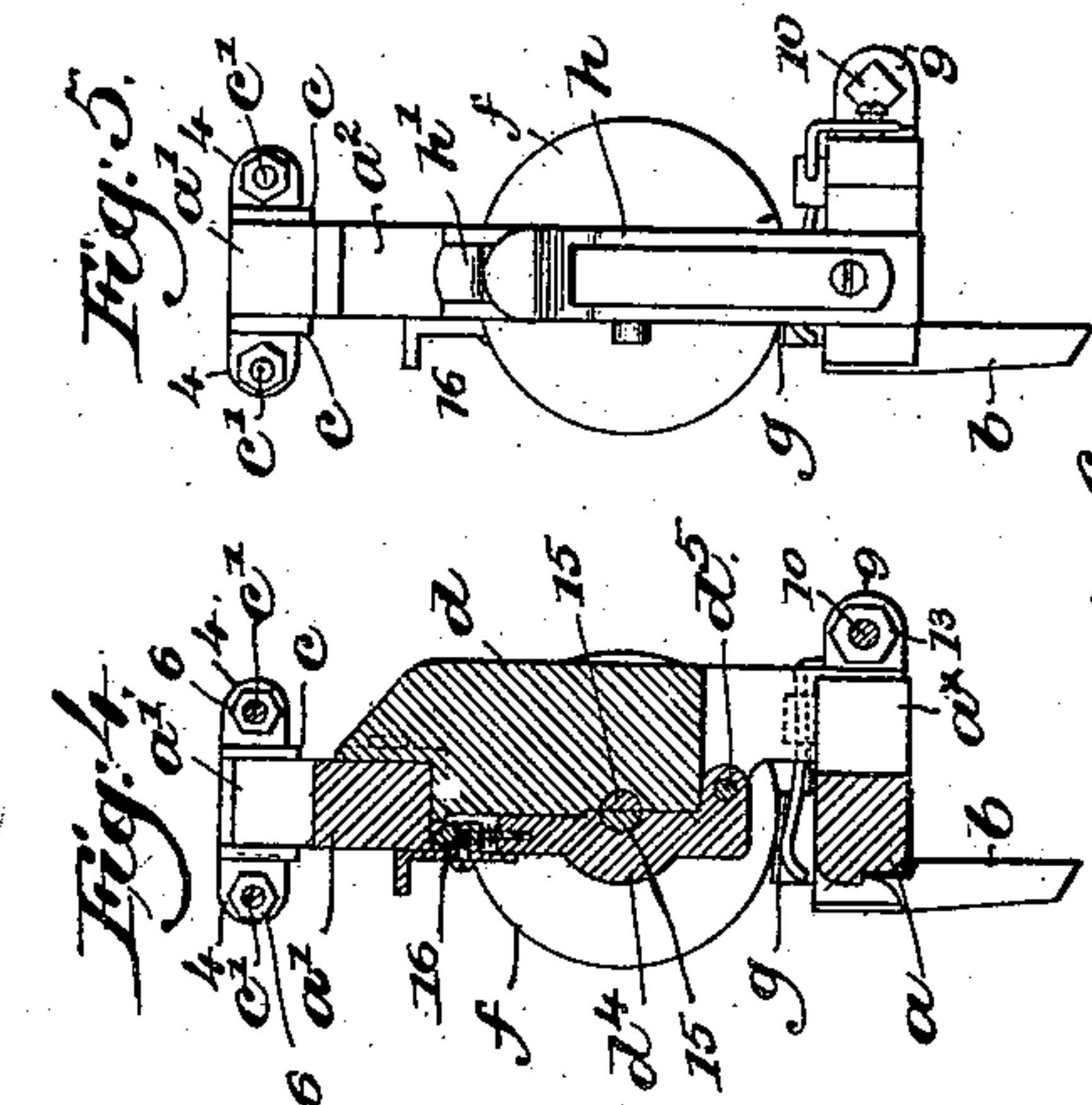
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UNITED STATES PATENT OFFICE.

HORACE WYMAN, OF WORCESTER, MASSACHUSETTS.

LOOM FOR WEAVING TUFTED FABRICS.

SPECIFICATION forming part of Letters Patent No. 543,820, dated July 30, 1895.

Application filed June 15, 1894. Serial No. 514,694. (No model.)

To all whom it may concern:

Be it known that I, HORACE WYMAN, of Worcester, county of Worcester, State of Massachusetts, have invented an Improvement in Looms for Weaving Tufted Fabrics, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

Heretofore the width of fabrics which could be produced practically on power looms for weaving tufted fabric has been limited, owing to the difficulty caused by the warping of the tube-frames, their liability to bend or spring between their ends or centrally when being used, and the longer the tube-frame the greater its liability to twist or warp and the greater the difficulty to insure correct alignment of the ends of the tuft-yarn tubes connected to the said frame, any lack of alignment resulting in misplacing or entirely losing a tuft, thus damaging the fabric and disfiguring the pattern.

I have aimed to provide a loom for weaving tufted fabrics of any desired width, and I have effected my object, so far as the correct alignment of the tubes of the tube-frame with relation to the body-warp is concerned, by producing a tube-frame which may be adjusted, strained, or bent to occupy correct position with relation to other parts, and, as herein shown, I have provided a tube-frame capable of supporting a plurality of tuft-yarn beams or spools.

My frame is provided for the first time with devices whereby it may be adjusted, drawn, or sprung in any direction required to effect correct working alignment of the points or delivery ends of the tuft-yarn tubes with relation to the warp, reed, or shears common to looms of this class—as, for instance, in United States Patent No. 490,237, dated January 17, 1893.

In the production of tufted carpets, especially rugs, &c., it is frequently desired to provide borders all around a center, and to do this certain beams of the chain have their tuft-yarns arranged to provide loops for the center and side border, while other beams have their tuft-yarns arranged for the production of the end borders, and this weaving is facilitated by mounting the tuft-yarn beams or spools in their carrying-chains in such man-

ner that, say, the first, third, fifth, &c., beams in the chain may be used to produce one part of the pattern, and the second, fourth, sixth, &c., beams another part of the pattern, and these beams are brought alternately into proper position with relation to the warp-threads at the fell or weaving-point, so as to be taken therefrom to have the tuft-yarns wound upon them properly inserted to form a row of tufts having the desired colors.

I have devised novel means for imparting movement to the chains carrying the tube-frames, in which are mounted the tuft-yarn beams.

All of the above features will be hereinafter fully described, and set forth in the claims.

Figure 1, in side elevation, represents on a small scale a sufficient portion of a loom for weaving tufted fabrics with my improvements added to enable my invention to be understood. Fig. 2 is a partial front elevation of the devices shown in Fig. 1. Fig. 3, on a larger scale, represents the tube-frame broken out to shorten the same. Fig. 4 is a section of the tube-frame shown in Fig. 3 in the dotted line *x*. Fig. 5 is an end view of the tube-frame shown in Fig. 3. Fig. 6 is a top view of part of the tube-frame, showing the devices for bending it and the bottom bar up and down as may be desired. Figs. 7 and 8, on a larger scale, represent the gearing employed for moving the frame-carrying chain, the usual sprocket-wheel being however omitted, because shown in Figs. 1 and 2. Fig. 9 shows separately the rear side of the bearing-stand *d*. Fig. 10 shows the engaging journals of the tuft-yarn beams, and Fig. 11 a modification to be described.

In the drawings, A represents part of the sideframe of a loom; A', a rock-shaft mounted in suitable bearings thereon and having an arm A², to which, as herein represented, is adjustably jointed two rods A³ A⁴, said rock-shaft having a downwardly-extended arm A⁵, provided with a roller or other stud to be acted upon by a suitable cam on the cam-shaft A⁶. The framework has a stand *m*, having bearings for the shaft *m'*, provided at its end with a toothed gear *m*², and alongside of it a sprocket-gear *m*³, over which is extended the chain *m*⁴, having usual single and double links with which co-operate the fingers *h* and springs *h'*, attached to the tube-frames, to be described,

said fingers and springs enabling the tube-frames to be so connected with the chain that when the latter is moved it will carry the tube-frames with it.

5 I have not herein shown any devices for taking the tube-frame from the chain, moving the tube-frame to insert the tuft-yarns carried by it into the shed formed in the usual body-warps, and then forming the tuft-yarns
10 into loops and cutting them off and restoring the tuft-yarn frame, as said devices are common and may be such as used in tuft-fabric looms or as represented in United States Patent No. 446,402, dated February 10, 1891.

15 The pinion m^2 derives its motion from a toothed gear n , mounted on a stud n' , carried in a bracket or stand n^2 , suitably attached to the framework. As herein represented, the outer face of this toothed gear is provided with
20 a series of holes n^3 , (shown best in Fig. 7 by dotted lines,) said holes being adapted to receive in them a locking device n^4 —herein represented as a sliding-pin having an enlarged head—carried by and sliding in a toothed plate
25 n^6 , said locking-device n^4 being adapted to lock the toothed plate n^6 to the toothed gear n . The toothed plate n^6 has a series of pins n^7 extended therefrom, with which co-operate the pawls
30 n^8 n^9 , one pawl at a time, the pawl n^8 being adapted to operate the toothed plate and the gear in a forward direction, as represented by the arrow near it, a distance sufficient to bring the alternate tube-frames and the tuft-yarn beams carried by them into working position with relation to the body-warp, the pawl
35 n^9 , when in use, being employed to reverse the rotation of said toothed plate and toothed gear, and consequently the sprocket-chain, at the same speed.

40 By changing the locking device n^4 from one to the other hole, the positions of the pins n^7 with relation to the toothed gear n are so changed that at the next operation of the pawl the latter will move the chain for only one-
45 half the distance—as, for instance, if one round of the chain supported in any usual manner had been made, each alternate tube-frame and its tuft-yarn beams having been utilized in the production of a row of tufts, and it is
50 desired at the next round of the chain to use tuft-yarn beams which were omitted at the previous round of the chain—then the operator will merely withdraw the locking device n^4 and move the plate n^6 , independently of
55 the gear n , far enough to put the locking device in the next hole n^3 , and thereafter the alternate tuft-yarn beams which were used at the previous round will be brought into position to be taken in usual manner from the
60 chain for the production of rows of tufts.

The pawls n^8 and n^9 are pivotally mounted upon pawl-carriers o o' , and each has its fulcrum on a stud o^2 , each pawl having connected with it a suitable spring, as o^3 , by which
65 to either keep the pawl pressed toward the plate n^6 , as represented by the pawl n^9 , or to hold the pawl away from the said plate, as

represented by the pawl n^8 . The operator may easily throw either pawl out of engagement or into engagement according to the direction it is desired to run the chain. 70

The tube-frame consists of a bottom bar a , to which are attached in usual manner the tubes b and a top bar a' , said bars being united at their ends by suitable stands a^2 , which in this instance of my invention afford bearings for the outer end journals of two tuft-yarn beams. Each bar of the tube-frame is shown as provided with a bending-point, for simplicity made as a cross-cut, indicated in the top bar at 2; and at opposite sides of said bending point 2 I have attached to the bar in suitable manner, as by screws 3, suitable blocks c , forming part of an adjusting device, said blocks, as herein shown, having one or more ears 4, in which I have placed adjusting-screws c' , said screws having suitable adjusting-nuts, (shown in Figs. 3 and 6 as three in number and marked 5, 6, 7,) and by changing the position of the nuts on said bolts in one or the other direction said ears may be forced apart or pulled together, that depending upon whether it is desired to bend the bar down or up. At a point between the ends of the bottom and top bars I have provided a beam-stand d , (see Fig. 9,) made, preferably, as a casting, having its ends flanged to partially embrace said bars, and I have shown said stand as slitted or bifurcated at one end, its lower end, as at 8, and straddling the bending-point or cross-cut in the bottom bar, indicated at a^* , and I have combined with suitable ears 9 of said stand an adjusting device, shown as a screw 10, having suitable nuts 12, 13, 14, preferably three in number, and by adjusting said nuts on said screw the bottom bar may be strained or sprung laterally or be adjusted in such manner as to deflect it more or less laterally, and thus neutralize any lack of alignment in a direction at right angles to the length of the loom. I have shown means whereby the bottom bar may be bent or swung up or down or laterally between the ends, as by a hinge, and it will be obvious that the adjusting devices may be applied, as shown, to both or to one bar, and that instead of the cut 2, I may use any equivalent, to thereby afford for the ends of the bar a turning-point, about which to be moved, to enable the bar to move one end with relation to the other end. 100

The intermediate stand d has combined with it a cap d^4 , shown as hinged at d^5 , said cap forming one side of a box or bearing to receive the journals 15 at the contiguous ends of a pair of tuft-yarn beams f , said cap having a suitable locking device, preferably made as a spring-controlled latch 16. 125

I have shown the journals 15 as slabbed off or partially cut away, (see Fig. 10,) to thus leave flattened faces to enable one journal to overlap another journal when brought together in the bearing-stand, the journals when shaped to overlap and engage each other serv- 130

ing the purpose of couplings between two adjacent tuft-yarn beams, to thus insure their rotation in unison.

I have shown the bottom bar as provided with suitable friction springs or devices *g*, adapted to bear against the head of each beam and prevent it from turning too freely.

The outer ends of the bottom bar have the usual fingers *h* and springs *h'* to co-operate with the usual chains $c^{2\times} c^{3\times}$ common to said Patent No. 490,237, which chain carries the tube-frames when not being used to have their yarns inserted for tufts.

I have herein shown the frame as provided with two beams; but this invention is not limited to the employment of only two beams, and while I have shown but one cut 2 and adjusting devices at each side of it this invention is not limited to any particular number of cuts more than one, nor to the exact construction shown for the adjusting devices, nor to the number of them or of the screws used.

In Fig. 11 I have shown one screw mounted on the top of the bar.

It will be understood from the foregoing description that the tube-frame, or the frame to which are attached the tubes, through which are led the tuft-yarns in order that they may be inserted into the sheds made in the body-warps, as provided for in looms for weaving tufted fabrics, has a plurality of spools, and thereby it is possible to weave tufted fabrics of any desired width, and by providing the tuft-frames with adjusting devices to spring or bend the same, so that the bottom bar may be bent up and down with relation to the warp or laterally, it is possible to effect a proper alignment of the tubes connected with the bottom bar with relation to the warp, with which, by suitable weft, will be incorporated the tuft-yarns wound on the said tuft-yarn spools, when the tuft-frames are brought into position by the chains and are lowered to deliver up their yarns and then be brought back again, all in usual manner.

The up and down and the side adjusting devices might be applied to the lower bar of a tube-frame and be productive of advantages, and my invention for aligning the bottom bar is not to be limited in all instances to the exact tube-frame shown, but may be applied to the bottom bar of any usual tube-frame. It will be understood that where two or more spools are used in a tube-frame the spools must be sustained at their inner ends, and this is done by providing the tube-frame with suitable-bearing stands in order that the journals or equivalent devices constituting the centers of rotation of the spools may be kept in a substantially horizontal plane. Nor is it limited to the exact form of the adjusting devices shown, as it is obvious that other methods for bending the bars may be employed. Neither is it limited to the use of transverse cuts in the bars, as such bars may be bent without their use.

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

1. In a loom for weaving tufted pile fabrics, the shaft *m'* having sprocket wheels, the tube-frame carrying chains *m*⁴, a series of tube-frames having tuft-yarn spools, the gears *m*², and toothed gear *n*, combined with a toothed plate, and a locking device to connect said toothed plate and gear *n* at different points, a pawl and ratchet mechanism and actuating devices therefor, whereby the said shaft *m'* may be rotated in such manner as to bring into working position and leave there only certain predetermined tube frames carried by said chain, and then by an adjustment of the toothed plate on the toothed gear bring into working position other tube frames not used at a previous rotation of the chain, substantially as described.

2. A tube frame and its connected series of tuft yarn tubes, combined with devices to effect the up and down bending of the bar carrying the tubes, substantially as described.

3. A tube frame and its connected series of tuft yarn tubes, combined with devices to effect the lateral bending of the bar to which the tubes are attached, substantially as described.

4. In a loom for weaving tufted fabrics, a tube frame composed of a top and bottom bar, and adjusting mechanism to co-operate therewith and effect the up or down bending of the bottom bar of the tube frame, substantially as described.

5. In a loom for weaving tufted fabrics, a tube frame composed of top and bottom bars connected to each other, combined with adjusting devices to effect the springing or bending of the bottom bar laterally, substantially as described.

6. A tube frame, combined with a plurality of tuft yarn carrying spools, and independent stands having bearings for the ends of said spools, substantially as described.

7. A tube frame, composed of top and bottom bars, a series of tubes connected to the bottom bar, bearings near the ends of said bars to support the outer ends of two tuft yarn spools, and intermediate bearings for the inner ends of said spools, substantially as described.

8. A tube frame composed of top and bottom bars connected at their ends, combined with a bearing stand connecting said bars between their ends, said stand being bifurcated at one end, and adjusting mechanism connected to said stand, substantially as described.

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

HORACE WYMAN.

Witnesses:

JUSTIN A. WARE.

SAMUEL B. SCHOFIELD.