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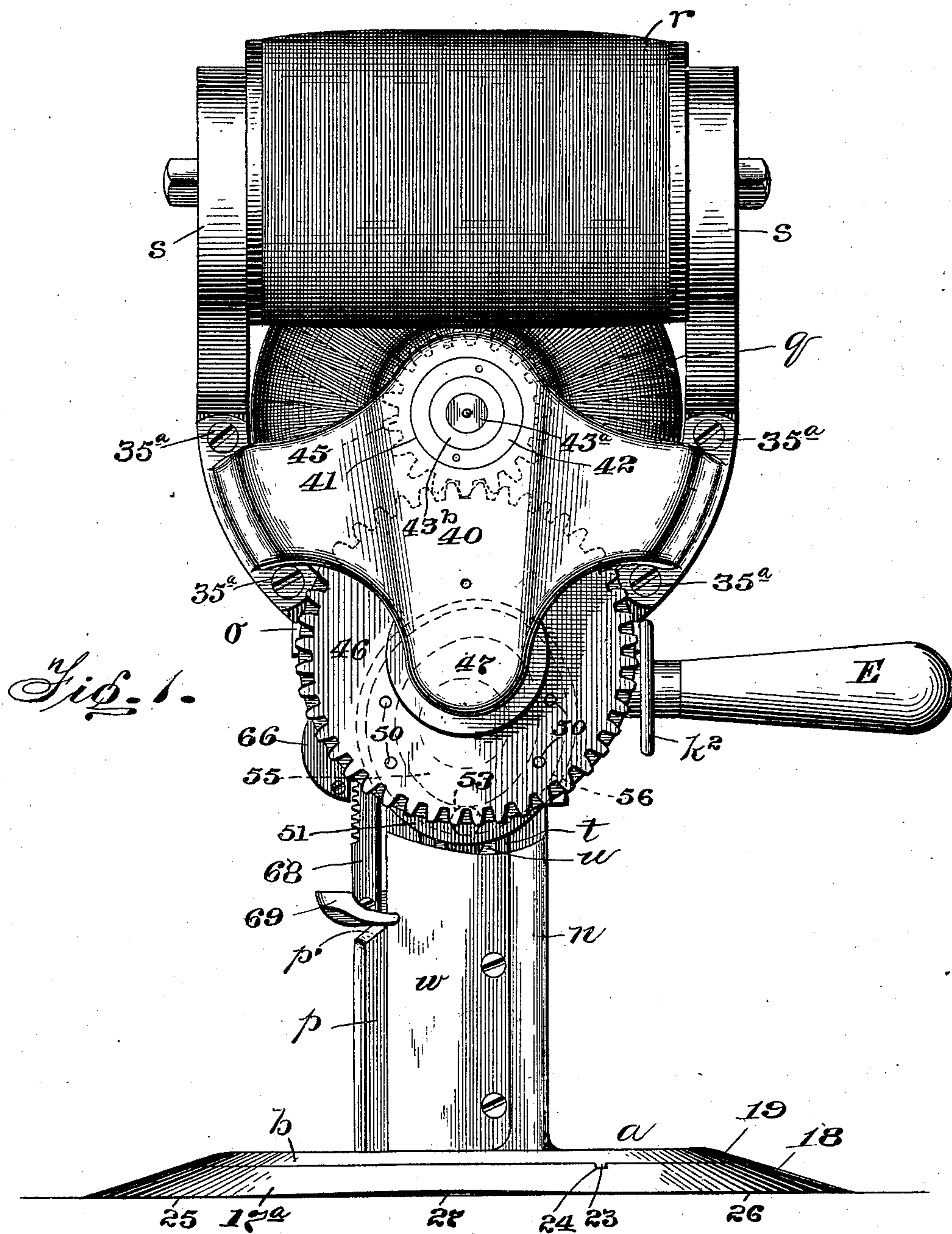
Patented May 7, 1901.

H. A. MEYER.
MACHINE FOR CUTTING FABRICS.

(Application filed Sept. 22, 1900.)

(No Model.)

3 Sheets—Sheet 1.



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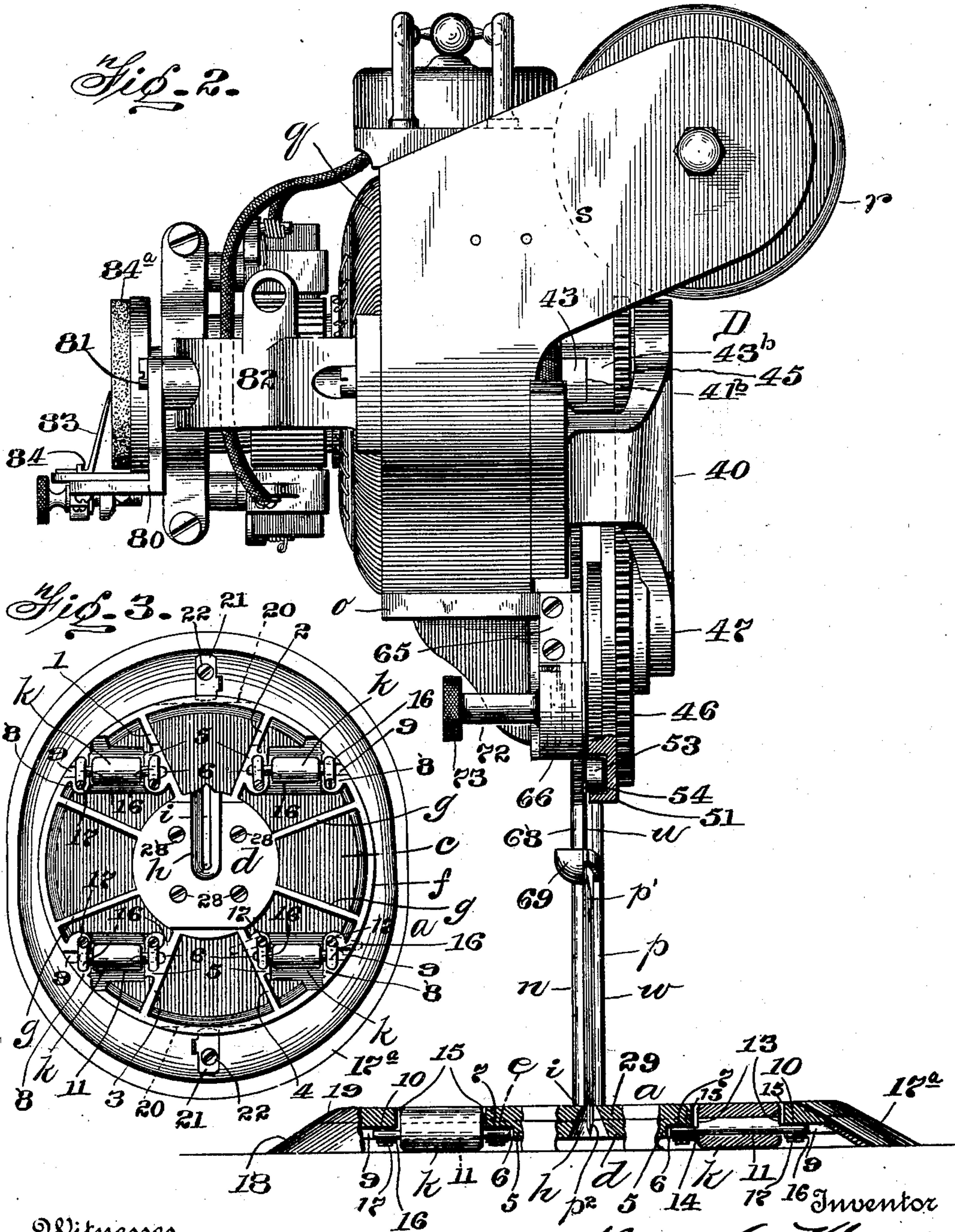
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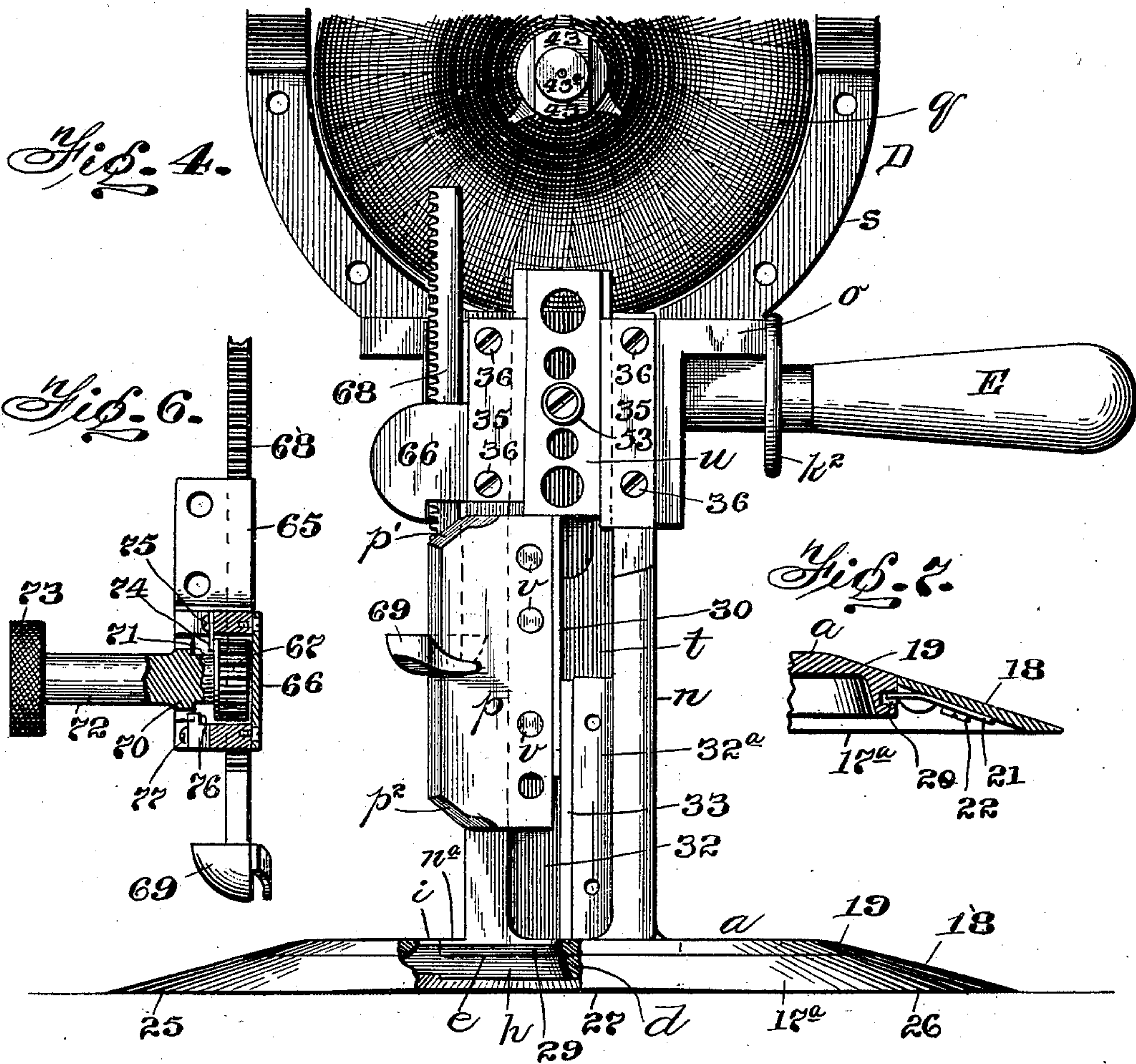
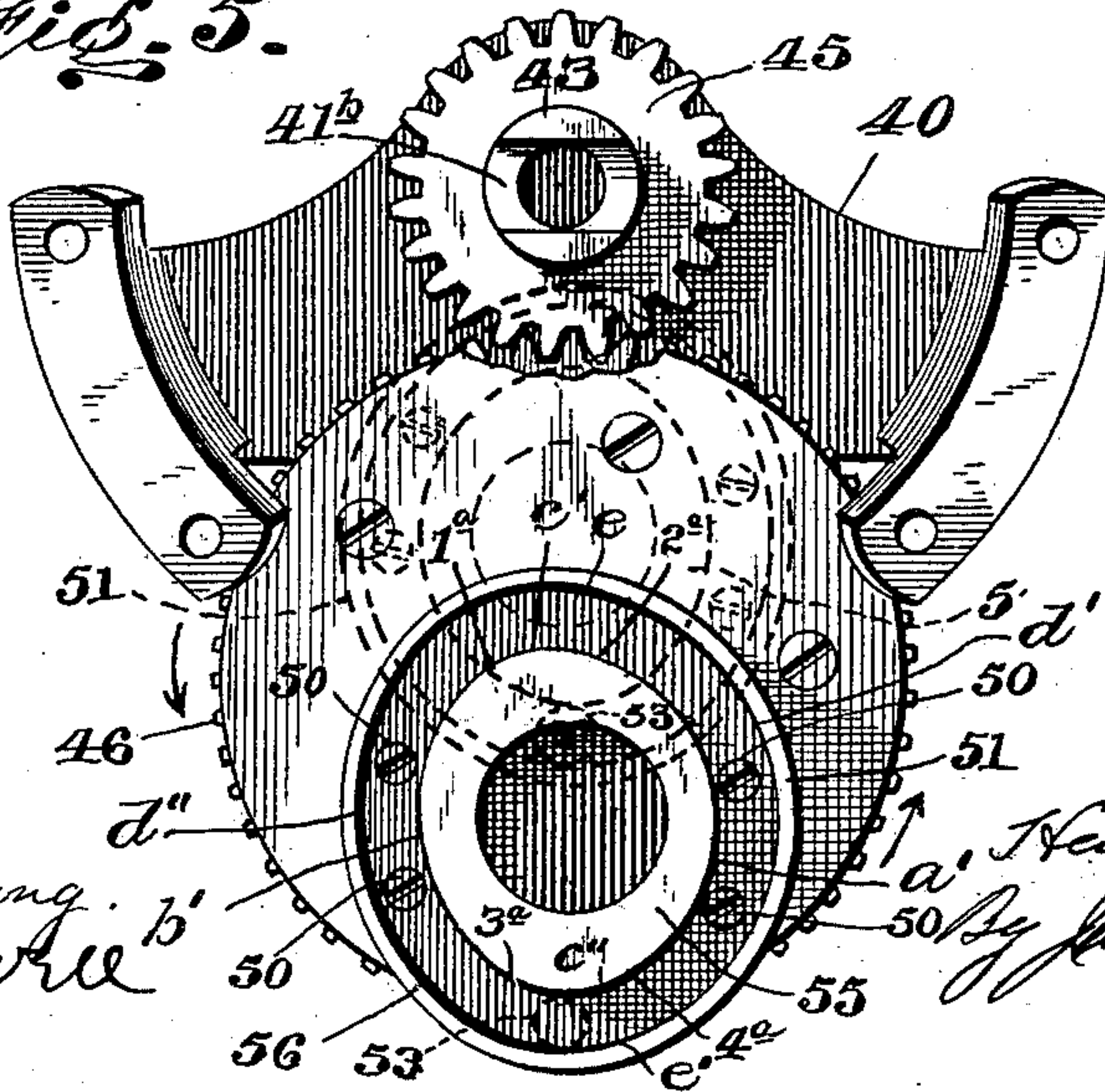


Fig. 5.



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UNITED STATES PATENT OFFICE.

HENRY A. MEYER, OF CINCINNATI, OHIO, ASSIGNOR TO THE WOLF ELECTRICAL PROMOTING COMPANY, OF SAME PLACE.

MACHINE FOR CUTTING FABRICS.

SPECIFICATION forming part of Letters Patent No. 673,405, dated May 7, 1901.

Application filed September 22, 1900. Serial No. 30,782. (No model.)

To all whom it may concern:

Be it known that I, HENRY A. MEYER, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Machines for Cutting Fabrics; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to machines for cutting textile fabrics and other material; and it consists, substantially, in such features of improvement as will hereinafter be more particularly described.

The invention has reference more particularly to that class of machines in which a reciprocating knife is employed to cut a number or series of superposed layers of fabric in accordance with a pattern laid upon the uppermost layer, the said cutting being effected while the machine is moved bodily over the surface of the table or other support upon which the said fabric layers are arranged. In this particular type of cutting-machine it has heretofore been common in many instances to drive or operate the reciprocating knife or cutter by means of a cam or eccentric combined with a pitman or connecting-rod or some other form of link or movable connection between said cam or eccentric and the knife. Such an arrangement, while possessing certain advantageous features, and perhaps being operative for many purposes, is under some conditions of use still open to several disadvantages and objections. For instance, the connection between the knife and its operative device being an indirect one, the length of working stroke is considerably increased, and the movements of the knife cannot take place with uniform regularity or with that precision so essential to a perfectly-operating machine. Moreover, with such an arrangement the connection soon works loose from wear, lost motion occurs, and frequently the fabric layers are caused to "buckle" or wrinkle in such manner as to render it exceedingly difficult for the operator to continue the work. This is especially the

case where the pattern being followed is at all complicated or intricate.

The principal object of the present invention is to provide means for overcoming the above-mentioned objections and also to provide means for constantly maintaining the truly-operative positions of the foot-plate beneath the lower layer of fabric even should any obstruction or unevenness be encountered on the surface of the table or other support over which the machine is moved or propelled by the operator.

A further object of the invention is to provide means or devices for more easily and accurately effecting the adjustment of the presser-foot and also to simplify the construction and arrangement of the said adjusting devices; still further, to increase the effective capacity of the machine generally and to render the same much easier of manipulation and control, as well as being more easily taken apart for the purposes of repair and adjustment.

The above and additional objects are attained by means substantially as shown in the accompanying drawings, in which—

Figure 1 represents a side elevation of my improved cutting-machine, and Fig. 2 is a front elevation of the same in part section. Fig. 3 is a bottom plan view of the base or foot plate of the machine, the said view indicating more clearly the means for strengthening the said foot-plate and also the means for facilitating the insertion and removal of the rollers on which the machine travels in its movements about or upon the surface of the table or other support for effecting the cutting of the fabric. Fig. 4 is a similar view to Fig. 1, broken off at the top, partly broken away and in section at the bottom, and also having the knife-operating mechanism and cover-plate removed or detached by which to more clearly indicate the construction and operation of the reciprocating knife as well as to indicate the arrangement of the backing or wear plate for the slide on which the knife is held. Fig. 5 is an interior view or elevation of the actuating or operating devices (detached) for the reciprocating knife or cutter, said view indicating very clearly

the construction of the double or compound eccentric cam, which has direct operative connection with the reciprocating slide, which carries the knife or cutter. Fig. 6 is an enlarged detail view, in part section, of the devices or means for effecting the adjustments of the presser-foot. Fig. 7 is a sectional detail view to more clearly indicate the yieldable fastening between the base or foot plate and the beveled elastic cloth-lifting plate combined therewith for passing beneath the layer or layers of material to be cut.

Preliminary to a more detailed description it may be stated that I employ a suitable base or foot plate for the machine, in the center of which is mounted an upright or standard having at its upper end a substantially right-angled bracket or shelf, upon which is supported in any preferred manner a suitable electric motor deriving its current from any suitable source and being properly connected up, so as to be under the control of the operator handling the machine. Reciprocating in a slideway formed or provided in the said standard or upright is a knife and slide therefor, which are operated through the medium of a peculiarly-constructed compound eccentric cam, hereinafter specifically referred to, which cam is operated from the driving or armature shaft of the motor.

Both the foot-plate and knife which I employ are of peculiar construction and arrangement, as are the presser-foot and the adjusting devices therefor, and I also provide means for taking up the wear which may occur between the back of the knife-slide and the guiding-strip on the standard. In addition to the above I also employ suitable means located directly on the armature-shaft for the purpose of sharpening the edge of the knife or cutter as may be necessary from time to time, and the said knife is capable of being reversed and used with equal effect in cutting the fabric.

Reference being had to the drawings, *a* represents as a whole the base or foot plate of the machine, which in the present instance consists of an enlarged plate *b*, substantially elliptical in outline and hollowed out on its under side at *c* for the purpose of lightness, a central circular portion or disk *d* being left which instead of being hollowed out on the under side is hollowed out on the upper side, so as to form a central circular recess *e*, for a purpose to be hereinafter described. Connecting the circumference of said disk with the inner side of the rim *f* of the foot-plate *a* is a number or series of radial ribs *g*, which are for the purpose of strength, and it will be understood that the under surfaces of the said disk, rim, and ribs are substantially even or in the same horizontal plane. The said central circular portion or disk *d* is formed with a deep notch *h*, extending substantially from its center to the circumference, and said notch is cut or formed all the way through the disk, the sides thereof tapering upwardly

to form a narrow slot *i* for the passage of the lower end of the reciprocating knife, as will appear. Certain ones of the ribs *g*, extending substantially in the direction of traverse of the machine and located at opposite sides of the central circular portion or disk *d*, are selected for the purpose of partially supporting the rollers *k*, upon which the machine moves, over the surface of the table supporting the fabric layers. Thus ribs 1 2 and 3 4 are each formed or provided at one side with an offset or projection 5, each having a notch or recess 6 extending transversely or at right angles to the direction in which the machine travels. The height of said notches or recesses is less than the thickness of the foot-plate *a*, (see Fig. 2,) so as to leave a shoulder 7 for the purpose about to be described. Formed or provided on the inner surface of the rim *f*, opposite each of the said ribs 1 2 3 4, is also an offset or projection 8, each having a notch or recess 9 in direct line with and of equal height to its corresponding or opposite notch or recess 6. A shoulder 10 is also formed with each of the offsets or projections 8, corresponding to the shoulders 7. Each pair of said notches or recesses 6 and 9 is for the reception of the ends of a short shaft 11, on which is loosely supported a roller *k*, the periphery of which is about even with the under surface of the rim *f* of the foot-plate *a*. Each shaft 11 is notched at 13 for a short distance from each end, so as to form shoulders 14, which abut the shoulders 7 and 10 and prevent endwise movement of said shafts. The foot-plate *a* is formed with openings or slots 15, extending substantially the distance between each pair of shoulders 7 and 10, the said openings or slots being for the purpose of accommodating a portion of the periphery of the rollers *k*, so as to reduce friction between the rollers and the under side of the foot-plate, and thus permit the machine to be moved along with comparative ease by means of the handle *E*, having a guard *k*² for the hand.

Attached to each of the offsets or projections 5 and 8 on one side of the notches therein is a retaining-plate 16, which works on a pivot 17, and when said plates are turned to extend across the notches 6 and 9 it is evident that the rollers and their shafts will be held in place on the under side of the said foot-plate. To remove any one of the rollers, it is simply necessary to turn or swing the retaining-plates from across the notches. (See dotted lines, Fig. 3.) It will thus be seen that the rollers are very readily removed for the purpose of removing particles of dirt or fabric which may collect between the same and the under side of the foot-plate.

Inclosing and closely fitting the rim *f* of the foot-plate *a* is a substantially elliptical cloth-lifting plate 17^a, which is more or less elastic and which is smooth on its upper surface and beveled at 18 to coincide with the annular beveled upper portion 19 of the foot-plate *a*.

In the cutting operation the forward thin edge periphery of the cloth-lifting plate 17^a passes under the lowermost layer of cloth, and the said cloth-lifting plate serves to gradually lift the layers upon the foot-plate as the machine is pushed forward. At substantially diametrically opposite points of the rim *f* of said foot-plate *a* grooves 20 are formed, which serve to receive the ends of locking-plates 21 on the under side of cloth-lifting plate 17^a, and thus lock the said plate in position upon the rim of the foot-plate. To remove the plate 17^a, it is simply necessary to turn the locking-plates 21 back on their pivots 22. In order to prevent the plate 17^a from turning on the rim *f*, the latter is formed or provided with a lug 23, fitting into a notch 24, formed in the inner edge of said plate, and thus when these parts are fitted together, as shown and described, the foot-plate *a* and plate 17^a are substantially or practically integral. The construction and arrangement are such that the weight of the machine keeps the locking-plates 21 against the upper sides of the grooves 20 in rim *f*; but should any slight obstruction or unevenness be encountered on the fabric-table the foot-plate *a* will be lifted in conformity to the extent of the obstruction, (which of course can never be great,) while plate 17^a will always tend to keep in close contact with the table and still keep on lifting the fabric in the desired manner. The distance between the upper and lower walls of the grooves 20 is such as to permit sufficient play of the catches or retaining-plates 21 for effecting the operation just described. In order to obtain a slight yielding or elastic effect of the cloth-lifting plate 17^a, the same is slightly sprung between its forward and rearward edges 25 26, so as to be just clear of the fabric-table at the sides, as indicated at 27, Figs. 1 and 4. The said edges 25 and 26 always rest upon the table, and the effect is obvious.

Fitting in the recess *e* of the disk *d* and secured therein by means of screws 28 is a plate 29, centrally of which is supported the lower end of the standard *n* of the machine. This plate is also provided with slot *n*^a in line with slot *i*, so as to permit passage of the lower end of the knife or cutter. Said standard or upright extends upward for a suitable height and is provided on one side at the upper end with a bracket *o*, extending substantially at right angles thereto, and upon this bracket is supported a suitable electric motor *D*, which is of ordinary construction and which actuates the operating devices for the knife or cutter *p* when properly connected to a source of electrical supply. The armature *q* of said motor, as well as the electromagnet *r* thereof, is supported in a suitable casing or frame, (designated at *s*.) The knife or cutter *p* is sharpened at its forward edge on both sides, (see Fig. 2,) and the upper and lower forward corners thereof are beveled and sharpened also, as indicated at *p'* *p*², respectively. In

the downward movement or thrust of said knife the lower beveled corner strikes the upper layer of cloth previous to the entrance of the long straight edge, and thus acts as a saw at the point of intersection of the straight edge with the said beveled corner. The knife is reversible, so that when one beveled corner becomes worn the other can be brought into use, thus prolonging the use of the knife. The said standard or upright *n* is formed or provided on one side with a vertical slideway *t*, in which works a plate or slide *u*, to which the said knife or cutter *p* is removably attached by means of lugs or projections *v* on the slide fitting into corresponding openings in the knife, or vice versa, at or near its rear edge. The knife or cutter is held in place by means of an outer plate or cover *w*, which closes up the slideway *t* and conceals the said knife and slide *u* from view, with the exception of the forward or sharpened edge of the former, which protrudes beyond the forward edge of the standard, as shown, so as to properly effect the cutting when the knife is reciprocated up and down.

In order to compensate for any wear that would take place between the inner or rear edge of the narrow part 30 of the slide *u* and the side of the slideway *t*, I form the lower part of said "way" narrower, as at 32, and between the rear edge of the said narrow part of slide *u* and the inner edge of a permanent portion 32^a of the standard I interpose a removable metal wear-block 33. Now when the rear or inner edge of part 30 of slide *u* becomes worn or in the event of the wear taking place on the wear-block itself it is simply necessary to remove said block and insert another one of proper size. In this way the slide will always work evenly and neither it or the knife will have to be removed except when broken or it becomes necessary to re-sharpen the knife. The said slide is held in place by means of plates 35, fastened, by means of screws 36, to the standard *n* on opposite sides of the slideway *t* at the upper part thereof.

Secured to one side of the frame or casing *s* by means of the screws 35^a (see Fig. 1) is a hanger or yoke 40, provided at its upper end with an opening 41, in which fits a hollow bushing 42, forming a bearing for a rotatable sleeve 43^b, the inner end of which projects beyond the inner side of the said yoke 40 and is cut out on opposite sides at 41^b to form recesses, in which similar lugs 43 on the armature-shaft 43^a are received, so as to form a locking engagement between said sleeve and shaft. Formed integrally with the said sleeve or fastened thereto on the inner side of yoke 40 is a small pinion 45, engaging with a gear-wheel 46, supported by the lower end or part 47 of said yoke. Secured to the inner side of said gear-wheel 46 in any suitable manner, as by screws or rivets 50, is a double or compound eccentric cam 51, which has a direct movable connection with the knife-slide, as shown.

Said connection is formed by means of a pin 53, having an antifriction-roller working in the groove 54 of said eccentric cam. This latter device may be described as constructed of a driving-cam 55 for driving the knife-slide downward and a lifting-cam 56 for raising or elevating said slide, the one being located or arranged within the other, so as to form the said cam-groove 54, and the two being arranged eccentric to the axis of the gear-wheel 46. The outer surface of the said driving-cam forms the inner wall of the said cam-groove 54 and the inner surface of said lifting-cam forms the outer wall of said groove. The configuration of the two cam-surfaces are identical, the lines of the outer or lifting-cam, however, being struck on larger curves, so as to form the groove.

One side of the inner or driving cam 55 is struck on the arc a' of a circle of shorter radius than the circle on which the arc b' , defining the opposite side thereof, is struck, while the remaining surface of said cam is struck on arcs c' and c'' of circles having equal radius with each other, but of shorter radius than the circles on which the said arcs a' and b' are formed. The said arcs a' , b' and c' , c'' merge into each other at the points 1^a, 2^a, 3^a, and 4^a, respectively. In describing said inner cam 55 it is referred to as when at rest and when the knife-slide is in its lowermost position, the terms "side" and "opposite side" thereof being simply employed for convenience of description, since said cam can have no permanent or fixed relation during the working or operation of the machine. The surface of the outer or lifting cam 56 is also struck on arcs d' and d'' of circles of different radius, combined with the arcs e' and e'' of circles of equal radius with themselves, but of shorter radius than the circles on which arcs d' and d'' are formed. The several arcs of the lifting-cam are parallel or concentric with the corresponding arcs of the driving-cam; but they are struck from circles of greater radius for the purpose hereinbefore stated. In the operation of the said double or compound eccentric cam let it be assumed that at the start the pin 53 is at its lowermost point, which will bring the knife to its lowermost position also. As the device begins to rotate in the direction of the arrows, Figs. 1 and 5, the inner surface of said cam 56 will immediately commence to exert a lifting action upon the pin 53 and continue to lift the same until the pin is carried to its highest point. (See dotted lines, Fig. 5.) At this time the eccentric cam will have been carried half-way around on the axis of the gear-wheel 46, (see dotted lines, Fig. 5,) and as the same continues to be carried around on such axis the driving effect of the surface a' of cam 55 begins to take place, and this effect continues until the device is again carried around to the position of start, when the pin 53 will again be in its lowermost position, the device having been carried around one complete revolution and one

complete up-and-down movement of the knife effected. Such action of the different cam-surfaces takes place rapidly in the operation of the machine, and I have found that the construction of "compound eccentric cam" which I employ gives a more positive action than can be obtained from any device hitherto used for a similar purpose. For instance, in the rise and fall of the knife and its slide there is absolutely no lateral or side thrust of either, and neither can any wobbling movement of the pin 53 take place in the cam-groove 54. During the action of either one of the cam-surfaces upon said pin there is such a close hugging between the cam and pin as to effect the desired reciprocating movements of the knife in the most positive and direct manner and with no tendency to slip or work loose. In virtue of the arc or cam-surfaces a' and d' being struck on circles of shorter radius than the circles on which the surfaces b' and d'' are struck the two latter surfaces are of less curvature than the two former, and this gives to the cam-groove 54 a more direct course for a short distance, as will appear. The tendency of this construction is to more perfectly insure a direct upward movement of the knife and its slide, while the tendency of the surfaces a' and d' , of greater curvature, is to insure a more direct downward movement thereof. It has been found that the desired working effect of the said lifting and driving cams is only obtained by arranging the same so that the longer sides thereof are practically or approximately vertical when the knife is at the limits of its up-and-down movement. Otherwise there would be a counter tendency to the operation, resulting in lost motion as well as binding between the parts, with very great liability to breakage. While the lifting-cam is acting upon the pin to lift the knife, the surface b' of the inner cam 55 has no effect except to prevent lateral or side thrust of the pin, which would interfere with the true and direct vertical movement of the knife-slide. When the driving-cam is acting upon the pin, the surface d' of the outer cam serves a similar purpose, the two said cam-surfaces b' and d'' meanwhile being idle.

Secured to the front of the standard n at the upper portion thereof is a bracket 65, to which is attached a casing 66, in which is contained a pinion 67, engaging with the teeth of a vertically-movable rack 68, carrying at its lower end a presser-foot 69, which is adjusted to bear down upon the layers of fabric when the machine is in use. Said presser-foot embraces the knife-edge and forward edge of the standard, leaving sufficient play for the movements of the knife, and the said rack 68 works along one side of the knife. The said pinion has formed therewith an additional pinion or ratchet-wheel 70, the two being separated by a circumferential groove 71, and a shaft 72 is also formed with said pinion, the same having means 73 for readily

turning the shaft by hand. Normally forcing the pinions inwardly is a spring 74, pressing against the outer side of pinion 67 and extending into the groove 71, the said spring being fastened at 75 to a part of the casing 66. Also normally engaging the teeth of the pinion or ratchet-wheel 70 is a pawl or tooth 76, also fastened at 77 to a part of the casing 66. It will thus be seen that the pinions and shaft have an outward movement, which is limited by the width of the groove 71, and also that when the parts are in the position shown in Fig. 6 no turning or axial movement of the pinions can take place, due to the fact of the engagement of pinion 70 by the pawl 76. Now whenever it is desired to adjust the presser-foot either up or down it is simply necessary to pull outward upon the shaft 72, which releases engagement of pinion 70 by the tooth, whereupon by turning the shaft in either direction the rack 68 will be moved accordingly. When said shaft is pulled outwardly, it is against the pressure of spring 74, and as soon as the proper adjustment of the presser-foot is made and the shaft released the said spring will force the pinions and shaft back again, whereupon the pinion 70 is again engaged by the pawl or tooth 76, and the presser-foot and its rack are thus locked in the position of adjustment. The said presser-foot and its adjusting devices have been found very effective in use, and their simplicity and mode of operation will be at once seen.

As a convenient means for sharpening the knife or cutter when the same has become dull I prefer to arrange means for this purpose at one side of the machine, the grinding-wheel itself being attached directly to the driving or armature shaft 43^a. Thus, as shown at Fig. 2, 80 represents one of a pair of brackets or arms, which are secured at 81 to a part 82 of the framing which supports the armature-shaft, and adjustably supported on said brackets is a holder or guide 83, in which the knife is held at 84, while the same is moved along by hand, so as to carry it against the surface of the emery or other suitable grinding-wheel 84^a, rotated directly from the armature-shaft. This sharpening device has been found very convenient as thus arranged, and it is evident that much time is saved by having such a device mounted on and operated directly from the machine.

Without limiting myself to the precise details of construction and arrangement, I claim—

1. In a fabric-cutting machine, a base or foot plate provided with a cloth-lifting plate inclosing or surrounding the same, and having a yieldable connection therewith permitting a limited vertical movement between the plates while preventing separation thereof.

2. In a fabric-cutting machine, an approximately elliptical base or foot plate provided with a cloth-lifting plate of substantially similar shape inclosing or surrounding the same,

and means for preventing separation of the plates while permitting a limited vertical movement thereof.

3. In a fabric-cutting machine, an approximately elliptical base or foot plate provided with a cloth-lifting plate of like construction inclosing or surrounding the same, and having a yieldable connection therewith permitting a limited vertical movement between the plates while preventing separation thereof, and means for preventing the latter plate from turning relative to the former.

4. In a fabric-cutting machine, a base or foot plate provided at opposite points with grooves, and a cloth-lifting plate inclosing or surrounding the same and provided with means for engaging the grooves, said means and grooves permitting a limited vertical movement between the two plates, substantially as described.

5. In a fabric-cutting machine, a base or foot plate provided at opposite points with grooves, and a cloth-lifting plate inclosing or surrounding the same and provided with movable tongues engaging said grooves, said tongues and grooves permitting a limited vertical movement between the two plates, substantially as described.

6. In a fabric-cutting machine, a base or foot plate provided at opposite points with grooves, a cloth-lifting plate inclosing or surrounding the same and provided with means for engaging the grooves, and means for preventing said latter plate from turning on said foot-plate, said grooves and the means first named permitting a limited vertical movement between the two plates, substantially as described.

7. In a fabric-cutting machine, a base or foot plate provided at opposite points with grooves, a cloth-lifting plate inclosing or surrounding said foot-plate, and provided with means for engaging said grooves, and a notch and lug engagement between the two plates to prevent turning of the latter plate upon the former.

8. In a fabric-cutting machine, a base or foot plate provided with an elastic cloth-lifting plate inclosing or surrounding the same, and a vertically-yieldable connection between the two.

9. In a fabric-cutting machine, a base or foot plate provided with an elastic cloth-lifting plate inclosing or surrounding the same, a separable and vertically-yieldable tongue-and-groove connection between the two, and means for preventing the cloth-lifting plate from turning on the foot-plate.

10. In a fabric-cutting machine, a base or foot plate provided with an elastic cloth-lifting plate inclosing or surrounding the same, a vertically-yieldable and separable tongue-and-groove connection between the two, and a lug on one part engaging a notch on the other, substantially as described.

11. In a fabric-cutting machine, a base or foot plate having a rim provided with a notch,

a cloth-lifting plate surrounding said foot-plate and having a lug engaging the notch, a yieldable connection permitting a limited vertical movement between the plates while preventing separation thereof, and rollers mounted beneath the said foot-plate, substantially as described.

12. In a fabric-cutting machine, a base or foot plate having a rim extending below the same and provided on its under side with a central portion or disk, radial ribs connecting said rim and disk, and rollers mounted between said rim and certain ones of the ribs, substantially as described.

13. In a fabric-cutting machine, a base or foot plate having a rim extending below the same, radial strengthening-ribs intersecting the rim, notched bearings on the rim and certain ones of the ribs, said bearings each having a shoulder as described, rollers supported between corresponding bearings the shafts thereof also having shoulders abutting those first mentioned, and movable plates extending across the ends of said shafts, substantially as shown and for the purpose set forth.

14. In a fabric-cutting mechanism, a foot-plate, a standard thereon provided with a slideway having a plate therein to reduce the width of same at the lower part, a vertically-reciprocating slide working in said slideway and also reduced in width at its lower part to

work in the narrowed part of the slideway, a knife or cutter carried by the slide, and a wear-plate inserted between the slide and said reducing-plate, substantially as described.

15. In a fabric-cutting machine, the presser-foot and its operating devices, the same comprising the vertically-movable rack having the presser-foot at its lower end, a pinion engaging said rack, and normally held to such engagement by means of a spring, and means for locking the rack at different positions of adjustment, substantially as described.

16. In a fabric-cutting machine, the movable rack carrying the presser-foot at its lower end, a longitudinally-movable pinion engaging said rack, a spring pressing the pinion to such engagement, a second pinion integral with the first and separated therefrom by a circumferential groove a tooth or pawl normally engaging the second-named pinion, and means for moving the pinions outwardly against the action of the spring, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

HENRY A. MEYER.

Witnesses:

JOSEPH FEY,
FRED KLEIN.