

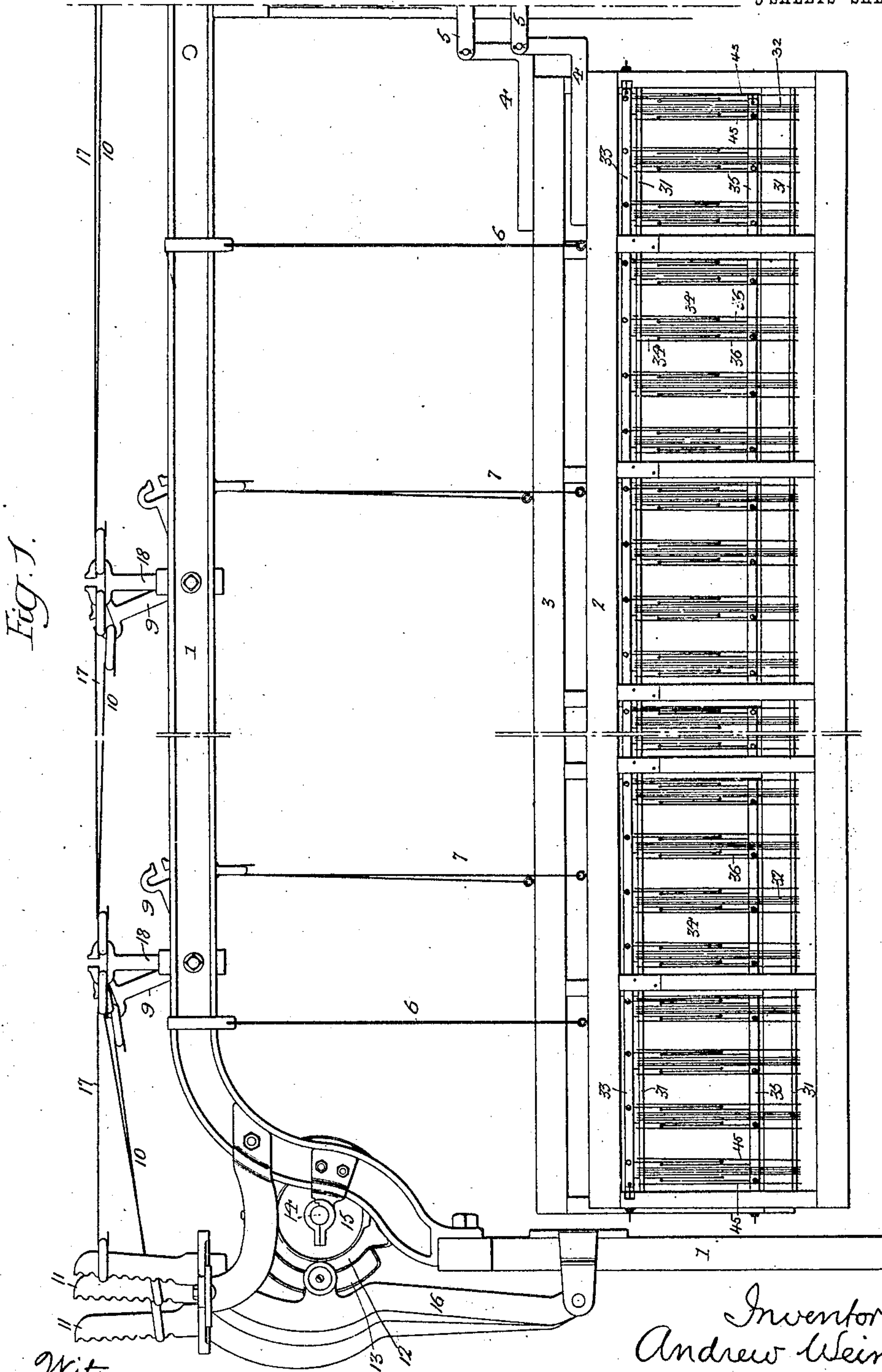
No. 849,647.

PATENTED APR. 9, 1907.

A. WEIMAR.
CROSS WEAVING LOOM.
APPLICATION FILED AUG. 8, 1905.

5 SHEETS—SHEET 1.

Fig. 1.



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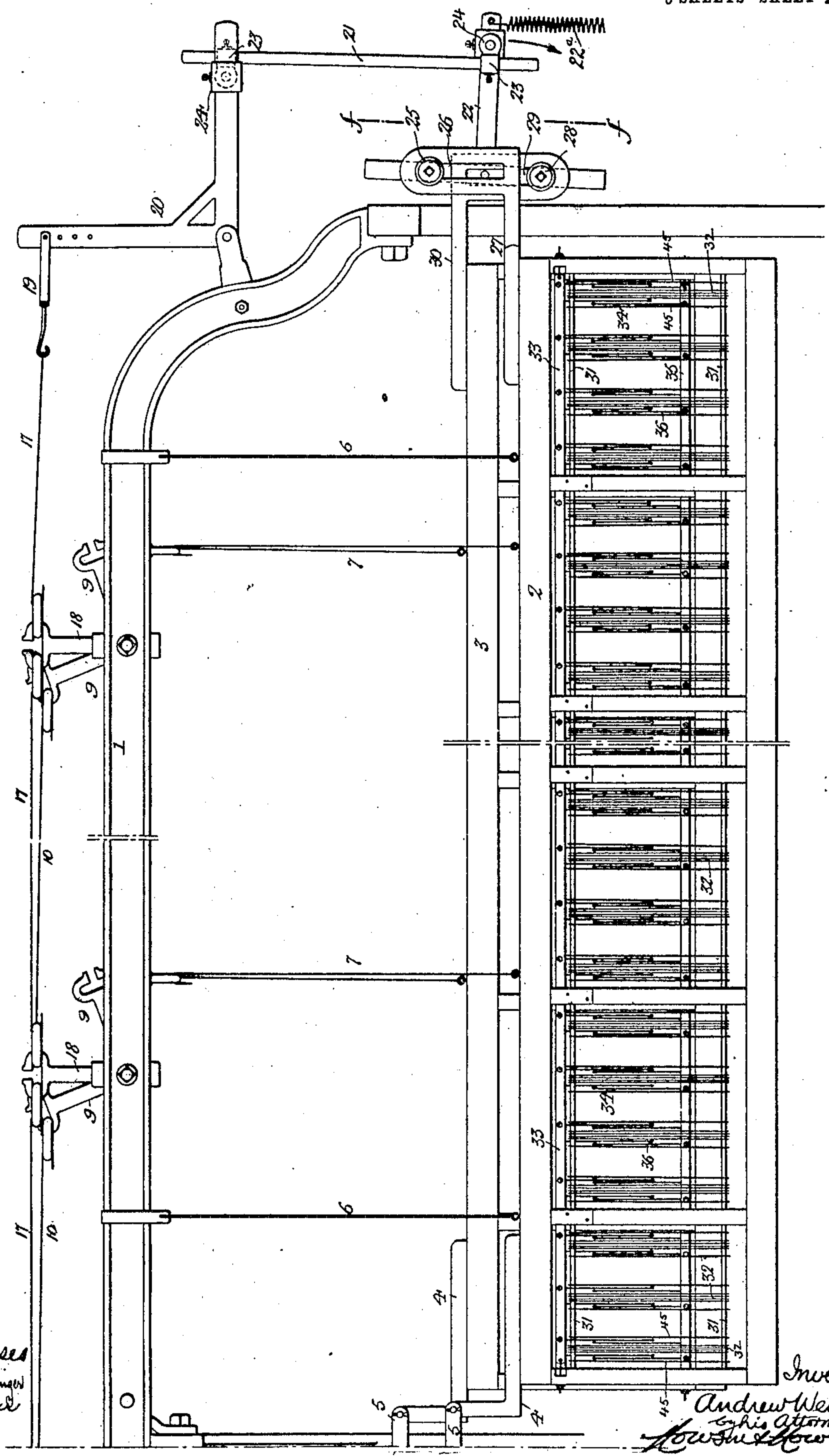
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5 SHEETS—SHEET 2.

Fig. 2.



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Fig. 5.

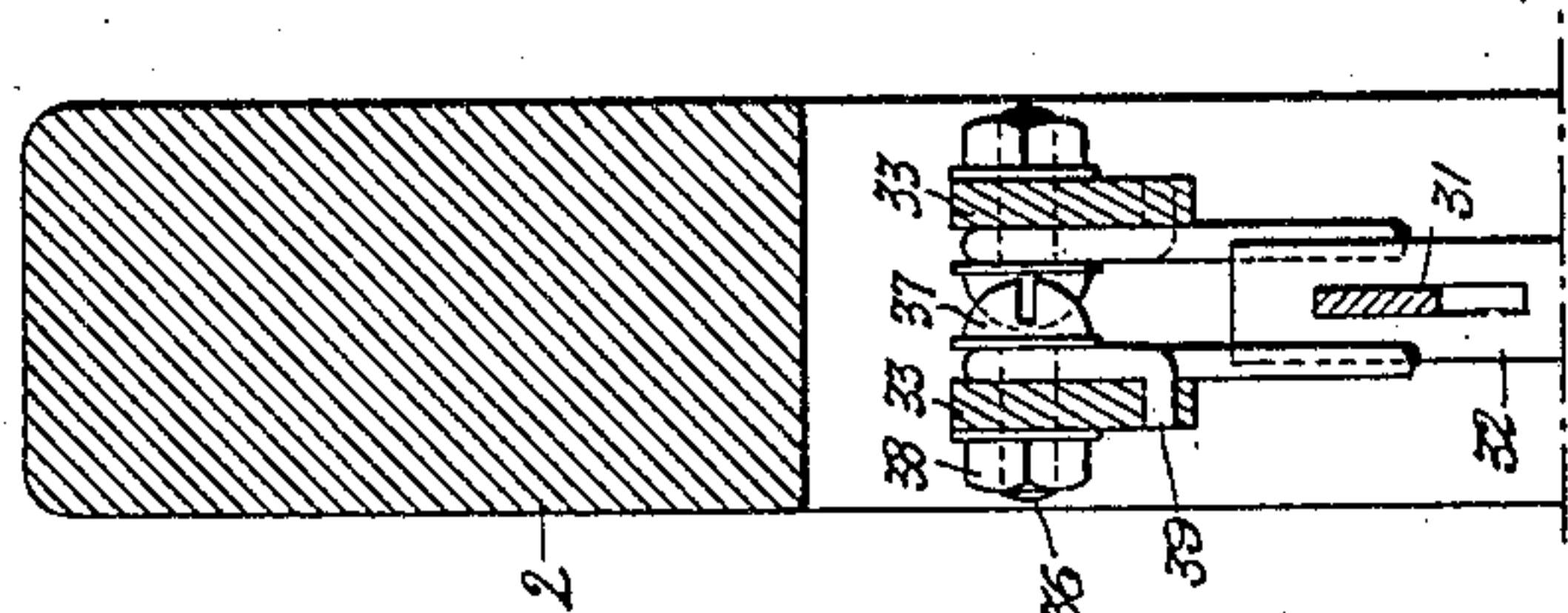


Fig. 4.

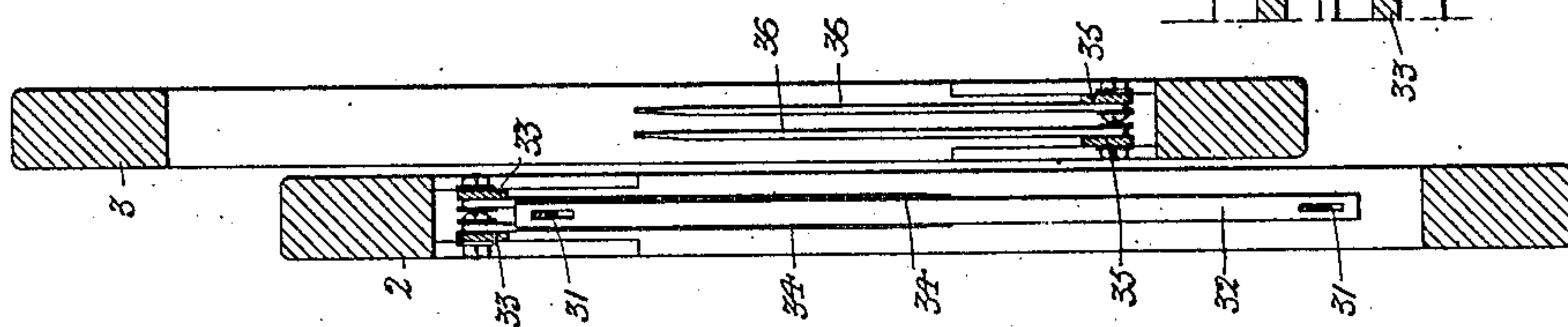


Fig. 6.

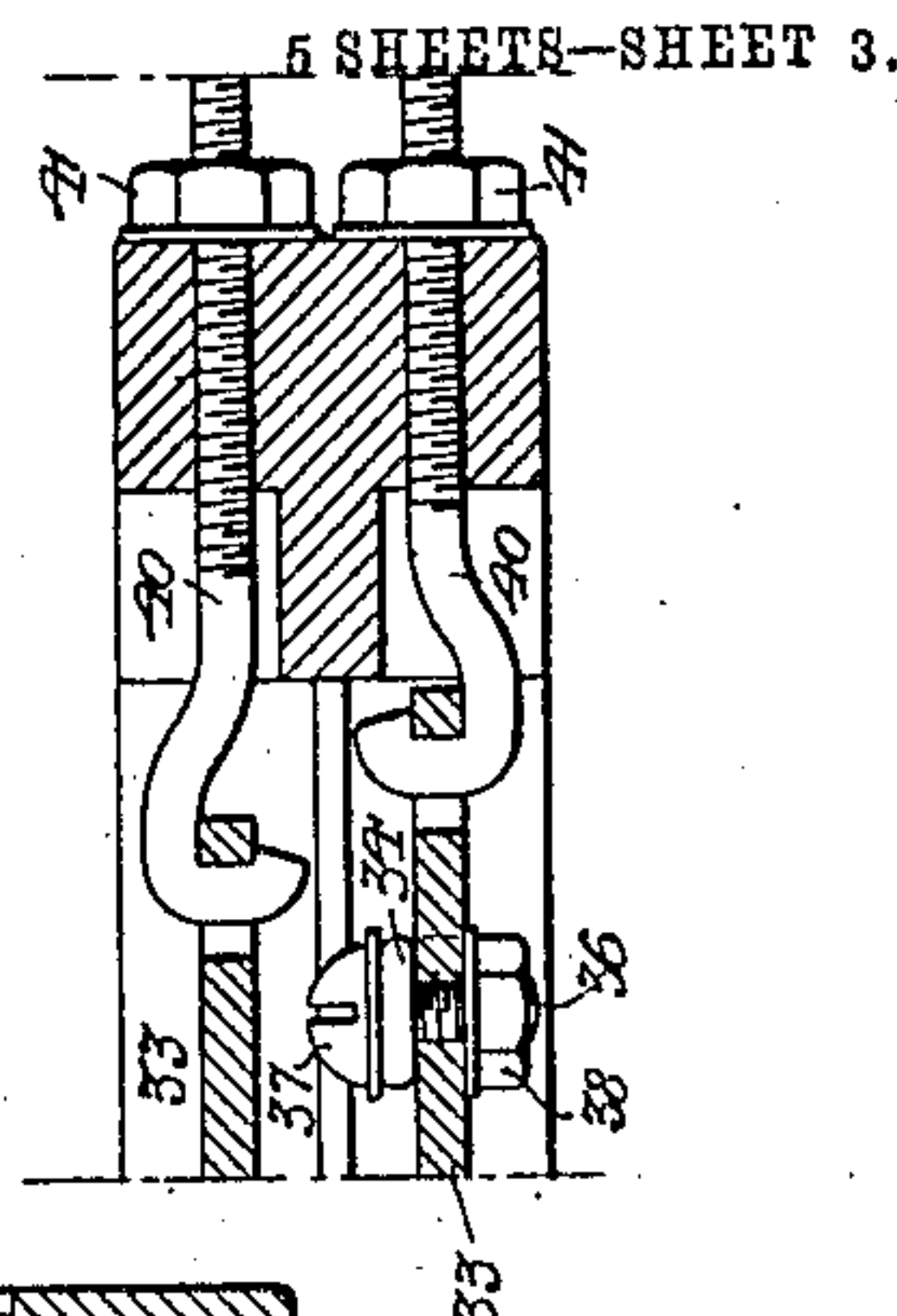
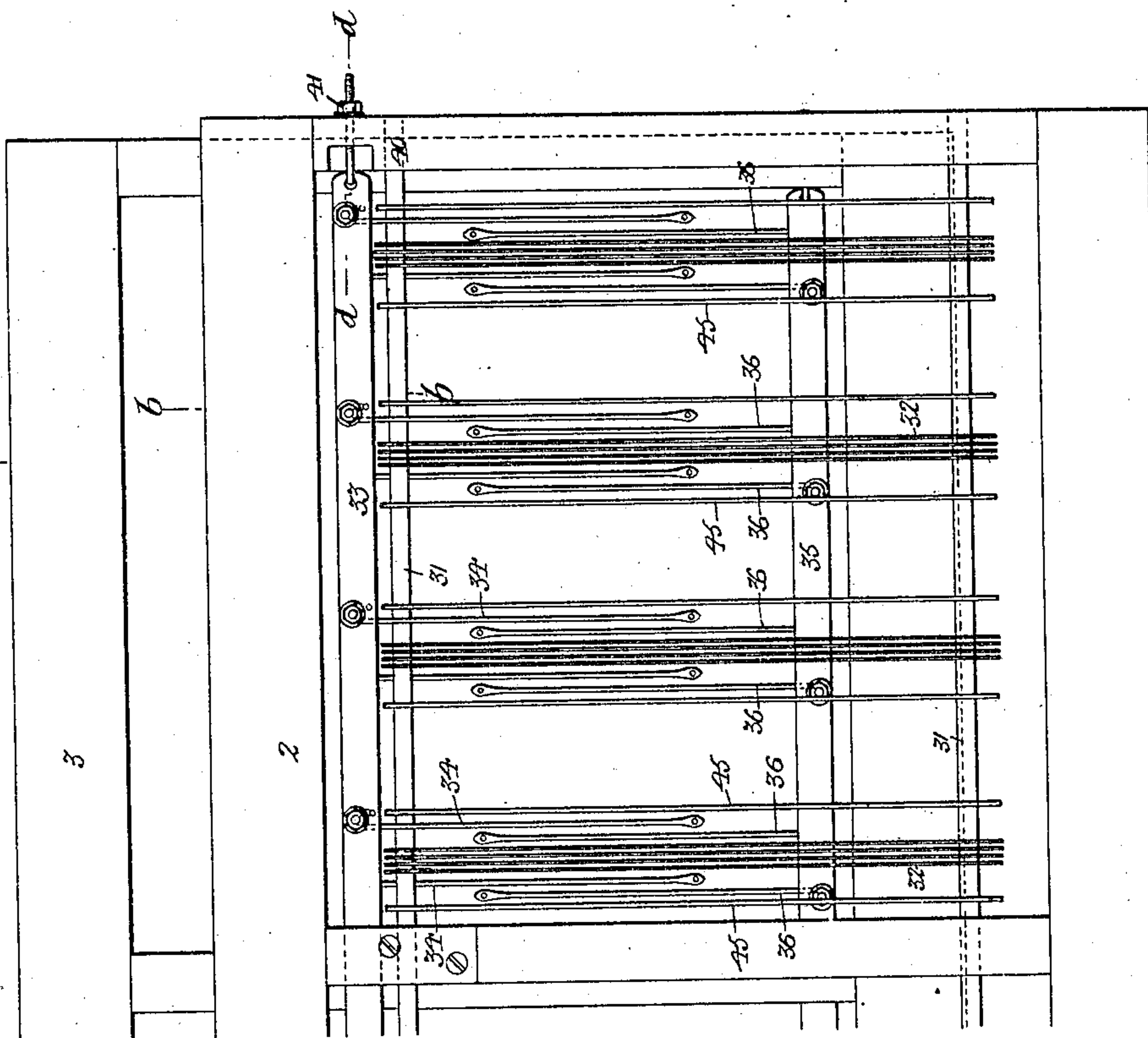


Fig. 3.



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5 SHEETS—SHEET 4.

Fig. 7.

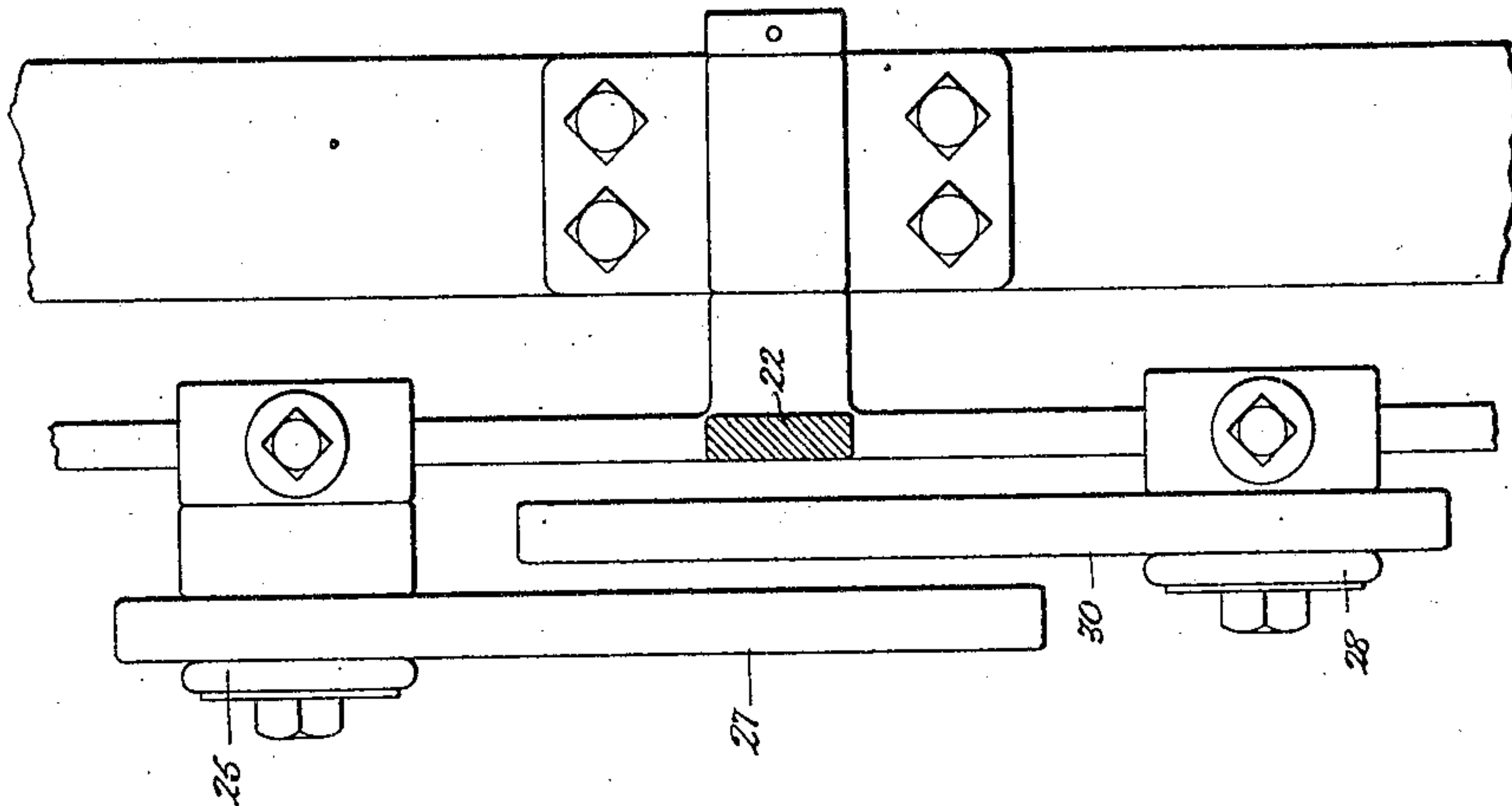


Fig. 9.

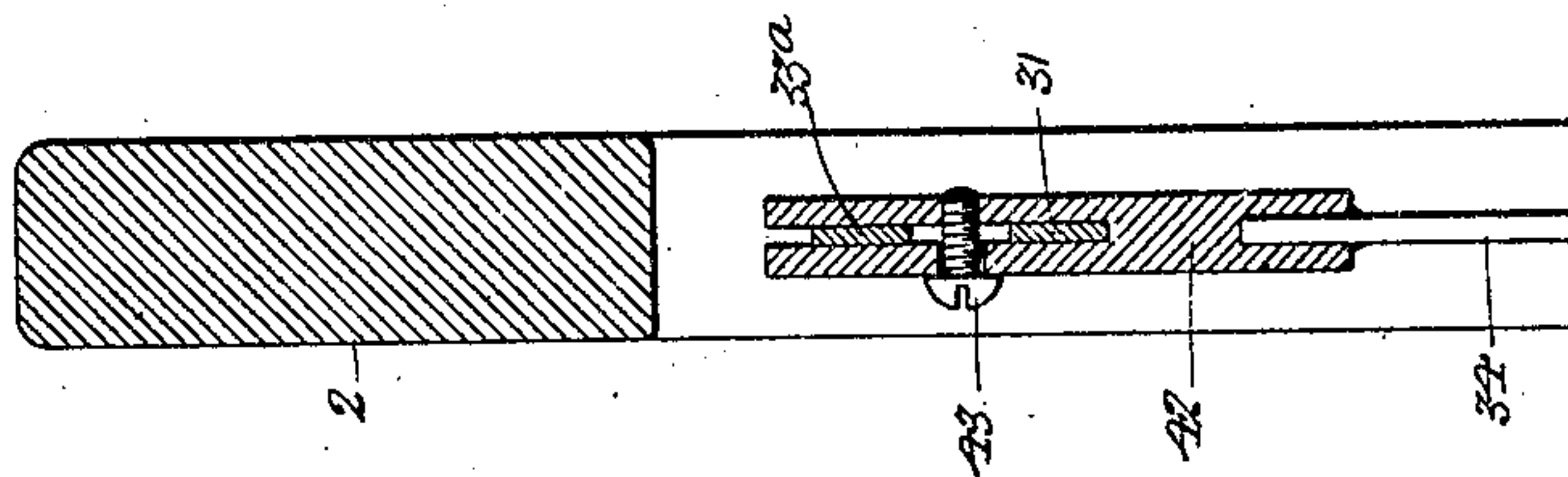
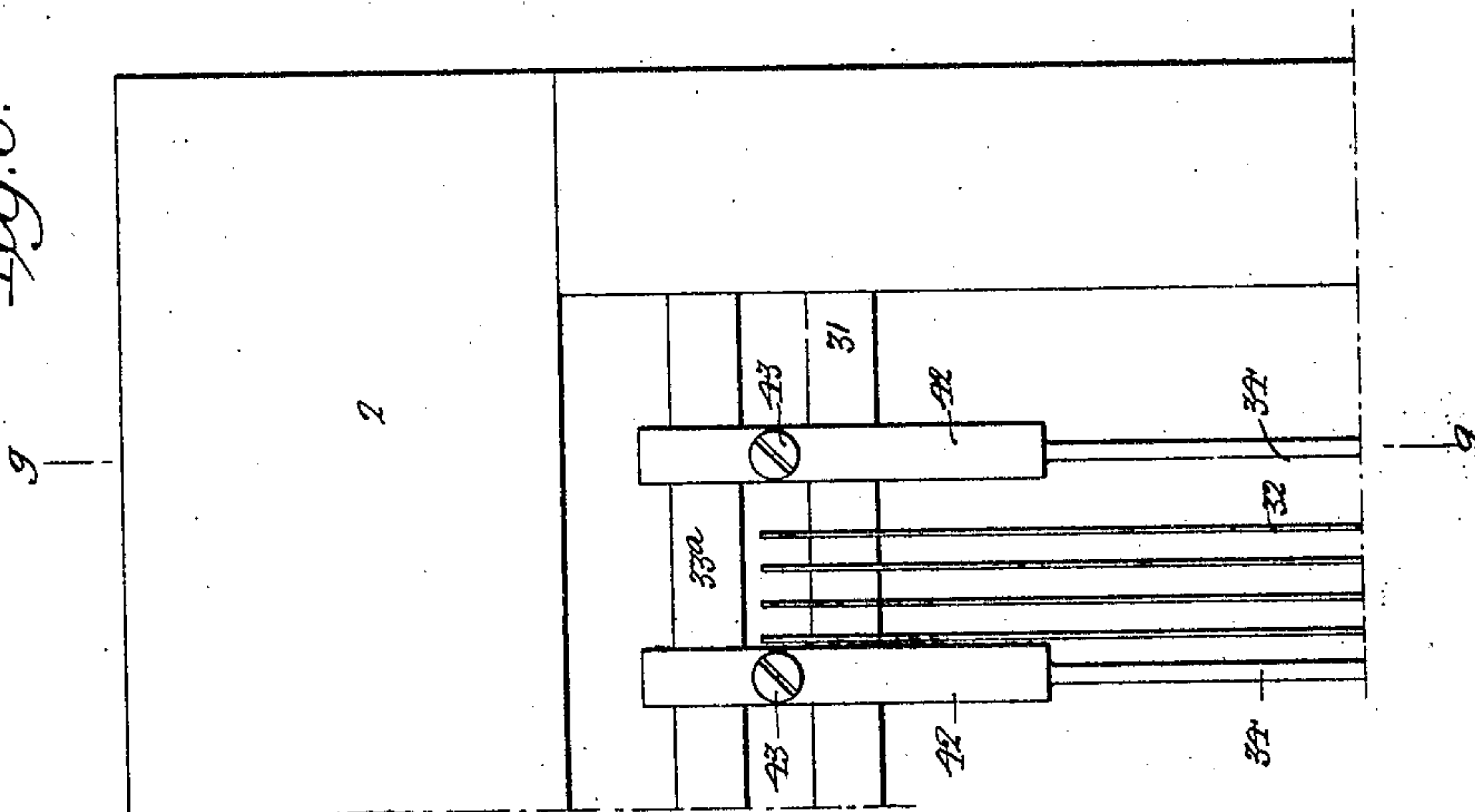


Fig. 8.



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5 SHEETS—SHEET 5.

Fig 10.

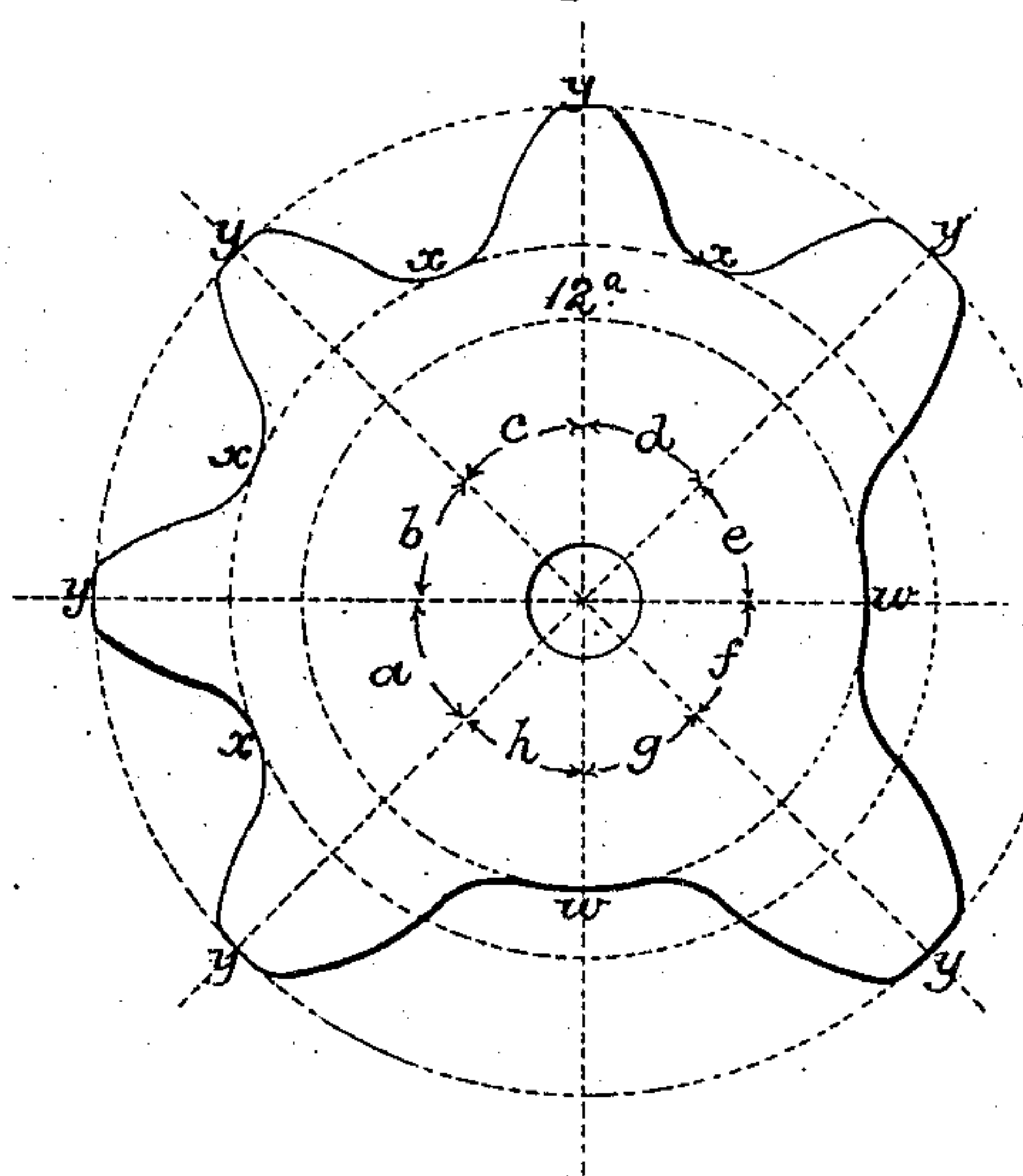


Fig 11.

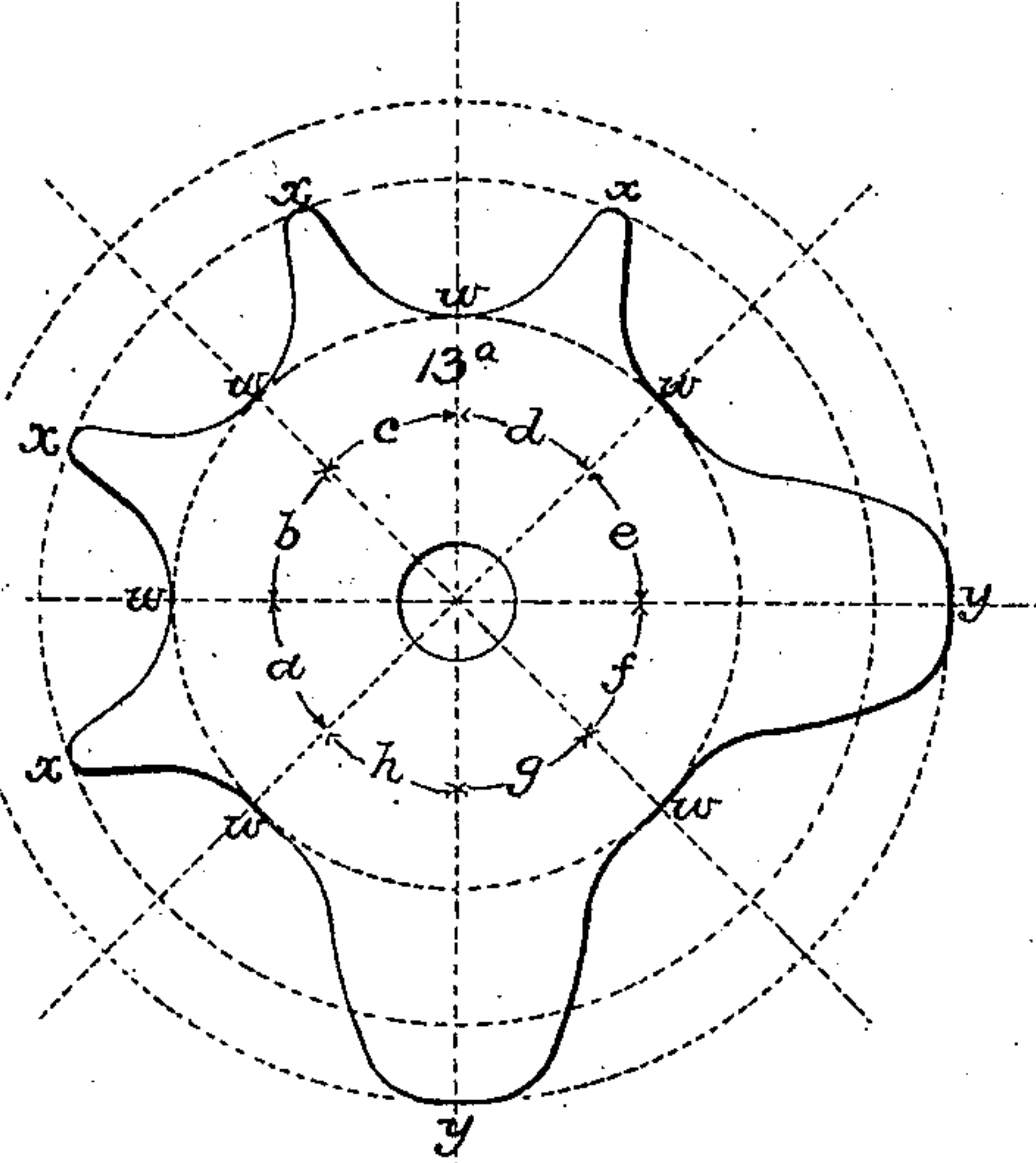


Fig 12.

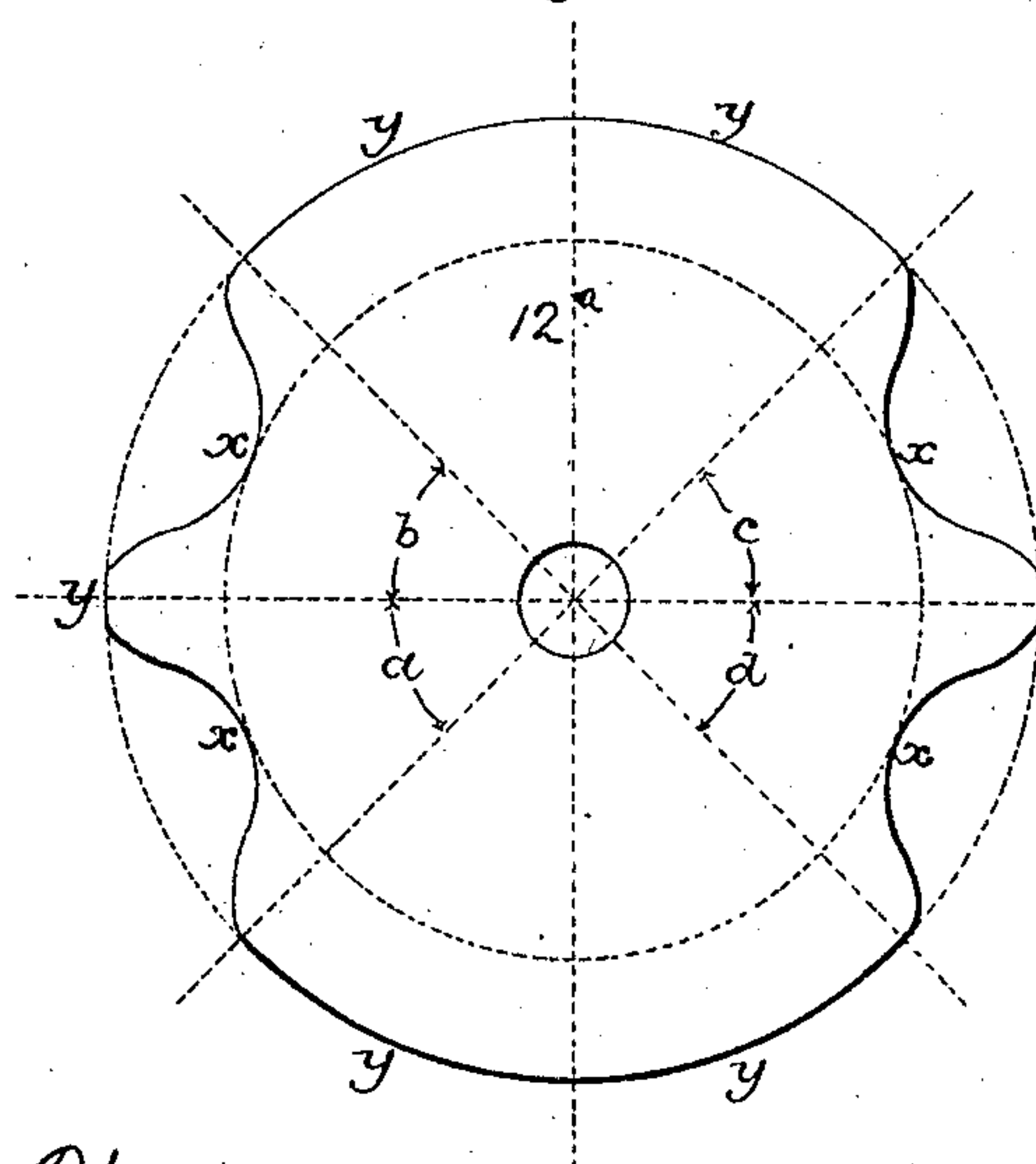
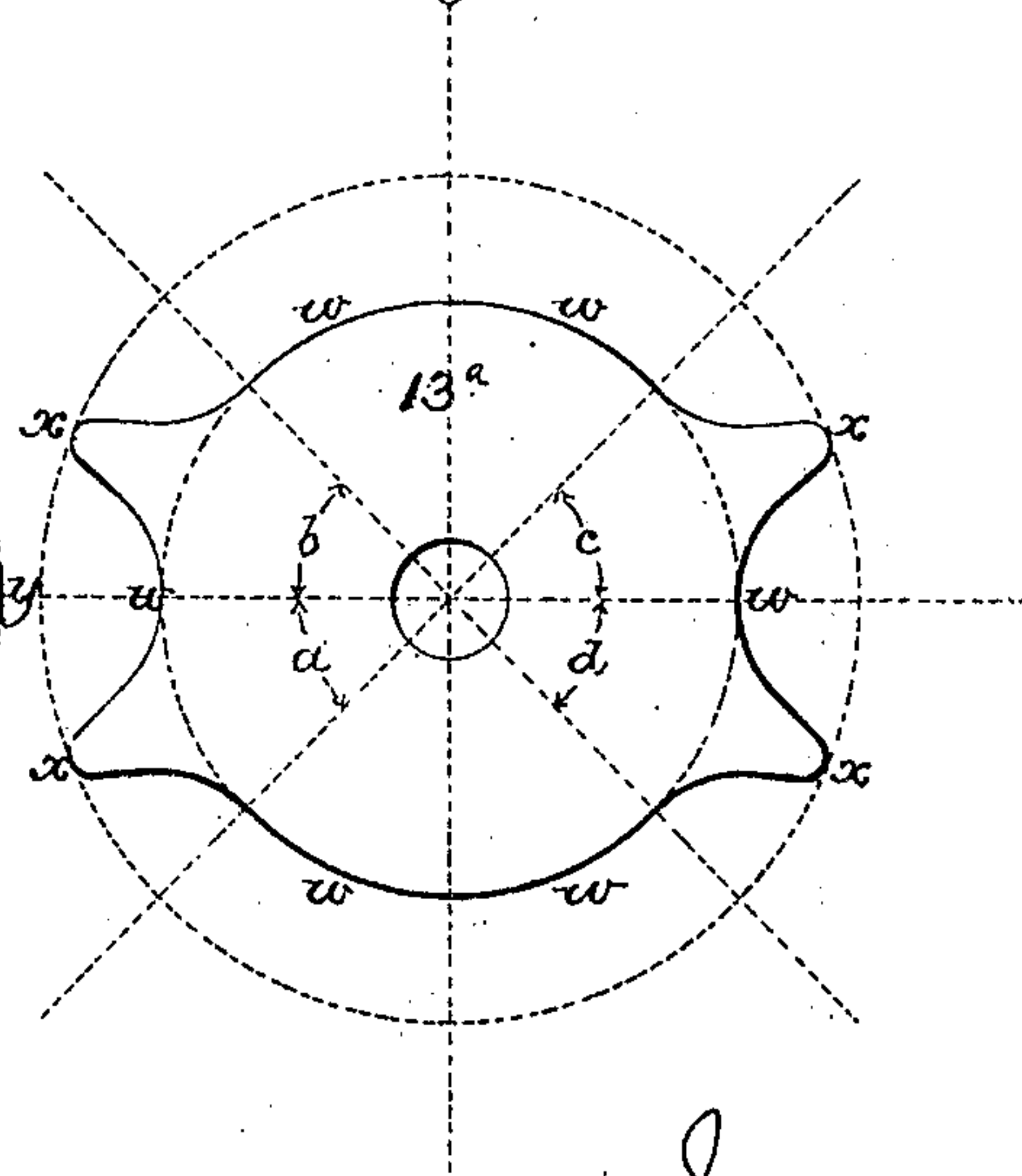


Fig. 13.



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UNITED STATES PATENT OFFICE.

ANDREW WEIMAR, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO WILLIAM D. WEIMAR, OF PHILADELPHIA, PENNSYLVANIA.

CROSS-WEAVING LOOM.

No. 849,647.

Specification of Letters Patent.

Patented April 9, 1907.

Application filed August 8, 1905. Serial No. 273,228.

To all whom it may concern.

Be it known that I, ANDREW WEIMAR, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Cross-Weaving Looms, of which the following is a specification.

My invention relates especially to improvements in that class of cross-weaving looms which are employed in weaving narrow webs, the cross-weaving being adopted in connection with certain of the warp-threads of each web—such, for instance, as the warp-threads at the selvages of the web—although certain features of the invention are applicable to cross-weaving looms generally.

The objects of the invention are to expedite the weaving operation, to simplify and cheapen the construction of the loom, to alternate plain weaving and cross-weaving with the same set of warp-threads, and to provide for quick and accurate adjustment in respect to each other of the warp-thread-controlling devices of the loom.

In the accompanying drawings, Figure 1 is a front view of one end of sufficient of a cross-weaving loom to illustrate my present invention. Fig. 2 is a similar view of the other end of the loom. Fig. 3 is an enlarged front elevation of the end portion of the heddles of the loom. Fig. 4 is a transverse section on the line *a a*, Fig. 3. Fig. 5 is a transverse section, on a larger scale, on the line *b b*, Fig. 3. Fig. 6 is a sectional plan view, also on an enlarged scale, on the line *d d*, Fig. 3. Fig. 7 is a view, partly in end elevation and partly in section, on the line *f f*, Fig. 2. Fig. 8 is a side elevation of part of a heddle, illustrating a special feature of construction forming part of my invention. Fig. 9 is a transverse section on the line *g g*, Fig. 8; and Figs. 10 to 13, inclusive, are views of cams employed when it is desired to alternate plain weaving and cross-weaving with the same set of warp-threads.

Referring first to Figs. 1 and 2, 1 represents part of the fixed frame of the loom, and 2 and 3 represent heddles, each composed of two sections, one extending from the central portion of the loom to the right-hand end of the same and the other extending from the central portion of the loom to the left-hand end of the same, each of these heddle-sections having at its inner end an angle-bar 4, which

is connected by a rigid transverse link 5 to a corresponding angle-bar at the inner end of the other section of the heddle, the two heddle-sections being thereby united by an elevated central connection, which while it insures rigidity of the heddle and uniform and simultaneous movement of both ends of the same yet does not interfere with any of the machinery usually located at the central portion of a loom of this type.

Each heddle is suspended from the arch-bar or yoke constituting part of the fixed frame of the loom by means of cords, wires, or other equivalent suspension devices 6, which serve to limit the descent of the heddle, and consequently prevent breaking of the warp-threads in the event of the breaking of either of the cords or wires 7, whereby each heddle is connected to bell-crank levers 9, which are hung upon suitable pivot-shafts carried by the upper frame of the loom and are by means of cords or wires 10 connected together and to a lever 11, each lever 11 having an antifriction-roller which is acted upon by a cam 12 or 13, mounted upon a shaft 14 at one end of the loom and rotated either continuously or intermittently by any suitable system of gearing. Another cam-disk 15 on said shaft 14 acts upon an antifriction-roller on a lever 16, hung to the same pin as the levers 11, this lever 16 being connected by a cord or wire 17 to an arm or lever 18, hung upon the same pivot-shaft as the levers 9, the connection being carried across the loom by other wires 17 and arms or levers 18 until the final cord or wire 17 is connected by a hooked yoke 19 to one arm of a bell-crank lever 20, which is pivoted to a bracket on the fixed frame of the loom and is connected by a rod 21 to another bell-crank lever 22, located in a lower plane and acted upon by a spring 22^a, which tends to move it in the direction of the arrow, Fig. 2. The rod 21 at its upper and lower ends engages and is secured to a tubular stud 23, which is pivoted to a slide 24, mounted upon the bell-crank lever 20 or 22, so as to be adjustable from and toward the fulcrum of the same. The lever 22 has three arms, the upwardly-projecting arm having a projecting stem with antifriction-roller 23, which engages a slot 26 in the vertical arm of an angle-bar 27, which is secured to the outer end of the heddle 2, the downwardly-projecting

arm of the lever 22 having a similar roller 28 which engages a slot 29 in the downwardly-projecting portion of an angle-bar 30, which is secured to the heddle 3. By the action of the cams 12 and 13, therefore, the heddles 2 and 3 are alternately raised and lowered, and by the action of the cam 15 the heddles are shifted laterally to a slight extent.

Each section of the front heddle 2 has mounted in its end bars and in certain intervening vertical bars upper and lower bars 31, upon which are loosely strung at appropriate intervals pairs or groups of vertical bars 32, between which pass those warp-threads of each set which are employed in weaving the plain fabric of each band, these warp-threads being controlled by ordinary heddles independent of the heddles 2 and 3 and having no cross movement. The heddle 2 also carries near the top a pair of bars 33, and each of these bars is provided with a series of depending needles 34, one of said needles being located at the right-hand side of each pair or group of reed-bars 32 and the other at the left-hand side of the same, and in like manner the heddle 3 is provided at its lower portion with a pair of similar longitudinal bars 35 with upwardly-projecting needles 36, located likewise at the right and left, respectively, of each pair or group of bars 32.

The needles 34 and 36 have at their free ends eyes for the reception of the warp-threads which are to be crossed, these warp-threads being in the present instance, the selvaging-threads of each group or set whereby a narrow web is woven, although the crossing warp-threads may be located in any desired portion of the web, the construction shown being simply one example of such location.

Outside of each pair of needles 34 36 is a guard-bar 45, mounted on the bars 31, whereby each group or set of cross-weaving warp-threads is confined between a pair of bars 32 and 45, thus preventing interference of said warp-threads with those adjacent thereto.

Each needle 34 or 36 is secured to its respective bar 33 or 35 by being looped or hooked around a bolt, which passes through said bar and has at one end a head 37 and at the other end a nut 38, as shown in Fig. 5, the bent or hooked end of the-needle being confined between the bar 33 or 35 and a washer under the head 37 of the bolt and being additionally secured to the bar, so as to prevent it from swinging or twisting thereon, by having a bent end portion 39, which enters an opening in the bar, and thus serves to lock the head of the needle rigidly thereto.

Each of the bars 33 or 35 has at each end an opening for the reception of the hooked inner end of a bolt 40, which passes through an opening in the end bar of the heddle and is threaded for the reception of a nut 41, which

bears upon the outer face of the heddle or upon a washer interposed between the same and the nut. These bolts 40 thus serve not only to maintain the bars 33 and 35 under tension, but also provide for a certain amount of lateral adjustment of said bars independently of each other, and thus provide for moving the needles 34 or 36 of each pair from and toward each other, so as to adapt them for use in connection with wider or narrower bands or change their position in respect to the width of the band, as may be desired, the loose mounting of the bars 32 and 45 on the longitudinal bars 31 also permitting of any desired lateral adjustment of said bars in respect to one another.

In Figs. 8 and 9 I have illustrated a construction in which the needles of each pair are adjustable in respect to each other independently of the needles of any other pair. In this construction a fixed longitudinal bar 33^a is employed, and each needle has at the tops a split head 42, which embraces both the bar 33^a and the bar 31 beneath the same and has a transverse clamp-screw 43. On loosening this screw the hold of the head 42 upon the bars 31 and 33^a is slackened, and said head can be moved laterally to any desired position on the bars required by the desired adjustment of the needle, the head being firmly clamped to the bars by again tightening the screw 43 after such adjustment has been effected. The lower crossing warp-thread of each set is carried by an upper needle 34, and the upper crossing warp-thread of each set is carried by a lower needle 36, and in cross-weaving the heddles carrying these needles are operated by what may be termed a "half-shed-and-return" movement—that is to say, the heddles are moved to an extent slightly in excess of one-half the opening of the shed, so that the free ends of the needles 34 will be slightly above the free ends of the needles 36, and at this time the lateral movement of the heddle-frames is effected prior to the drop of the frame 2 and the lift of the frame 3 to their former positions. This half-shed-and-return movement of the heddles is effected during one complete beat or forward and backward movement of the lay and can of course be made in less time than an up-and-down movement equal in extent to the full opening of the shed, as in previous looms of this class with which I am familiar. Hence the operation of the loom is correspondingly quickened.

If it is desired to combine cross-weaving and plain weaving with the same set of warp-threads, these half-shed-and-return movements of the heddles 2 and 3 alternate with full-shed movements without return and without crossing movement of either heddle, and in Figs. 10 to 13 I have shown cams con-

constructed in accordance with my invention for effecting this compound movement of the heddles, 12^a representing the cam which imparts movement to one heddle-frame and 13^a the cam which imparts movement to the other heddle-frame, the cams 12^a, Fig. 10, and 13^a, Fig. 11, having three throws *w*, *x*, and *y*, (indicated by the concentric dotted lines,) the cam 12^a, Fig. 12, having the two throws *x* and *y*, and the cam 13^a, Fig. 13, having the two throws *w* and *x*. Each of these cams is designed to have one complete rotation for eight rotations of the crank-shaft corresponding to eight full beats of the lay, and it will be observed that the movements *a*, *b*, *c*, and *d* will each effect a partial drop and a following rise or a partial rise and a following drop of the heddle acted upon, while the movements *e*, *f*, *g*, and *h* will effect a full drop or a full rise only, the movements *a*, *b*, *c*, and *d* corresponding with the cross-weave and the movements *e*, *f*, *g*, and *h* corresponding with the plain weave.

In the cam shown in Figs. 10 and 11 there is a movement of the heddles for each full beat of the lay; but in the cams shown in Figs. 12 and 13 there is no shedding of the cross warp-threads between the cross-weaves, the cams being so constructed as to provide for a dwell between the successive cross-weaving movements.

It will be understood that in a loom intended to combine cross-weaving and plain weaving with the same set of warp-threads in the manner described the cam 15 is so formed as to impart no lateral movement to the heddles 2 and 3 during the time that plain weaving is being performed.

The character of the cams will of course be determined by the character of the weave to be produced, and instead of using cams I may use pattern-chains with like conformation of the members for effecting movement of the heddles which control the cross-weaving warp-threads.

Having thus described my invention, I claim and desire to secure by Letters Patent—

1. The combination in a cross-weaving loom of the fixed frame, heddle-frames carrying eyed needles for controlling the cross-weaving warp-threads, cam-controlled shedding-levers, and a cam-controlled heddle-frame-shifting lever at one end of the loom, transmitting-levers at the other end of the loom and levers at the top of the loom whereby motion is transmitted from the shedding-levers to the heddle-frames and from the heddle-frame-shifting lever at one end of the loom to the transmitting-levers at the opposite end of the loom, substantially as specified.

2. The combination, in a cross-weaving loom, of the main frame, heddle-frames carrying eyed needles for controlling the cross-

weaving warp-threads, a cam-controlled heddle-frame-shifting lever at one end of the loom, a three-armed lever at the opposite end of the loom engaging one heddle-frame on one side of its fulcrum and the other heddle-frame on the other side of its fulcrum, and means for transmitting movement from said heddle-frame-shifting lever to said three-armed lever, substantially as specified.

3. The combination in a cross-weaving loom of heddle-frames carrying eyed needles for controlling the cross-weaving warp-threads, bars upon which said heddle-frames are mounted, and means for adjusting said bars laterally in respect to the heddle-frame so as to vary the relation of the needles to each other, substantially as specified.

4. The combination, in a cross-weaving loom, of heddle-frames having eyed needles for controlling the cross-weaving warp-threads, and bars flanking said needles on each side, substantially as specified.

5. The combination, in a cross-weaving loom, of heddle-frames having longitudinal bars carrying eyed needles for controlling the cross-weaving warp-threads, and other longitudinal bars upon which are mounted bars flanking the needles on each side, substantially as specified.

6. The combination of a heddle-frame having longitudinal bars thereon with transverse bolts therein, and eyed needles for controlling the cross-weaving warp-threads, each of said needles having a hooked end engaging a bolt of a longitudinal bar, and also having a bent end entering an opening in said bar, substantially as specified.

7. The combination, in a cross-weaving loom, of heddle-frames carrying eyed needles for controlling the cross-weaving warp-threads, means for simultaneously raising one of said heddles and lowering the other, and means for effecting lateral movement of the heddle-frames when the heddle-eyes are adjacent to each other at the center of the shed, substantially as specified.

8. The combination, in a cross-weaving loom, of heddle-frames having longitudinal bars, eyed needles for controlling the cross-weaving warp-threads, and means for laterally adjusting the needles of each heddle-frame from and toward each other on their supporting-bars, substantially as specified.

9. The combination, in a cross-weaving loom, of heddle-frames controlling the cross-weaving warp-threads, and pattern mechanism for operating said heddle-frames, said pattern mechanism having members for imparting to each heddle-frame a half-shed-and-return movement with intervening side movement for each full beat of the lay, substantially as specified.

10. The combination, in a cross-weaving loom, of heddle-frames for controlling the

cross-weaving warp - threads; and pattern
mechanism having, in alternation, members
for imparting to each heddle-frame during
each full beat of the lay, a half-shed-and-re-
5 turn movement with intervening cross move-
ment, or a full-shed movement without re-
turn or cross movement, substantially as
specified.

In testimony whereof I have signed my
name to this specification in the presence of 10
two subscribing witnesses.

ANDREW WEIMAR.

Witnesses:
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Jos. H. KLEIN.