

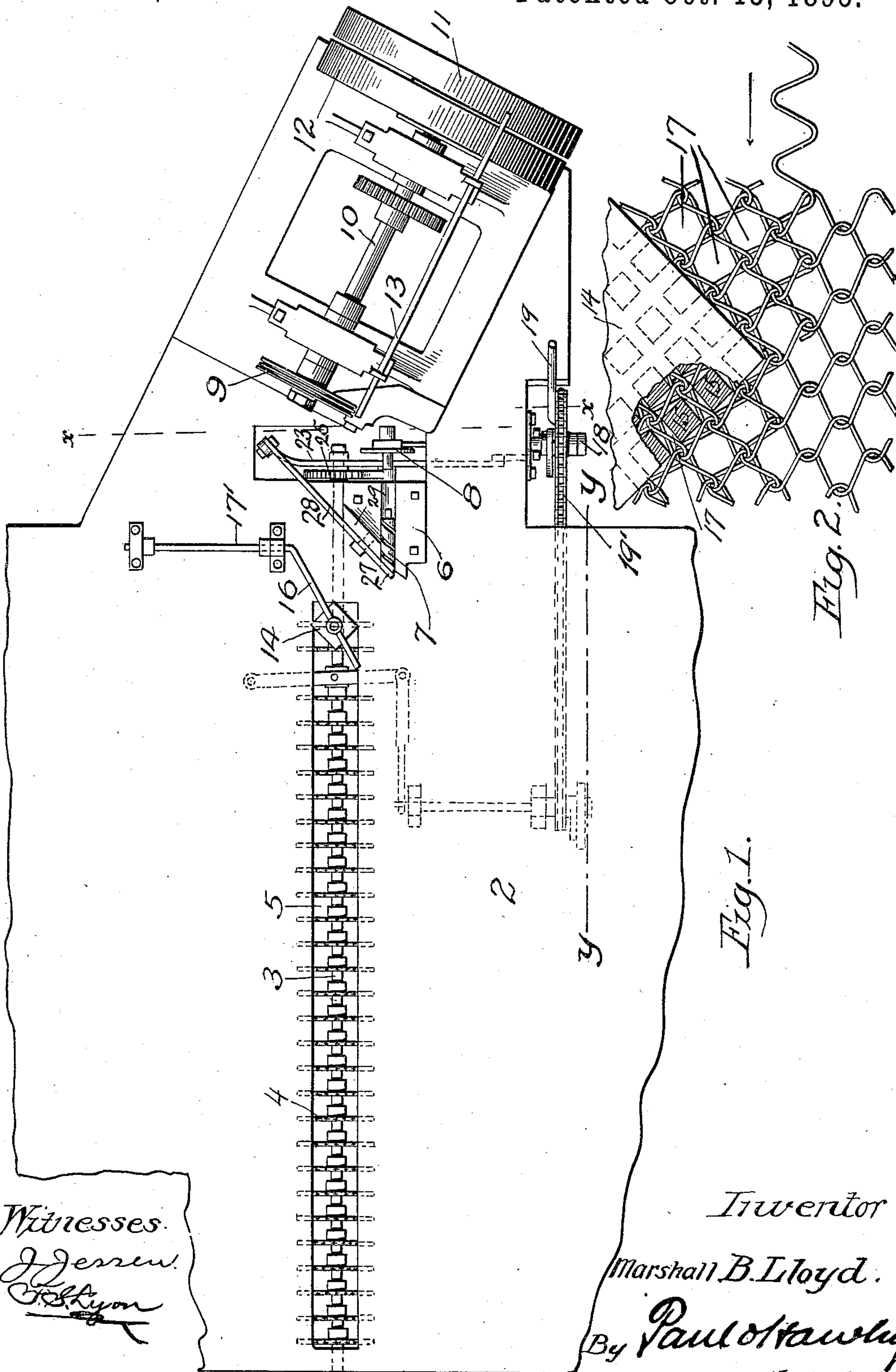
(No Model.)

4 Sheets—Sheet 1.

M. B. LLOYD.
WIRE COILING MACHINE.

No. 548,001.

Patented Oct. 15, 1895.



Witnesses.
J. Jensen.
C. E. Lyon.

Inventor
Marshall B. Lloyd.
By Paul O'Hawley
attorneys.

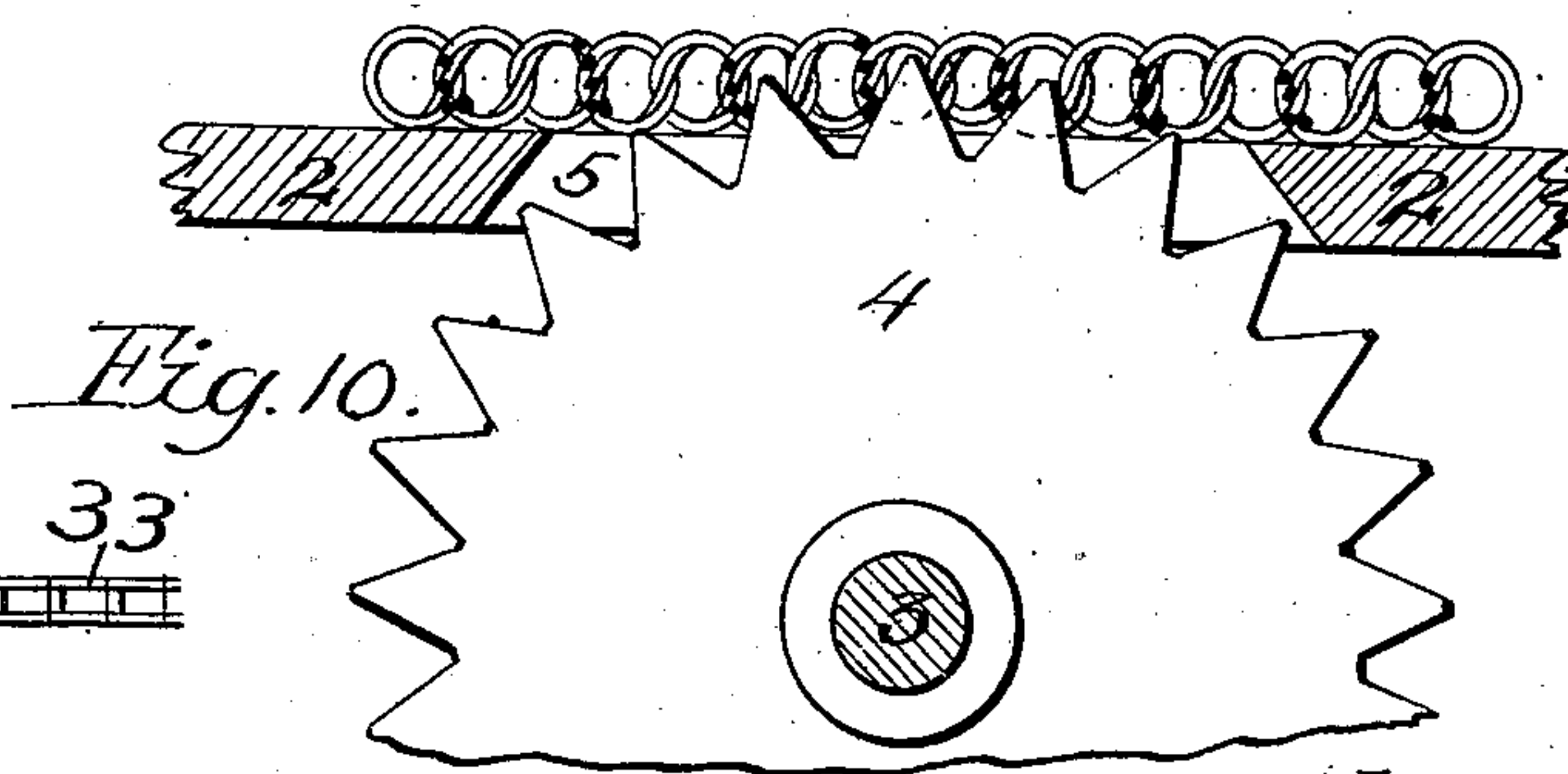
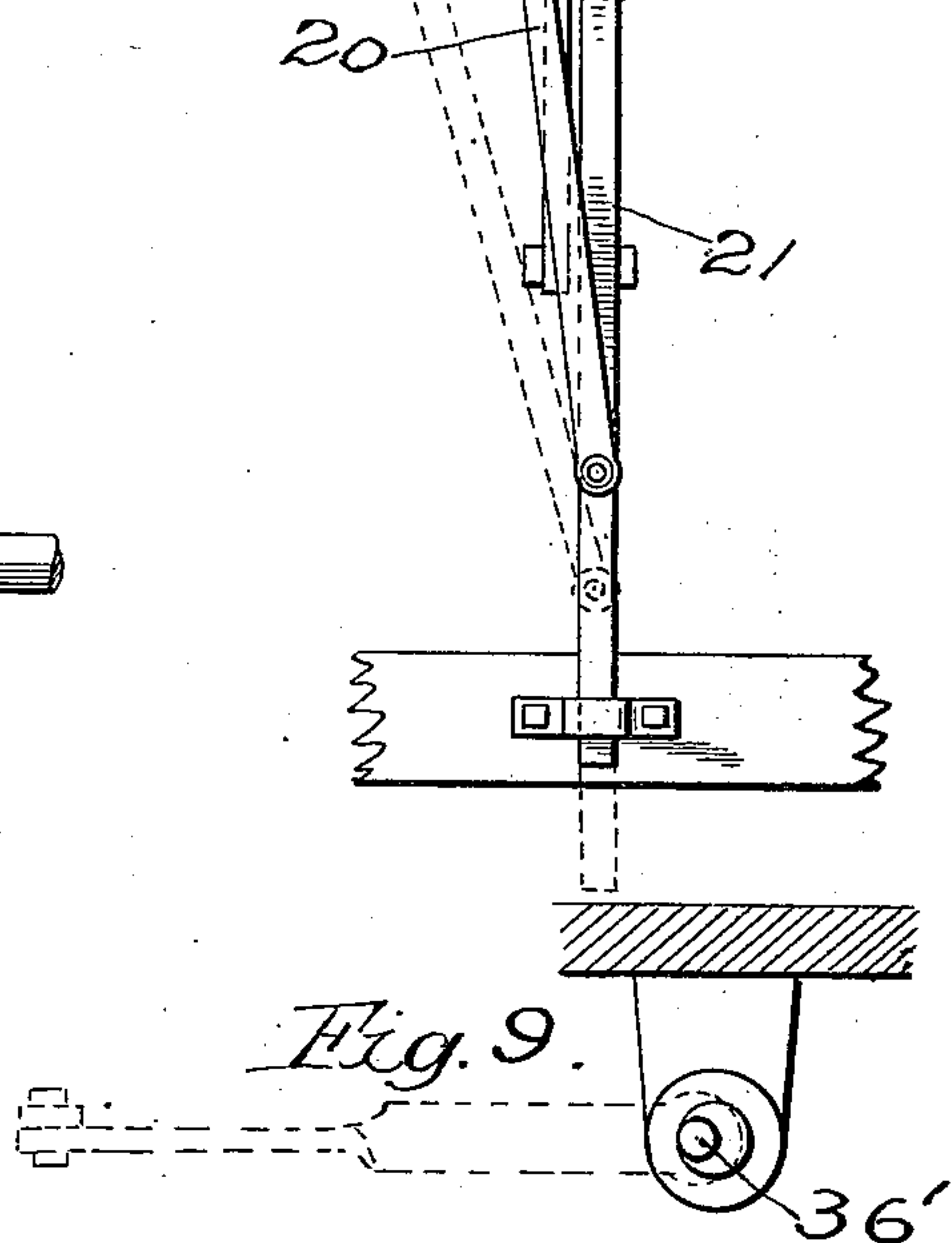
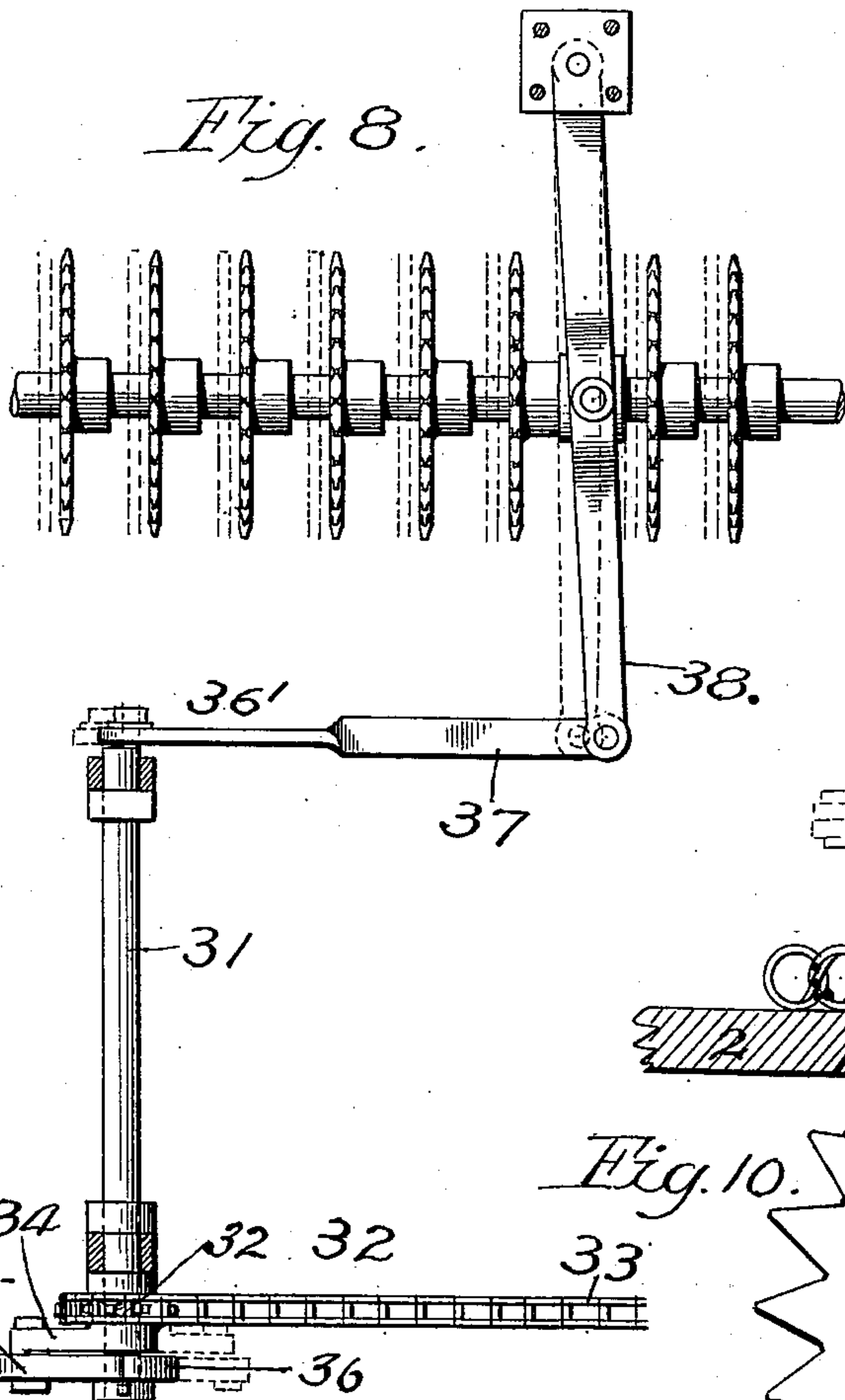
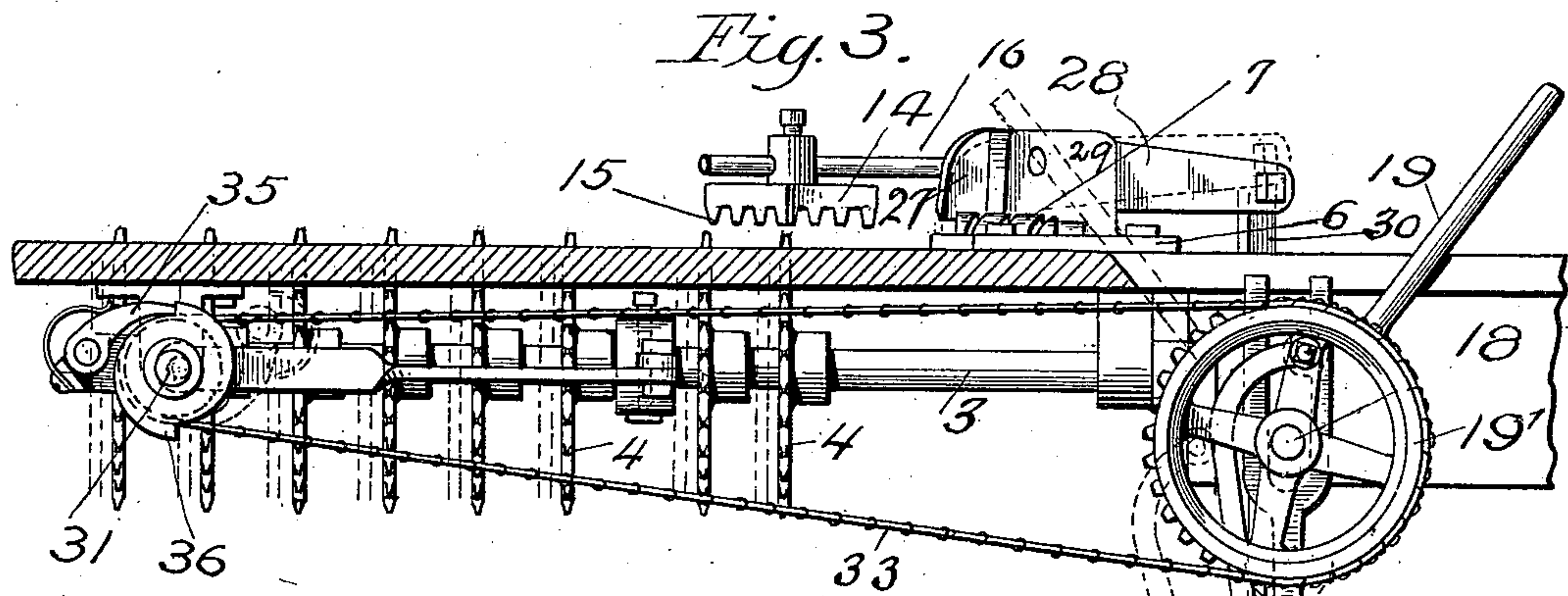
(No Model.)

4 Sheets—Sheet 2.

M. B. LLOYD.
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Patented Oct. 15, 1895.



Witnesses.

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4 Sheets—Sheet 3.

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Fig. 4.

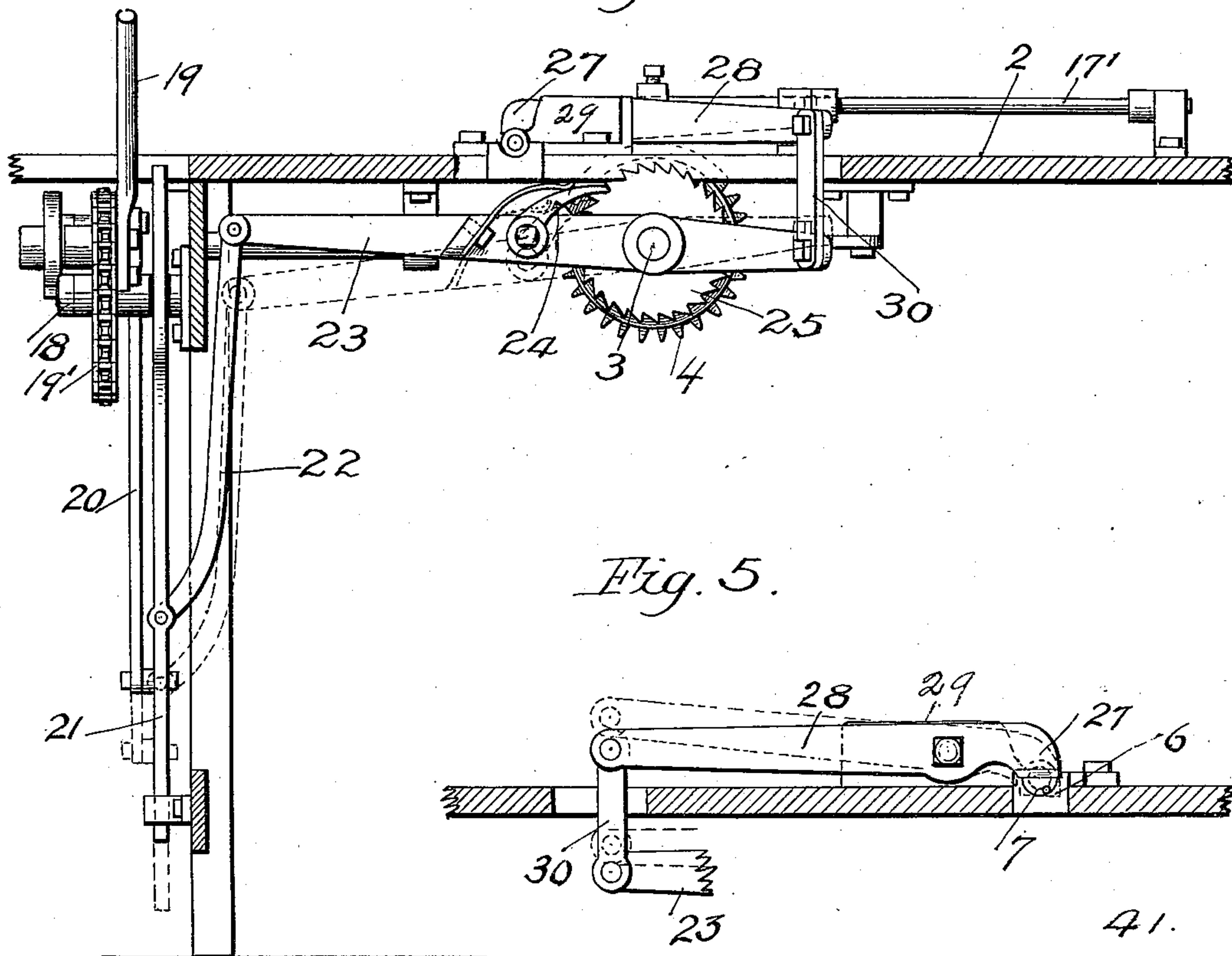


Fig. 5.

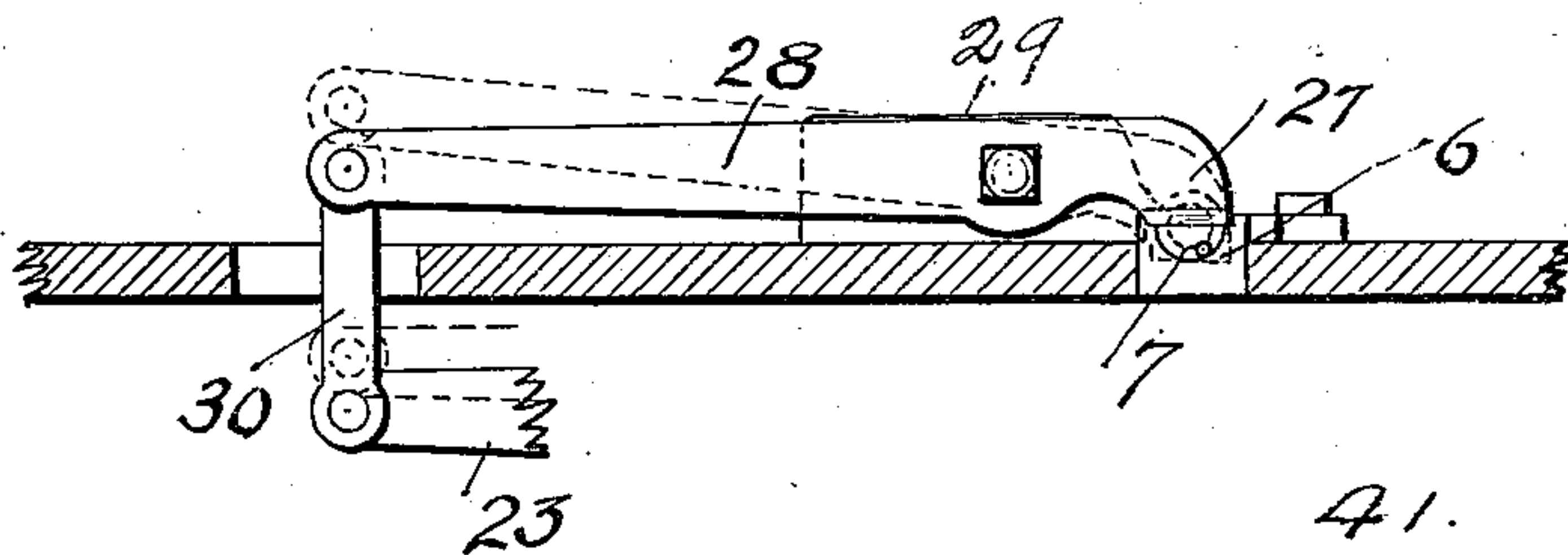


Fig. 6.

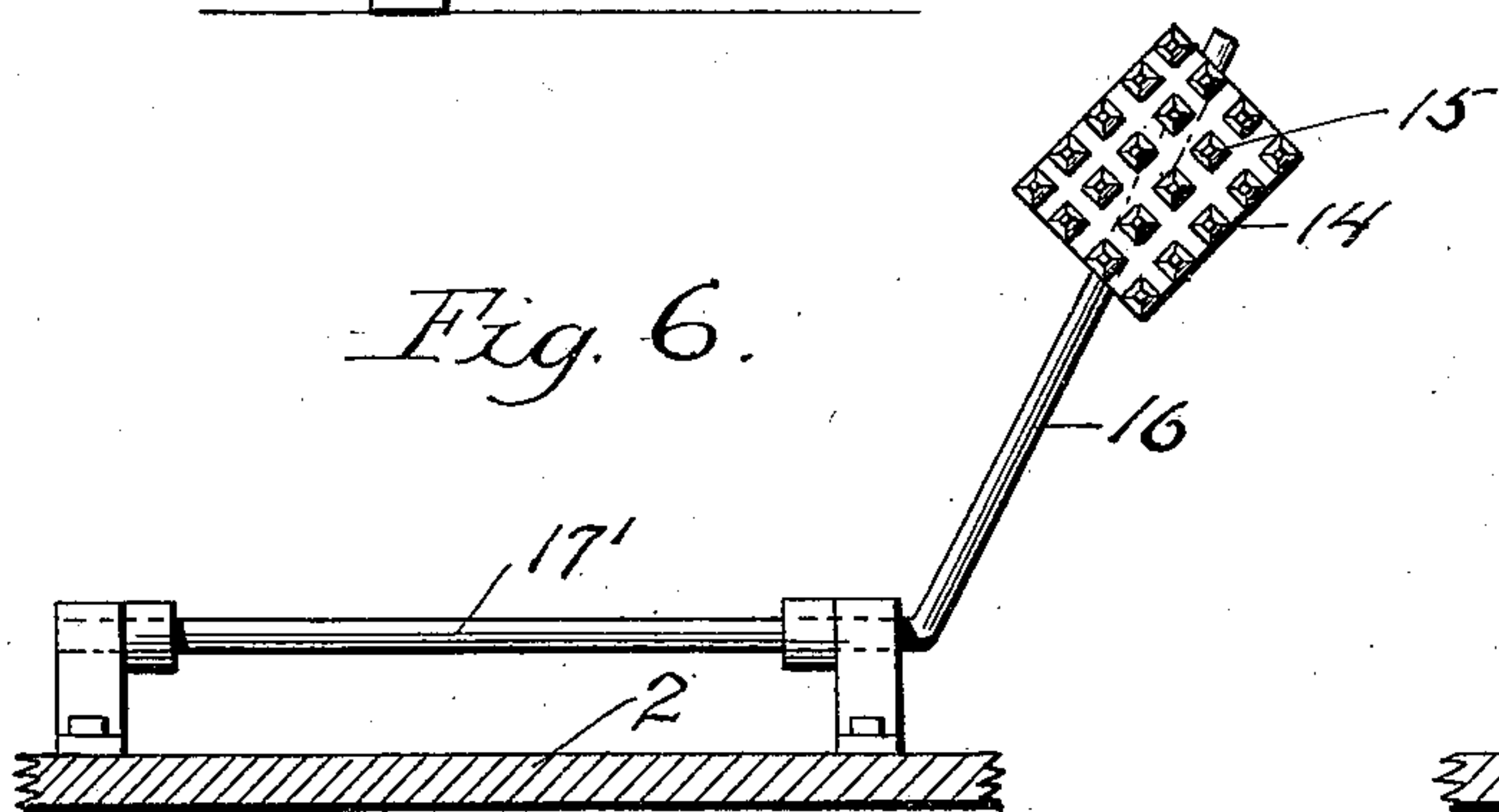
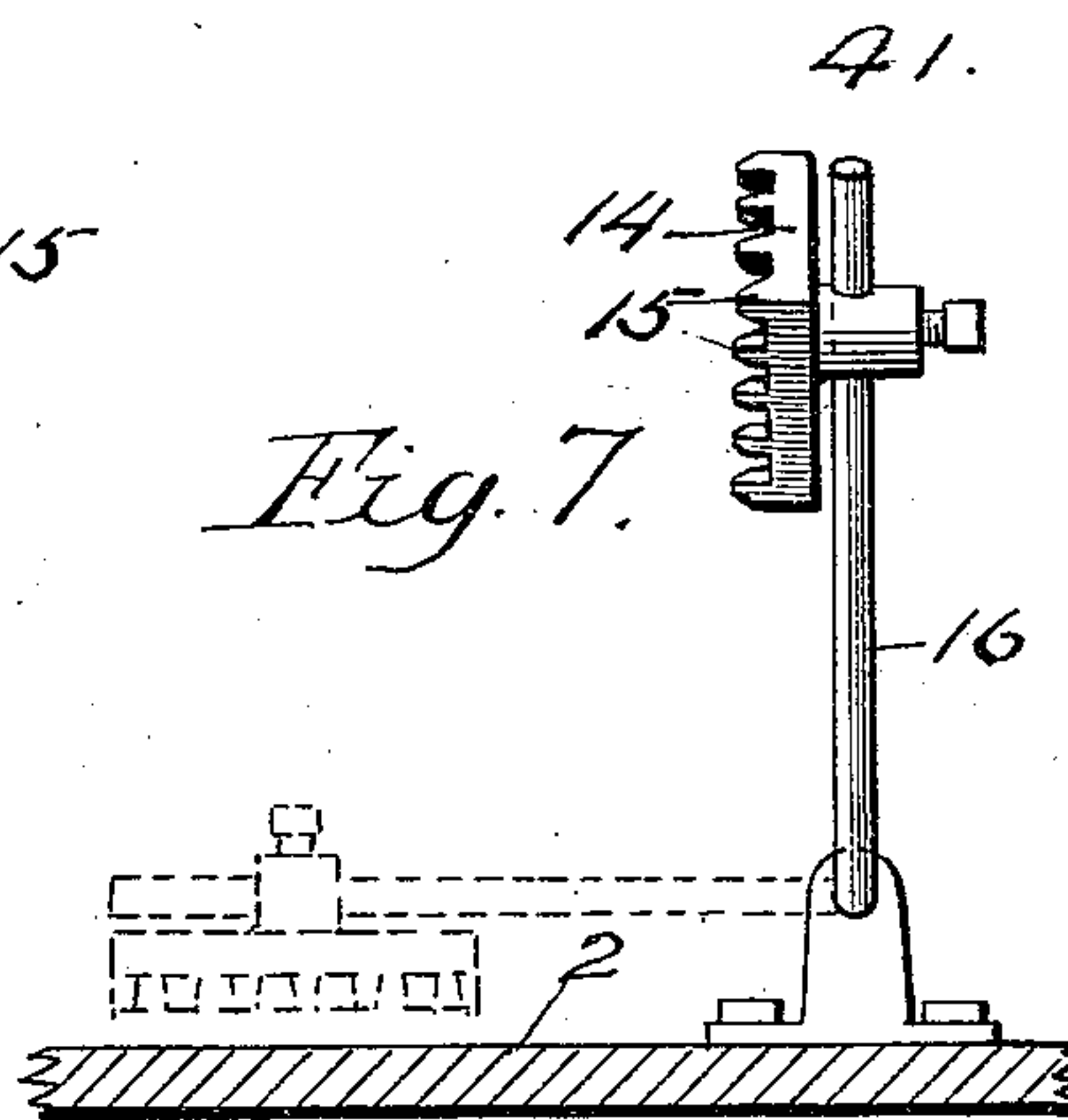


Fig. 7.



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4 Sheets—Sheet 4.

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Fig. 11.

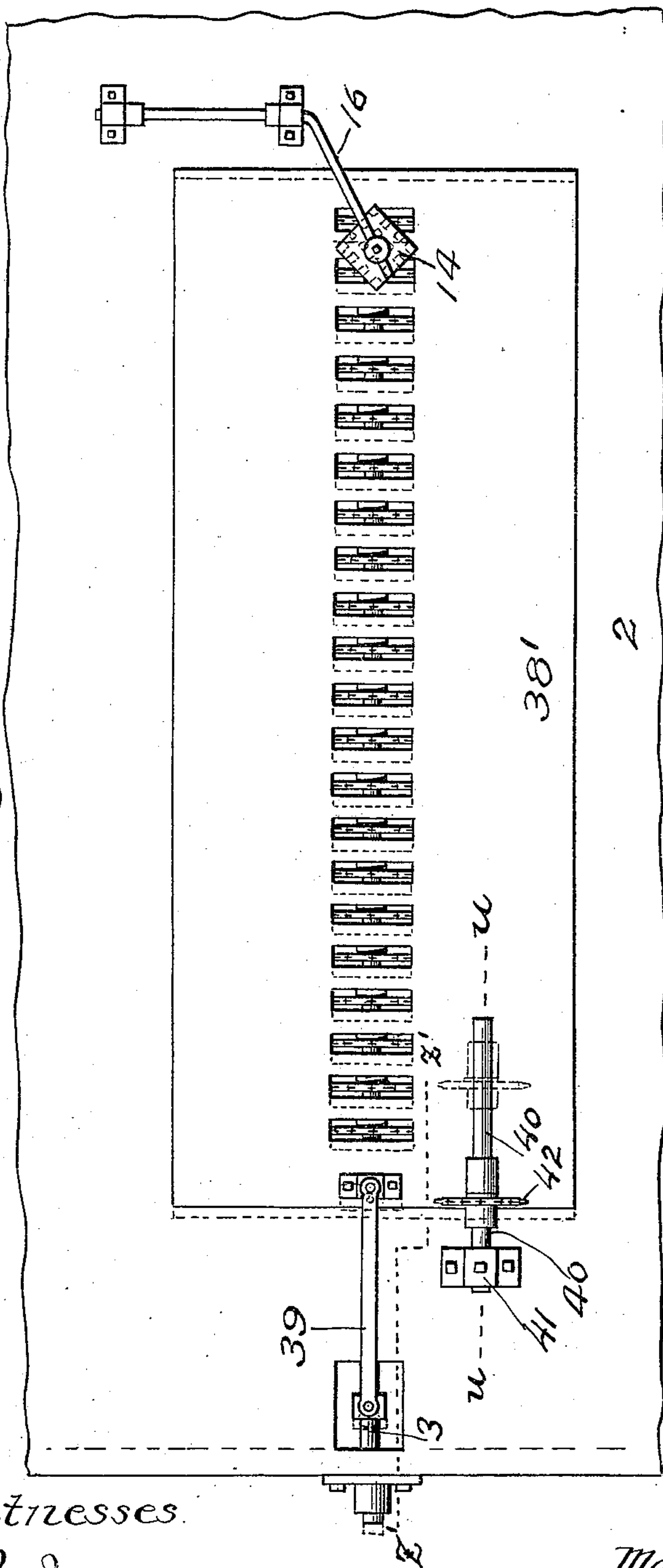


Fig. 14.

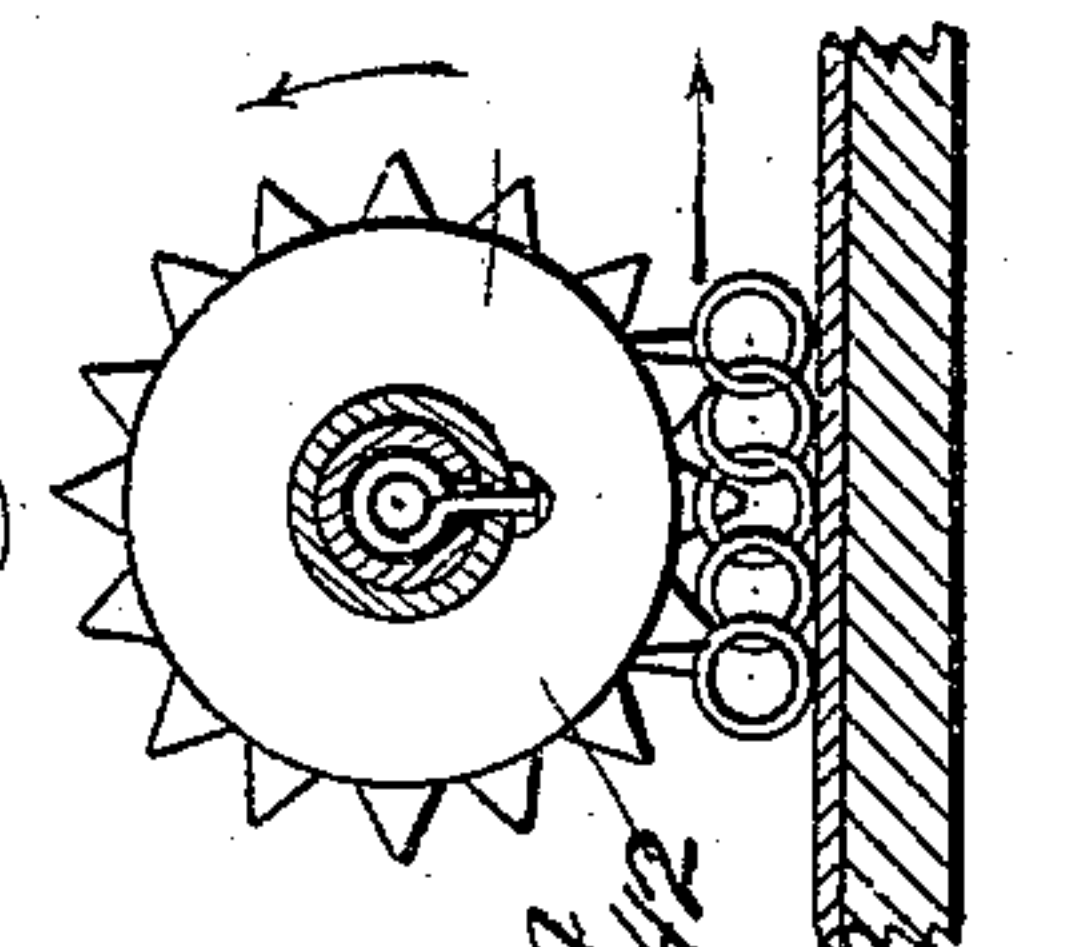


Fig. 13.

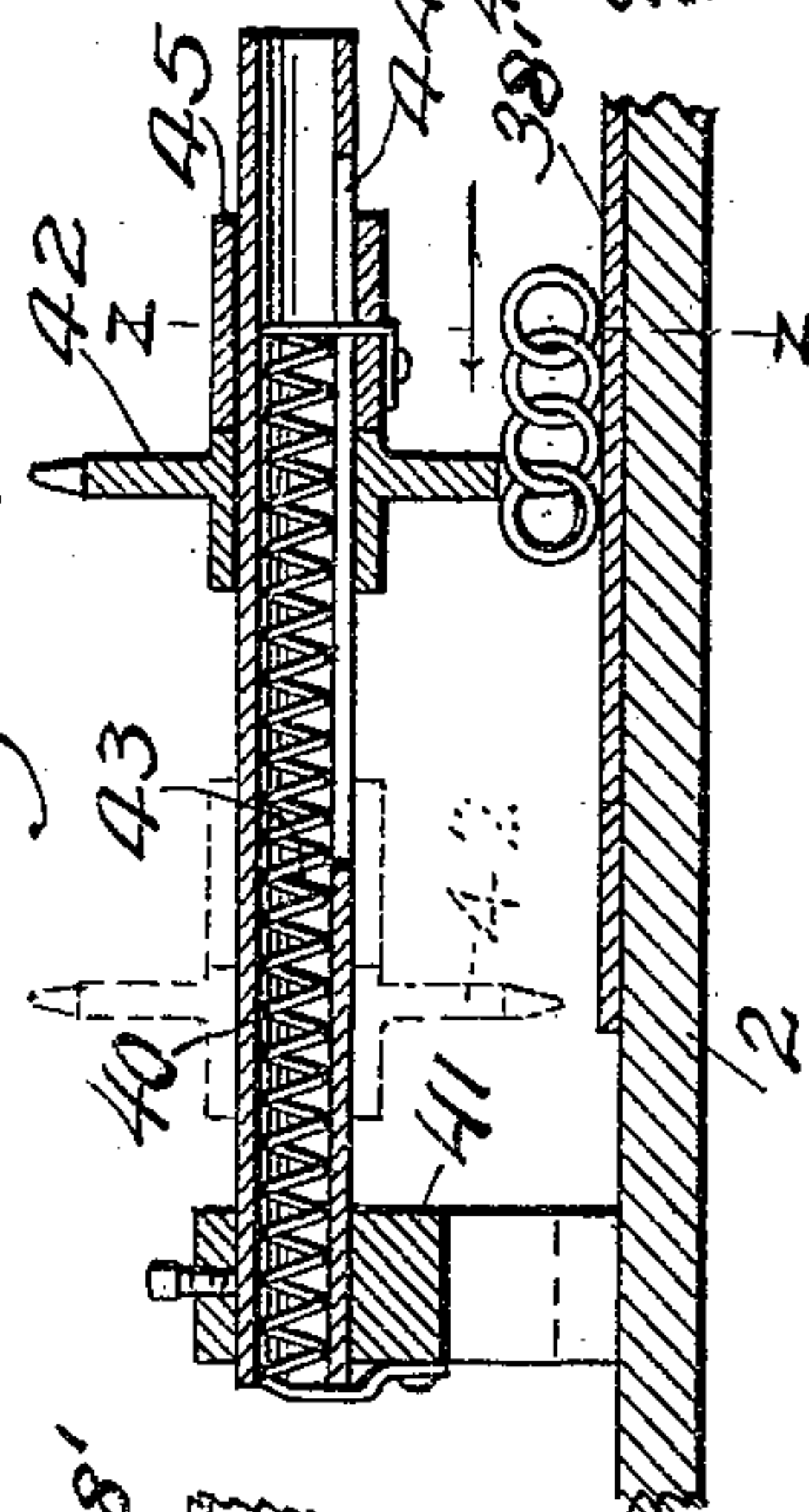
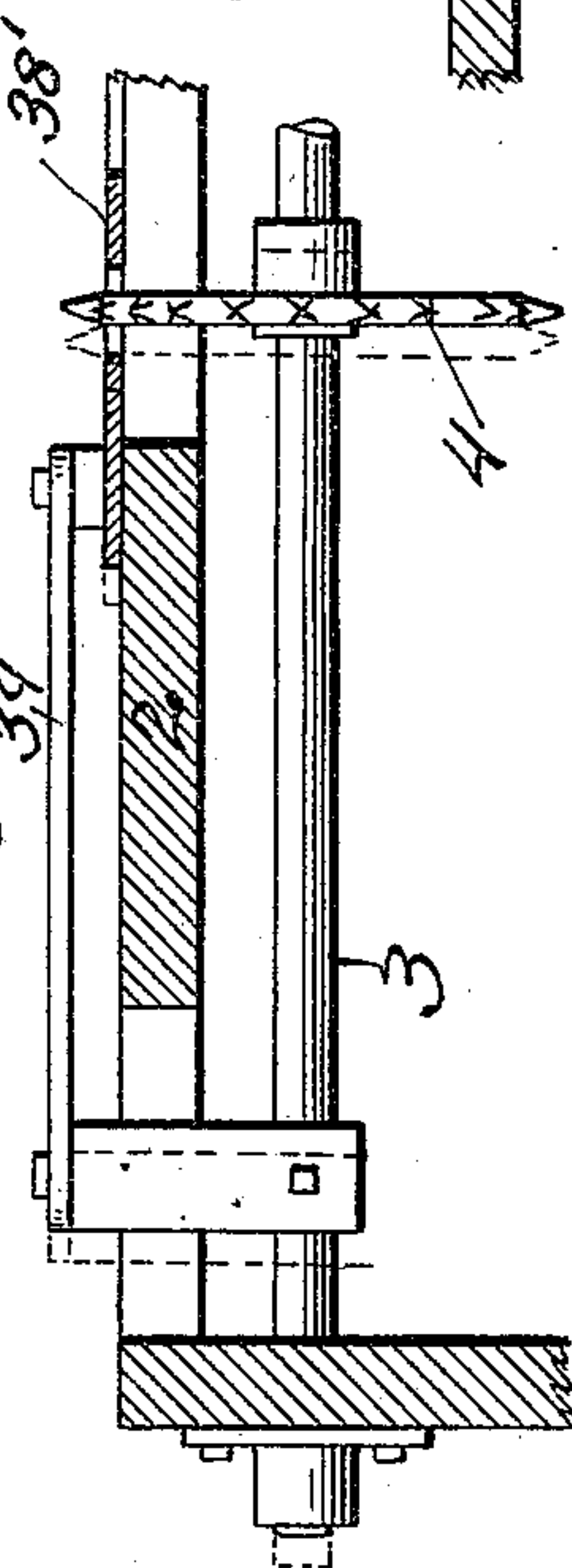


Fig. 12.



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UNITED STATES PATENT OFFICE.

MARSHALL BURNS LLOYD, OF MINNEAPOLIS, MINNESOTA, ASSIGNOR TO THE
WHITE MANUFACTURING COMPANY, OF SAME PLACE.

WIRE-COILING MACHINE.

SPECIFICATION forming part of Letters Patent No. 548,001, dated October 15, 1895.

Application filed April 12, 1895. Serial No. 545,423. (No model.)

To all whom it may concern:

Be it known that I, MARSHALL BURNS LLOYD, of the city of Minneapolis, Hennepin county, Minnesota, have invented certain new and useful Improvements in Wire-Weaving Machinery, of which the following is a specification.

My invention relates to wire-weaving machinery, and particularly to a machine used for inserting the cross-weave or transverse coils in double-weave wire fabrics.

The object of my invention is to provide a simple and reliable cross-weave machine, the parts of which may for the most part be hand-operated.

The particular object of my invention is to provide a machine adapted to receive a large piece of single-weave fabric and to hold the same firmly while the transverse coils are inserted; further, a machine adapted to advance the fabric as the transverse coils are inserted, and, further, to shift said fabric longitudinally with respect to the cross-weave, as required for the insertion of succeeding transverse coils; and a further object of my invention is to provide means for guiding the coil into the stationary and accurately-held fabric, and, further, to provide means for maintaining an even tension upon the fabric while in or upon the machine, and, further, and in connection with the above, to provide convenient means for cutting the wires at the end of the fixed guide, whereby the fabric may be worked close to the guide and securing a positive entrance of the coils.

A further and general object of my invention is to provide a cross-weave machine which may be operated by unskilled labor.

To these ends my invention consists generally in a wire-weaving machine of the construction and combination of parts, all as hereinafter described, and particularly pointed out in the claims.

The invention will be more readily understood by reference to the accompanying drawings, forming part of this specification, and in which—

Figure 1 is a plan view of a machine embodying my invention. Fig. 2 is an enlarged plan view of a section of the fabric, a portion thereof being complete and a portion incom-

plete, and also showing, in partial section, the holder, which is used at a point near the coil-guide. Fig. 3 is an enlarged side and sectional elevation of the machine on the line *y y* of Fig. 1. Fig. 4 is a similar view on the line *x x* of Fig. 1. Fig. 5 is a detail view of the cutter. Figs. 6 and 7 are detail views of the wire-holder. Fig. 8 is an enlarged plan view taken from Fig. 3, the table being removed. Fig. 9 is an enlarged detail view of the end of the crank-shaft used. Fig. 10 is an enlarged detail view showing one of the sprockets or spur-wheels used to advance the fabric. Fig. 11 is a plan view showing the sliding plate employed on the table to avoid the warping of the fabric as it is moved longitudinally and also showing an auxiliary tension device. Fig. 12 is an enlarged detail view on the line *z' z'* of Fig. 11. Fig. 13 is an enlarged sectional view on the line *u u* of Fig. 11. Fig. 14 is a transverse section on the line *z z* of Fig. 13.

As shown in the drawings, 2 represents a table of suitable length. Beneath the table is a shaft 3, mounted in suitable bearings, which bearings permit a slight longitudinal movement of the shaft. This shaft carries a large number of the spur or sprocket wheels 4, secured thereon to revolve with the same. The space between the several sprockets preferably increases (not particularly shown in the drawings) toward the rear of the shaft, but the wheels are so placed that they approximate the pitch of the coils and hold the fabric in a stretched position, so that all cross-coils will readily interlock with the same. The sprockets 4 project upward through the slot 5 and slightly above the surface of the table to engage the fabric laid thereon. On the forward end of the table I provide a plate 6, wherein is the fixed wire-guide 7, the same being preferably located near the position of the shaft 3, on which line the fabric is most firmly held. In line with the guide 7 is a coiler 8, of any suitable design, and 9 represents one of the force-feed rolls placed upon the shaft 10, at the opposite ends of which are fixed and loose pulleys 11 and 12.

13 represents a belt-shifter conveniently placed upon the table, so that it may be readily grasped by the operator.

14 represents a metal block, the under sur-

face of which is provided with a number of square or diamond shaped projections 15, which are adapted to sink into the meshes 17 of the fabric, as shown in Fig. 2. The position of this block is made permanent by securing the same upon the arm 16 of a short shaft 17'. This arrangement permits the block to lift and allow the fabric to pass through beneath it.

The shaft 3 is rotated by the mechanism shown best in Figs. 3 and 4, where 18 represents a short shaft, from which the operating arm or lever 19 projects, said arm being preferably secured upon a sprocket 19'. To one of the arms of this sprocket is secured the link or connecting-rod 20, leading down to the vertically-movable bar 21, held in suitable guides on the frame of the machine. From this rod (see Fig. 4) a connecting-rod 22 extends upwardly to a connection with the horizontal lever 23, preferably journaled on the end of the shaft 3 and bearing a spring-pawl 24, adapted to engage the ratchet-wheel 25, secured on the shaft 3, whereby, as the arm or lever 19 is thrown, said shaft is rotated a proper distance to move the entire fabric forward the width of a single coil. Advantage is also taken of this movement to operate the cutter or shear for cutting the wire, the knife 27 being secured upon the strong lever 28, pivoted on a lug 29 on the table-plate, and this lever being connected to the extended end of the lever 23 by a short link 30. The cutter-lever is preferably placed at an angle with the wire-guide and operates across the bevel end of said guide and the plate or block wherein it is secured, the wire being sheared between the knife and said block at the point where the wire projects from the spiral guide. The final movement of the shaft 3 is in a longitudinal direction, the same being obtained from the sprocket 19', as shown in Figs. 1, 3, 4, and 8.

31 represents a shaft beneath the table and carrying a small sprocket-wheel 32 in line with the sprocket 19', connected therewith by a sprocket-belt 33. This sprocket is loose upon the shaft 31 and is provided with an arm 34, carrying a spring-pawl 35, adapted to engage the cam-wheel 36, secured upon the shaft 31, to be turned in a single direction only. At the end of the shaft 31 I provide the crank-pin 36', and from this a connecting-rod 37 extends to the shifting-lever 38, connected by a swivel-collar to the shaft 3 and pivoted upon the opposite side of the shaft. The crank-pin 36 is well shown in Fig. 9. To avoid friction between the table and the fabric lying thereon, I preferably provide a sliding plate 38' upon the table, the same having openings up through which the spur or sprocket wheels project and said plate adapted to move with the shaft and said sprockets being connected therewith by a link 39, extending from the plate to a fastening upon the shaft 3. To maintain an even tension upon the fabric, I may employ

the short longitudinal shaft 40, secured in the block 41 on the table and whereon a sprocket or spur wheel 42 is adapted to slide. The shaft 40 is preferably hollow to contain a light tension-spring 43, the outer end of which is secured to the block 41, while the inner end projects through a slot 44 in the shaft and is fastened upon a follower-ring 45, which engages the side of the sprocket 42. The sprocket 42 is therefore free to revolve, but is constantly pressed toward the bearing-block 41, and hence when the sprocket is drawn out and engages with the fabric it will exert tension thereon to draw the first weave-coils apart to prevent the same from collapsing into one another, in which condition the cross-weave coils could not be properly inserted.

The operation of my machine will be clearly understood from the following: A piece of single-weave fabric—that is, a fabric made up of interlocked coils all running in the same direction and that direction transverse to the shaft 3—is placed upon the table and drawn tight across the several sprocket-wheels which are meshed with the fabric. The fabric may be additionally secured by then drawing out the tension-wheel or sprocket 42 and meshing the same with the fabric, the wheel acting to draw apart the coils thereof. Next the aligning block or holder 14 is pressed down by the operator, the pressure upon the same forcing the square or diamond shaped projections into the meshes of the fabric, which is therefore straightened and held firmly at a point close to the fixed guide from which the coil of wire emerges when the shifter 13 is thrown to move the belt upon the fixed pulley and operate the force-feed rolls. The coil starting from the fixed guide enters the fabric on the table and screws or turns forward through the same until the shifter 13 is thrown back to stop the feed-rolls. At this time the operator grasps the handle 19 and throws the same forward, thereby operating the knife to cut the wire at the guide 7 and at the same time by giving the shaft 31 a half-turn throws the lever 38 and moves the shaft forward or back, according to its original position at the starting of the machine. At the same instant that this is done, and when the knife is operated, the ratchet device 25, in connection with the lever 23, is turned to rotate the several sprocket or spur wheels 4 to move the fabric transversely across the table. Thus the fabric is fed forward or transversely a distance equal to the width of a single coil and is at the same time moved forward or back longitudinally with the shaft the distance of half a coil, so that as the holder 13 is again pressed into the fabric the edge thereof will be so presented to the fixed guide that a coil turning therefrom will interlock properly with the last coil inserted. After the second coil has been inserted the handle 19 is again operated, this time to move the shaft

3 in an opposite direction while turning it ahead. It is to facilitate the movement of the fabric upon the table that the sliding plate 38 is used. If desired, the cutting of the wire may be done by hand, or all of the parts shown to be operated by hand may be arranged to work automatically.

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

1. The combination, in a cross weave machine, of a suitable support or table, with means for thereon feeding or moving a single weave fabric longitudinally with regard to the coils of the fabric, a coiler, and means in connection therewith for forcing wire through and into said single fabric transversely to the coils making up said single fabric, substantially as described.

2. The combination, in a cross weave machine, of a suitable support or table, with means for feeding or moving a single weave fabric longitudinally thereon, a coiler to direct cross coils transversely into said single fabric, and a shifting mechanism for shifting said fabric toward or from said coiler to alternate the longitudinal positions of succeeding cross or transverse coils, substantially as described.

3. The combination, in a cross weave machine, of a suitable support or table, with a mechanism for feeding or moving a single weave fabric longitudinally across the same, a wire coiler, and a guide whereby cross or transverse coils may be directed into a single weave fabric upon said table or support, substantially as described.

4. The combination, in a cross weave machine, of a suitable support or table, with a mechanism for feeding or moving a single weave fabric longitudinally across the same, a wire coiler, and a fixed guide from which cross or transverse coils are directed transversely into a single fabric upon said table or support, and means in connection with said feeding mechanism for moving the fabric alternately toward and from said guide to vary the respective longitudinal positions of succeeding cross coils, substantially as described.

5. The combination, in a cross weave machine, of a suitable table or support, with a mechanism for feeding a single fabric thereon, a coiler from which cross or transverse coils are forced transversely with respect to the coils of a single fabric upon said table or support, and a holder or aligning device movably arranged upon said table or support to engage the fabric thereon in proximity to the point where the transverse coils enter the single fabric, whereby the fabric is aligned to receive the cross or transverse coils, substantially as described.

6. The combination, in a cross weave machine, of a suitable table or support, with a single weave fabric feeding mechanism, a wire coiler, and a coil guide, and a movable

holding or aligning block adapted to engage the fabric at a point near said guide, substantially as described.

7. The combination, in a cross weave machine, of a suitable table or support, means for feeding a single fabric across said table or support, a wire coiler, a fixed coil guide, a movable holding or aligning device to engage the fabric near said guide, and means for moving the fabric toward and from said guide, as and for the purpose specified.

8. The combination, in a cross weave machine, of a suitable support, a wire coiler, a fixed coil guide, and a fabric holding and aligning device to engage and align the fabric near said guide, as and for the purpose specified.

9. The combination, in a cross weave machine, of a suitable support, a fabric feeding mechanism, means in connection therewith for moving the fabric transversely with respect to its coils, a wire coiler, a transversely arranged fixed coil guide, and a movable block transversely fixed upon said support and adapted to engage and align the fabric thereon substantially as described.

10. The combination, in a cross weave machine, of means for feeding a single weave fabric longitudinally with respect to its coils, a transverse coil-guide, and a movable aligning device or holder, substantially as described.

11. The combination, in the cross weave machine, of a suitable support, a mechanism for feeding a single fabric across the same, a tension device to engage said fabric, a transverse coiler, and a holder for the fabric near said coiler, substantially as described.

12. The combination, in a cross weave machine, of a suitable support, means for feeding a single weave fabric across the same, a tension device to engage the fabric upon said support and independent of said feeding mechanism, a coiler, a fixed guide, and a movable holder or aligning device to engage the fabric near said guide, substantially as described.

13. The combination, in a cross weave machine, of a suitable fabric support, a transverse fixed coil guide, and an aligning or holding device to engage the fabric near said guide, substantially as described.

14. The combination, with a suitable support, of a tension device to engage the fabric thereon, a fixed guide, and a holding and aligning device adapted to engage the fabric near said guide, as and for the purpose specified.

15. The combination, in a suitable support, of a tension device to engage the fabric thereon, a force feed mechanism, a coiler, a fixed coil guide, and a holding and aligning device to engage the fabric near said guide, as described.

16. The combination, in a cross weave machine, of a suitable support, a fabric tension device, a transverse coiler and coil guide, a

cutter or shear provided near said guide, and means for operating said parts, substantially as described.

17. The combination, in a cross weave machine, of a suitable fabric support, a longitudinally and a transversely movable fabric moving mechanism, a transverse coiler and fixed guide, and means for operating said feeding mechanism to move the fabric with respect to said coiler and guide whereby the longitudinal positions of succeeding cross or transverse coils are alternated, substantially as described.

18. The combination, in a cross weave machine, of a suitable support, with longitudinally and transversely movable fabric feeding mechanism, a revoluble fabric tension device, a wire coiler, and a fixed transverse coil guide, substantially as described.

19. The combination, in a cross weave machine, of a suitable support, with longitudinally and transversely movable fabric feeding mechanism, a revoluble fabric tension device, a wire coiler, a fixed transverse coil guide, and a movable fabric engaging and aligning device provided in proximity to said guide, substantially as described.

20. The combination, with a suitable support or table, of a transversely and longitudinally operating fabric feed, a wire coiler, a fixed transverse coil guide, a wire cutter near said guide, and fabric holding or aligning and tension devices, substantially as described.

21. The combination, in a cross weave machine, of a suitable support, means for moving a single fabric transversely and longitudinally thereon, a transverse coiler, and a movable plate provided on said support, on which plate the fabric rests, substantially as described.

22. The combination, in a cross weave machine, of a suitable support, a transverse and longitudinal fabric moving mechanism, a fabric carrying plate, a transverse coil guide, and a movable fabric holding and aligning device in proximity to said guide, substantially as described.

23. The combination, in a cross weave machine, of a support for a single weave fabric, a transverse tension device to engage said fabric, a transverse coiler, and a fabric holding and aligning device arranged near said coiler, as and for the purpose specified.

24. The combination, in a cross weave machine, of a suitable support, means for moving a single weave fabric longitudinally and transversely thereon, a transverse coiler and a fabric holding and aligning device to engage the fabric near said coiler, substantially as and for the purpose specified.

25. The combination, in a cross weave machine, of a suitable support, means for stretching a single weave fabric transversely thereon, and a transverse coiler, substantially as described.

26. The combination, in a cross weave machine, of a suitable support, means for transversely stretching a single weave fabric thereon, a wire coiler, and a transverse and fixed coil guide, substantially as described.

27. The combination, with a suitable table or support, of a transversely and longitudinally movable fabric moving device, a coiler, a fixed guide for the wire coils, and a movable block having projections adapted to enter the meshes of a fabric upon said support or table, and when pressure is exerted upon said block to straighten and align the portion of the fabric in proximity to said guide, substantially as described.

28. The combination, with a suitable table or support, of a transversely and longitudinally movable fabric moving device, a coiler, a fixed guide for the wire coils, and a movable block having projections adapted to enter the meshes of a fabric upon said support or table, and when pressure is exerted upon said block to straighten and align the portion of the fabric in proximity to said guide, means for cutting the wire near said guide, and means for operating said fabric moving device to move the fabric forward the width of the coil and to move the same longitudinally a distance equal to one-half the pitch of the coil, substantially as described.

29. The combination, with a suitable table or support, of a longitudinally movable shaft arranged beneath the same, sprocket or spur wheels provided thereon to engage the fabric on said table and whereon said fabric may be stretched and held, a fixed coil guide, a wire cutter, a ratchet mechanism in connection with said shaft, a crank device also in connection therewith for moving the same longitudinally, and a single device whereby said knife or cutter and said ratchet device and said crank device may be operated, substantially as and for the purpose specified.

30. The combination, with a suitable table or support, of a longitudinally movable shaft arranged beneath the same, sprocket or spur wheels provided thereon to engage the fabric on said table and whereon said fabric may be stretched and held, a fixed coil guide, a vertically movable fabric holding and aligning device provided in proximity to said guide, a wire cutter, a ratchet mechanism in connection with said shaft, a crank device also in connection therewith for moving the same longitudinally, and a single device whereby said knife or cutter and said ratchet device and said crank device may be operated, substantially as and for the purpose specified.

31. The combination, with a suitable table or support, of a revoluble and longitudinally movable fabric moving mechanism, a longitudinally movable tension sprocket to engage the fabric and stretch the same, a vertically movable holding and aligning device or block, and a fixed coil guide, as and for the purpose specified.

32. The combination, with a suitable table
or support, of a longitudinally movable fab-
ric carrying plate, longitudinally movable
fabric engaging sprockets projecting through
5 said plate, means for revolving said sprockets,
and fabric holding and coiling devices, sub-
stantially as described.

In testimony whereof I have hereunto set
my hand this 8th day of April, A. D. 1895.

MARSHALL BURNS LLOYD.

In presence of—

C. G. HAWLEY,
FREDERICK S. LYON.