

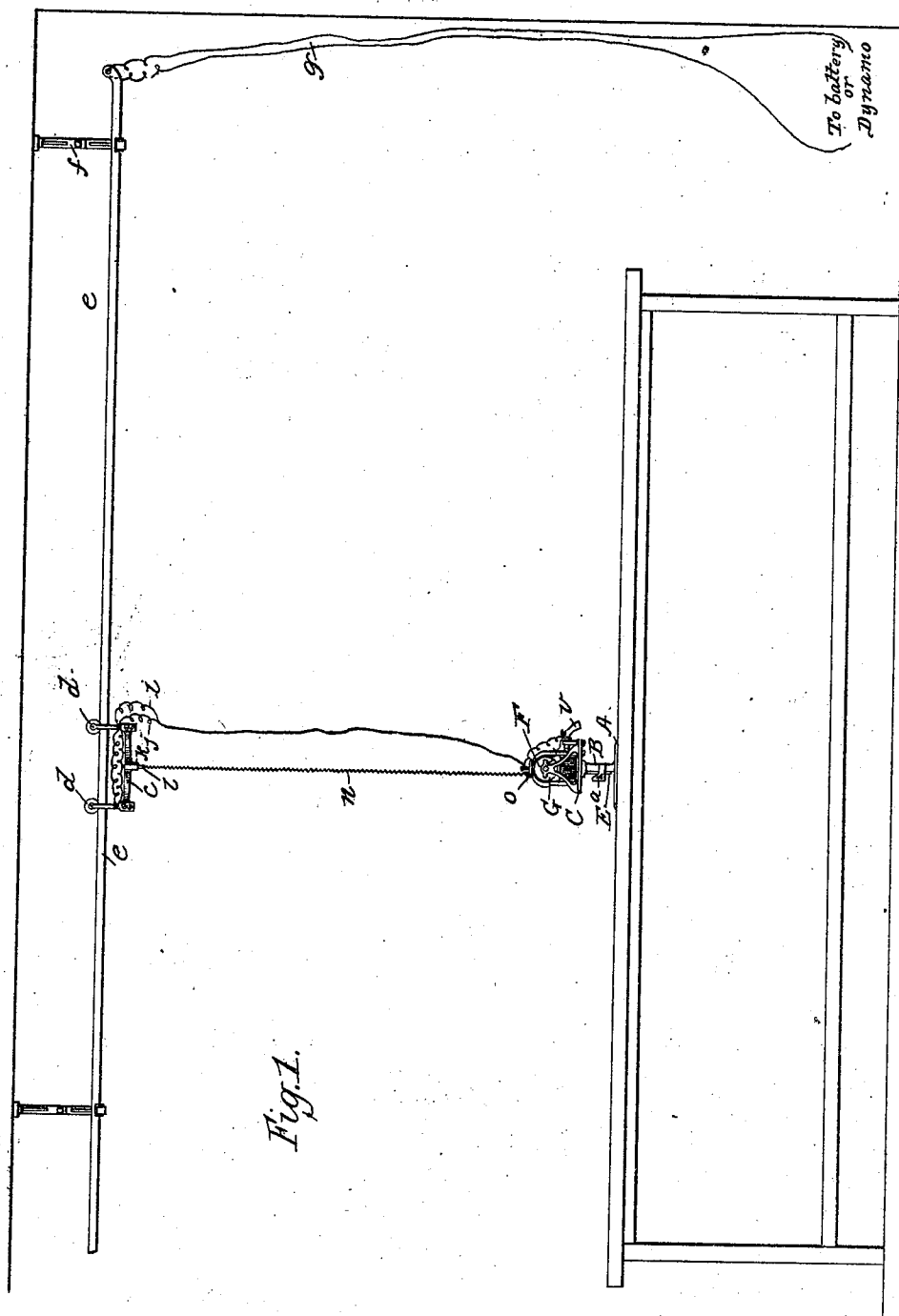
(No Model.)

5 Sheets—Sheet 1.

H. A. CALDWELL.
CLOTH CUTTING MACHINE.

No. 502,031.

Patented July 25, 1893.



Witnesses
Wm. M. Rheem.
Wm. J. Hemming.

Inventor
Henry A. Caldwell
by Elliott & Quinlan,
Attorneys.

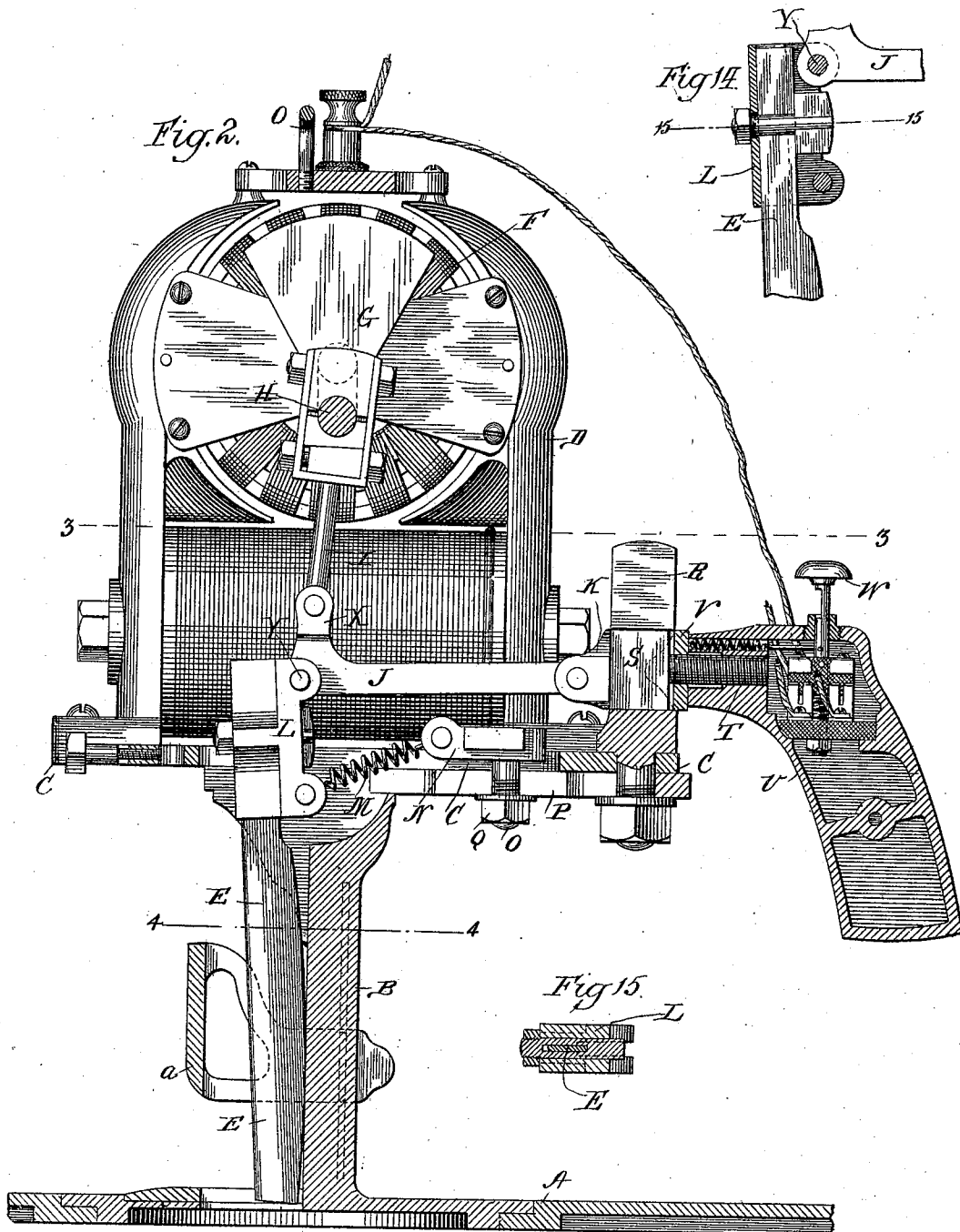
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5 Sheets—Sheet 2.

H. A. CALDWELL.
CLOTH CUTTING MACHINE.

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CLOTH CUTTING MACHINE.

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Fig. 3.

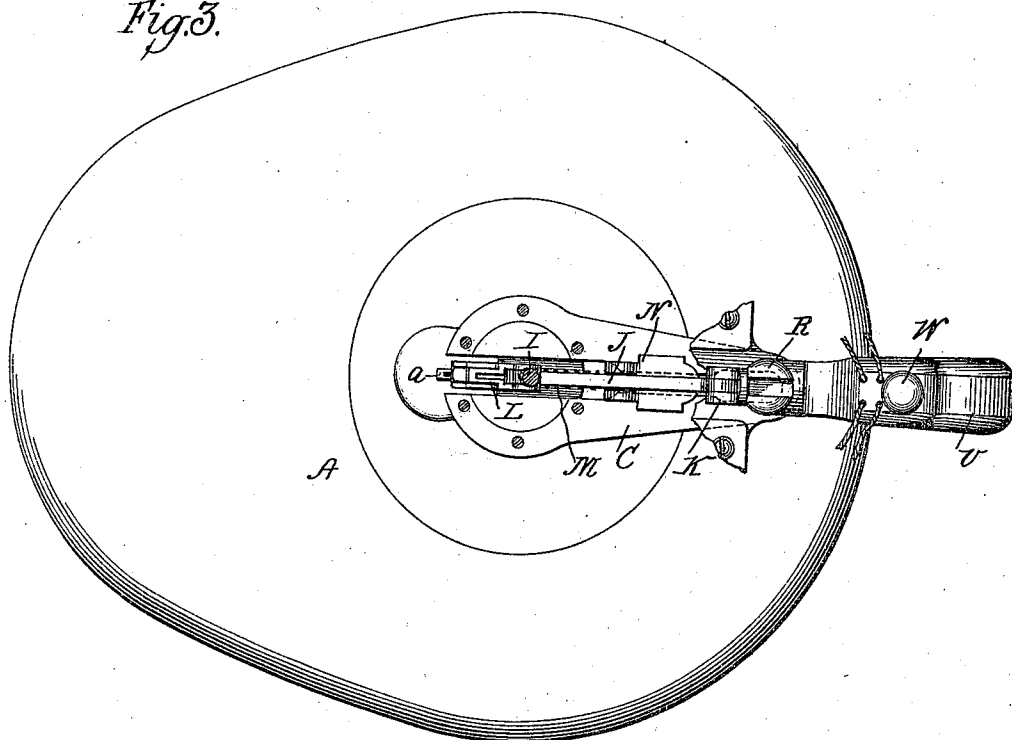
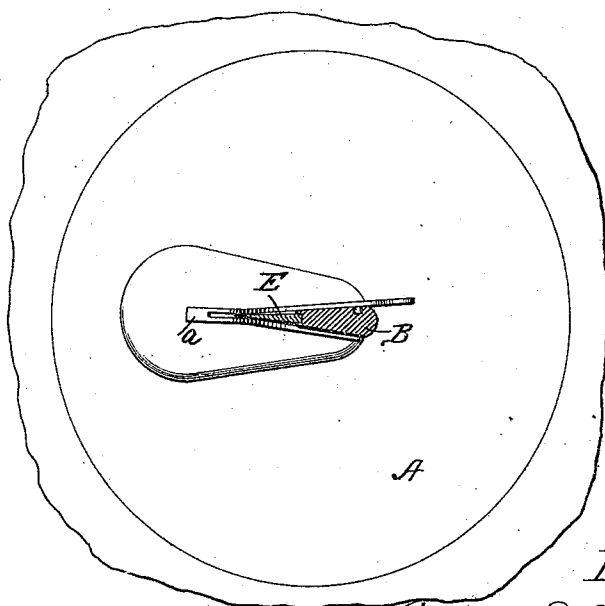


Fig. 4.



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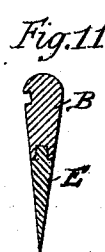
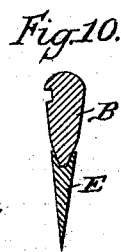
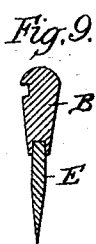
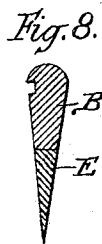
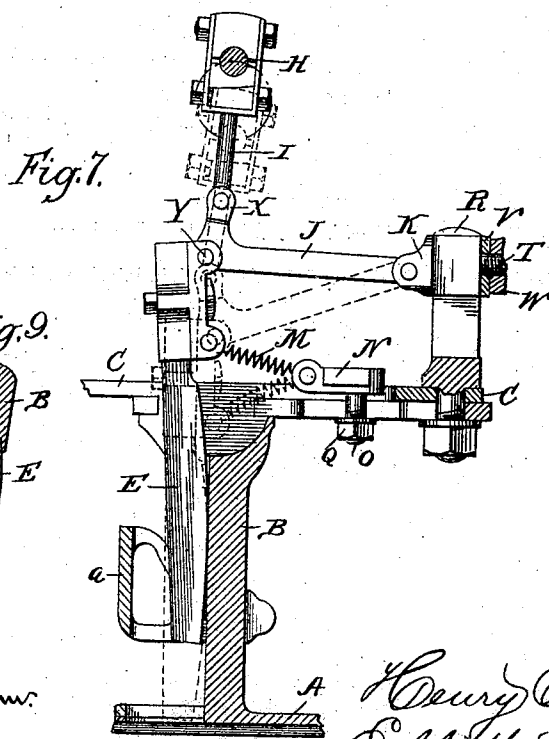
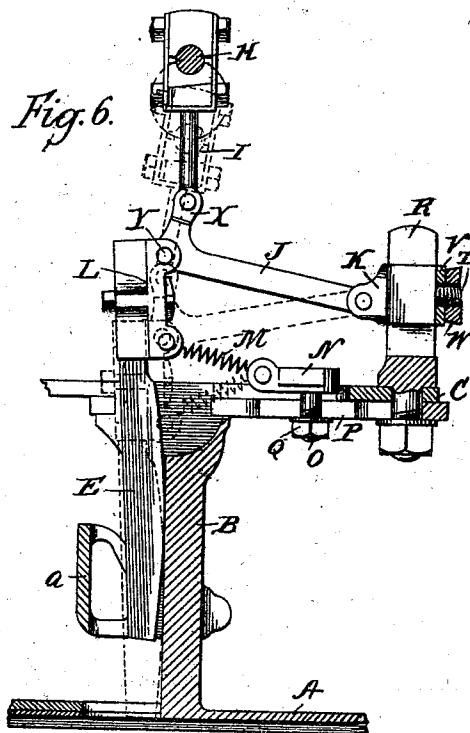
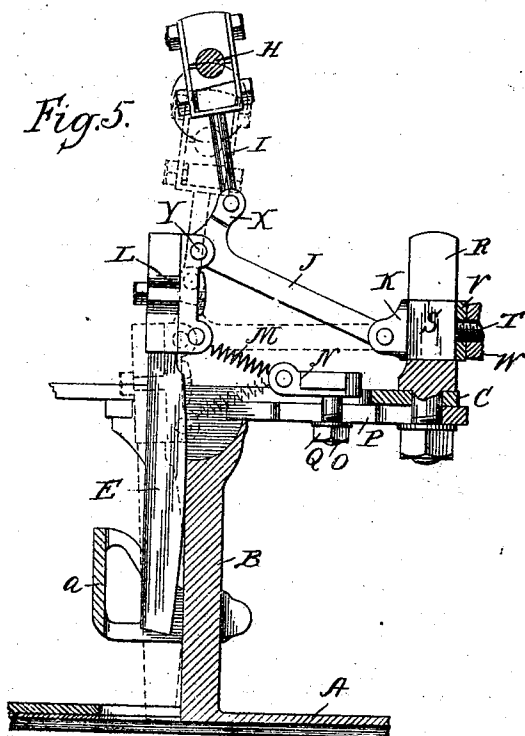
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H. A. CALDWELL.
CLOTH CUTTING MACHINE.

No. 502,031.

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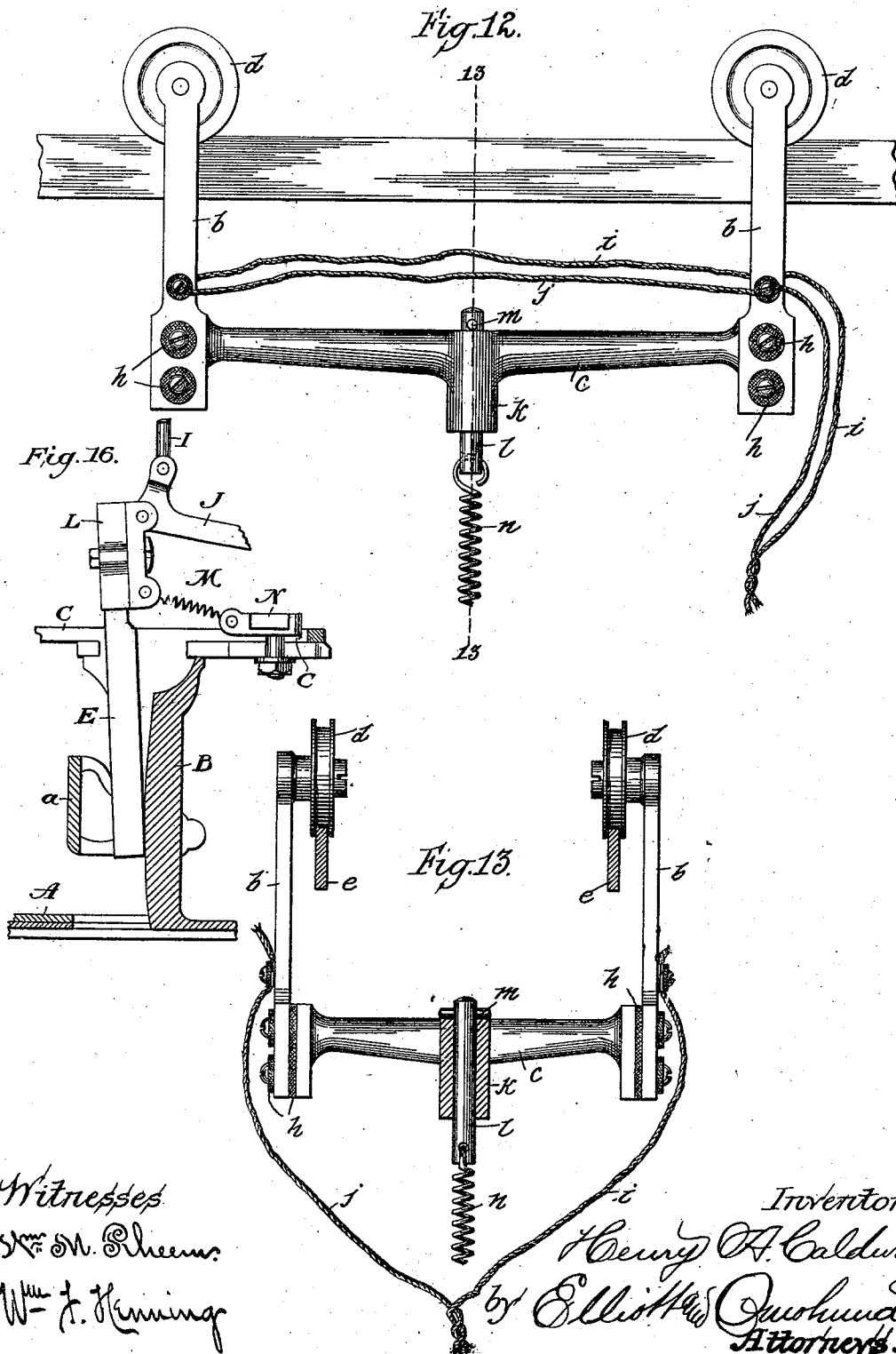
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UNITED STATES PATENT OFFICE.

HENRY A. CALDWELL, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE ELECTRIC CUTTING MACHINE COMPANY, OF SAME PLACE.

CLOTH-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 502,031, dated July 25, 1893.

Application filed March 11, 1892. Serial No. 424,484. (No model.) Patented in England March 8, 1892, No. 4,609; in Germany March 8, 1892, No. 64,618; in Canada September 19, 1892, No. 40,414, and in Austria-Hungary October 10, 1892, No. 12,780.

To all whom it may concern:

Be it known that I, HENRY A. CALDWELL, a citizen of the United States, and a resident of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Cloth-Cutting Machines, (for which the following foreign patents have been granted, to wit: British Patent No. 4,609, dated March 8, 1892; Canadian Letters Patent No. 40,414, dated September 19, 1892; Austrian and Hungarian Letters Patent No. 12,780, dated October 10, 1892, and German Letters Patent No. 64,618, dated March 8, 1892,) of which the following is a specification.

This invention relates to improvements in that class of machines known as "overboard" cloth cutting machines, in which a reciprocating cutting knife is employed, but is more especially designed as an improvement upon the invention set forth in Letters Patent No. 470,233, granted to me on the 8th day of March, 1892. In that application is described and claimed the broad idea of my invention, to-wit: a cutting knife reciprocated in a curved line, upon a shifting pivot or fulcrum between the ends thereof, and my present invention, while operating upon, and embodying the same general features contained in my aforesaid application, possesses specific features of novelty and construction, which I desire to secure by this application.

While both the machine of my aforesaid application and the present machine are adapted for all kinds of work required of a cloth cutting machine, the former was especially designed for "high-pile" work, while the latter, the present machine, is especially designed for "low-pile" work, and the differences in the construction and operation of the two machines are especially desirable on account of the difference in the character of the work to be performed thereby, although many of the features of the present machine are applicable to, and would be advantageous in, a machine of the general construction of that shown and described in my aforesaid application.

In the machine of my aforesaid application, the shifting pivot or fulcrum of the cutting knife was obtained by means of a link or

equivalent device pivoted at one end to the knife, and at the opposite end to the supporting frame of the machine, and by reason of the freedom required in that class of machines for the lower portion of the knife, to give the same a proper range of action, the link was necessarily connected with the knife at a point so near the upper end thereof, that the amount of throw or movement given to the lower end of the knife, was objectionable in certain classes of work, more especially in low piles of goods in which work the end of the knife had the most of the work to do; besides which, as the knife worked within a slotted standard, comparatively little effective cutting surface was available in working upon low piles, and shreds of the goods being operated upon would inevitably become wedged between the knife and the standard, and sometimes seriously interfere with the operations of the knife. In addition to this, the necessary width of the standard in which the knife worked, desirable for obtaining sufficient rigidity of the standard to support the weight of the operating part of the machine is objectionable for the reason that it enters the cut in the fabric so closely after the cutting edge of the knife, that the greater width of the standard unduly spreads the goods as cut, and in narrow cuts, will shift the layers of cloth to an objectionable extent.

The prime object of this invention is, therefore, to overcome the first of these objections by dispensing with the employment of the link or like device, and at the same time provide the knife with a shifting pivot or fulcrum between the ends thereof, which may have a range of action to the extreme lower end of the knife if desired, whereby the objectionable throw or movement of the lower end of the knife is avoided, and yet all the advantages of a shifting pivot or fulcrum for the knife are secured.

Another object is to render available as an effective cutting surface, the entire lower end of the knife, whereby the capacity of the machine is greatly promoted.

A further object is to dispense with the employment of the slotted standard, and at the same time afford a guide and support for the

knife from the standard in such manner that the knife at the point of conjunction with the standard may have substantially the same thickness as the standard, whereby is avoided the danger of shifting the layers of cloth by the passage of the standard through the cut, and of the lodgment of shreds between the standard and the knife.

A still further object is to provide a novel form of trolley and support for the machine when electrically operated, whereby the trolley subserves the double purpose of a traveling electrical conductor for the machine and as a support or counterbalance therefor to relieve the operator of the major portion of the weight of the machine in moving it overboard in operation.

Other objects are to provide ready and convenient means for changing the adjustments of the machine to vary the stroke or range of action of the cutting knife thereof; to so support and operate the cutting knife, that while it is provided with a shifting pivot or fulcrum between the ends thereof, it is at the same time readily adjustable and detachable from the machine; and to provide certain other details of construction in the carrying out of my invention, all as illustrated in the accompanying drawings, in which—

Figure 1, represents a side elevation of my cutting machine, showing the same mounted upon a work table in its operative position, when driven by electrical power; Fig. 2, a central vertical section through a cutting machine embodying my invention; Fig. 3, a horizontal section thereof on the line 3, 3, of Fig. 2, showing the electric motor removed; Fig. 4, a similar view on the line 4, 4 of Fig. 2; Figs. 5, 6 and 7, diagrammatic illustrations of the movements of the knife and its operating parts in the three principal adjustments thereof; Figs. 8, 9, 10 and 11, horizontal or cross sections through the cutting knife and standard showing the relative arrangement thereof and various modes of connection therebetween; Fig. 12, a detail side elevation of the trolley on an enlarged scale; Fig. 13, a transverse vertical section thereof, on the line 13, 13 of Fig. 12; Figs. 14 and 15, detail view of the knife block; Fig. 16, a detail view of a modification of my invention.

Similar letters of reference indicate the same parts in the several figures of the drawings.

Referring by letter to the accompanying drawings, A indicates the base-plate or foot of the machine, B the upright standard and C a table supported upon the upper end of the standard, and upon which are mounted the operative parts of my machine, including the preferable form of power in the shape of the electric motor D, although any other form of motive power for operating the cutting knife E may be employed without departing from the spirit of my invention.

The motor which I have found most effect-

ive is of the double class, having two armatures F mounted upon a single crank shaft G to the crank portion H of which is pivotally connected one end of the pitman I, the opposite end of which is also pivotally secured to a lever J, pivoted at one end to an adjustable bearing K, and at its opposite end to a knife block L, in which the upper end of the cutting knife E is adjustably and detachably secured. The rear edge of the cutting knife is curved longitudinally, as clearly shown in Figs. 1, 5, 6 and 7, and is preferably of the same thickness or width as the front edge of the standard B, against which it bears and with which it is held in close relation by means of a coil or other suitable spring M, one end of which is secured to the knife block below the pivot connection thereof with the lever J, while the other end is adjustably secured to the frame of the machine in any suitable manner, such as by the sliding block N, which may be locked in any desired adjustment by means of the screw bolt O working through a slot P in the table, upon the end of which bolt is a lock-nut Q bearing against the under side of the table. Obviously, however, other forms of springs and adjusting devices may be employed without departing from the spirit of my invention, so long as they serve to yieldingly maintain the rear edge of the knife in contact with the standard. It will be understood that the longitudinal curvature of the rear edge of the cutting knife is considerably exaggerated in the drawings, for the purpose of clearer illustration thereof, and that, consequently, the movements of the knife illustrated in the drawings are much greater than they would be in practice.

While the adjustability of the bearing K to which the rear end of the lever J is pivotally secured may be obtained in many different ways, that illustrated in the drawings is believed to possess both novelty and advantages over any prior construction. It consists of a vertical slotted post R, in the slot of which works a flattened portion S of the bearing, from which rearwardly and horizontally extends a threaded screw or stud bolt T, working in a threaded socket within the grip or handle U, the front end of which bears against the filling block V, which is interposed between the handle and the post, partially encompassing the latter, so as to prevent the rotation of said block. Hence, when the handle is turned so as to lessen the grip of the parts upon the post, the bearing may be adjusted vertically on the post to any desired position and then rigidly secured there by turning the handle back to its normal position. For convenience, the handle is preferably formed into a "pistol grip" and has a push button, W, thereon, operating the circuit making and breaking device inclosed within the handle, the detail construction of which need not be herein illustrated or de-

scribed in detail, as it forms no part of this invention, being of any form which will effect the desired end.

From the foregoing, it will be readily understood that the bearing of the curved back edge of the knife against the forward edge of the standard affords a shifting or traveling fulcrum for the knife during its reciprocations, since in its reciprocations the upper end thereof must swing upon the arc of a circle struck from the pivot bearing at the rear end of the lever J, which arc will vary with every change in the position of the bearing K, by which the pivot of the said lever is carried, and, hence, with every change the range of action, as well as the character of the action of the cutting edge of the knife is correspondingly changed.

In Figs. 5, 6 and 7 are illustrated diagrammatically the three main adjustments of the bearing and the effect thereof on the cutting knife. For instance, in Fig. 5, the pivot bearing of the lever J is shown at the lowest extreme of its adjustment, and in such position the lower end of the knife is thrown the farthest possible distance from the standard when the knife is in its highest position and is brought nearest to the standard when the knife is in its lowest position, as illustrated by the dotted lines. In Fig. 7, on the contrary, where the pivot bearing of the lever is at the highest extreme of its adjustment, the conditions are exactly the reverse, the lower end of the knife being nearest the standard when the knife is in its highest position and farthest away from the standard when the knife is in its lowest position. In Fig. 6, where the pivot bearing of the lever is in its mid-position, the effect is to bring the lower edge of the knife about the same distance from the standard in both the lowest and highest positions thereof, the lower end of the knife in this adjustment moving first in toward the standard and then out. The sole function of the spring M is to maintain the rear edge of the knife in close contact with the front edge of the standard, and it is made adjustable in order that the tension thereof may be varied as desired. All these adjustments of the stroke of the knife are of the utmost importance to the successful operation of a machine of this class, for I have found by practice that in a machine so operating, the knife can be adjusted so as to cut any kind of fabric, but that the adjustment of the knife for cutting one kind of fabric may render it wholly inoperative for cutting other kinds of fabrics.

In practice, while it is preferred to connect the pitman I with the lever J between the ends thereof, as for instance by connecting it with a lug X thereon, at the same time, the pitman might be connected directly with the knife block L in any suitable manner, such as by means of the pivot Y connecting said block with the lever J, it being understood that the form or class of the lever J, or whether it merely subserves the purpose of a link, is

immaterial, so long as it subserves the function of controlling the movements of the upper end of the knife, assisting to form the rotary action of the shaft G into a reciprocating action of the knife. The bearing of the rear edge of the knife against the front edge of the standard is of especial importance, for various reasons, chief among which is that it enables the dispensing with the link employed in the machine of my aforesaid application for controlling the action of the lower free end of the knife and also because it enables the employment of a solid standard of practically the same width at its front edge as the rear edge of the knife, for, by this latter arrangement, is avoided the shifting of the layers of cloth, which is liable to occur in the use of a slotted standard, in which the knife works, because of the necessarily and suddenly greater diameter of the standard than the knife; besides which is also avoided the danger of lodgment between the knife and the standard of shreds of cloth, which occurs in the use of the ordinary slotted standard. It is desirable, however, that with the knife operating upon the front edge of the standard, as herein described, the knife should be guided and supported in its movements, in order that the thinnest possible blade may be employed for operating upon low piles of goods, in which work, the lower end of the knife does most of the work and in effect must chop its way through the goods. On high pile work, the guide and support, especially for the lower end of the knife, would not be so essential, as the cutting in that case is done on the front or cutting edge proper of the knife.

A guide and support for the knife from the standard may be provided in numerous ways, such, for instance, as illustrated in Figs. 2 and 8, in which the vertical adjustable presser foot subserves the further purpose of a guide, being adjustably secured to the standard either by spring or screw pressure and provided with a vertical slot, through which the lower end of the knife works. The objection to this form of guide and support for the knife is that the presser foot must be always above the pile of goods, and hence, does not support the knife at the point where most needed; that is, at the extreme lower end. This objection may be overcome by slightly grooving the forward edge of the standard and letting the rear edge of the knife work therein, as illustrated in Fig. 9; or by forming a tongue and groove connection between the rear edge of the knife and the forward edge of the standard, as illustrated in Figs. 10 and 11, the former showing the tongue on the standard and the latter showing the tongue on the knife. In such cases, the presser foot would then be required to subserve only its ordinary functions and the knife would be supported and guided throughout its length.

In all the constructions shown in Figs. 8 to 11 inclusive, no obstruction would be offered

to the rocking of the back edge of the knife upon the front edge of the standard for in all of such arrangements, the grooves and interlocking tongues would extend longitudinally of the knife and standard and would be of such depth as to afford a guide and support for the knife practically throughout its length, since in practice the curvature of the back is very slight and a depth of groove of from one-sixteenth to three thirty seconds of an inch, or less, would be all sufficient to accomplish the desired results. However, so far as relates to the broad idea of this invention, that of providing a shifting or traveling fulcrum for the knife between the ends thereof by curving the rear edge of the knife, it would be no departure from my invention to apply this feature to a slotted standard within which the knife works, since it would only be the equivalent of deepening the groove shown in Fig. 9, and, indeed, it would also be within the scope of this invention to reverse the arrangement of the parts and put the curve upon the standard and have the rear surface of the knife straight as illustrated in Fig. 16, although such construction would be objectionable, on account of the great work to which the standard would be subjected by the rapidly operating knife.

The trolley which I design to employ in connection with this machine, illustrated in Figs. 1, 12 and 13, is also of novel form and possesses great utility and advantages not common to any trolley heretofore in use, so far as I am aware. This consists of a frame composed of four vertical hanging arms *b* rigidly connected at their lower ends by a horizontally disposed frame *c* and at their upper ends each carrying a grooved roller *d* running upon a pair of tracks or rails *e*, supported by brackets *f* or in any other suitable manner, which rails constitute conductors for the electric current, being connected by the wires *g* in any suitable manner with some source of electrical energy, such as a battery or dynamo. The rollers *d* and the hangers *b* also constitute a part of the electric conductor or circuit, being insulated from the frame *c* by some insulating material, *h*, but connected by the wires *i, j*, with a motor mounted upon the table of the machine, one of which wires is the inleaving and the other the returning wire for the circuit through the motor.

The frame *c* is entirely perforated or provided with a hub *k*, in which freely turns a pin *l*, held in position by cross-pin *m*, or in any other convenient manner, to the lower end of which pin is secured one end of the long coil spring *n*, the opposite end of which is attached to an eye *o* upon the frame of the motor or to any other suitable part of the machine, the tension of which spring being such that the spring counter-balances or supports the greater portion of the weight of the machine, thus enabling the employment of a larger and stronger motor, because the work of the operator in moving the machine from the table upon which the work rests, is re-

duced to the minimum thereby. This spring connection also serves to move the trolley back and forth upon the tracks as the machine is moved about in work, without the danger of twisting or knotting the connection between the machine and the trolley, *i. e.*, the swiveled spring, and at the same time relieves the conducting wires *i, j*, which are united in one just below the trolley, of this duty which would otherwise result in crystallizing the wire and breaking the same at its point of connection with machine and trolley.

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

1. In a cloth cutting machine, the combination with a reciprocating knife having a shifting fulcrum between its ends, of a yielding connection for holding the knife up to its fulcrum, substantially as set forth.

2. In a cloth cutting machine, the combination with a standard, of a reciprocating knife fulcrumed upon the front edge of said standard, the meeting edges of one of said members being curved and the other straight, and a yielding connection for holding said knife against said standard, substantially as set forth.

3. In a cloth cutting machine, the combination with a knife having a shifting fulcrum between its ends and means for reciprocating said knife in a curved line, of a yielding connection for holding said knife up to its fulcrum, substantially as set forth.

4. In a cloth cutting machine, the combination with a reciprocating knife having a curved back, of a fulcrum for the back of said knife and a yielding connection for holding said knife up to its fulcrum, substantially as set forth.

5. In a cloth cutting machine, the combination with a standard, of a knife having a curved back resting against said standard, and a spring acting upon said knife to hold it against said standard, substantially as set forth.

6. In a cloth cutting machine, the combination with a standard, of a knife having a curved back resting against said standard, a lever for reciprocating said knife, and a spring acting upon said knife to hold it against said standard, substantially as set forth.

7. In a cloth cutting machine, the combination with the standard, an adjustable arm or lever and means for oscillating said lever, of a knife attached to said lever and having a shifting fulcrum between its ends, and a yielding connection for holding the knife up to its fulcrum, substantially as set forth.

8. In a cloth cutting machine, the combination with the standard, an adjustable arm or lever and means for oscillating said lever, of a knife attached to said lever and having a shifting fulcrum between its ends and a yielding connection adjustably anchored at one end and acting upon said knife for holding it up to its fulcrum, substantially as set forth.

9. In a cloth cutting machine, the combination with the standard, an adjustable arm or lever and means for oscillating said lever, of a knife attached to said lever having a curved back and a yielding connection for holding said knife up to its fulcrum, substantially as set forth.

10. In a cloth cutting machine, the combination with the standard, an adjustable arm or lever and means for oscillating said lever, of a knife attached to said lever and having a curved back, and a yielding connection adjustably anchored at one end and acting upon said knife for holding it against said standard, substantially as set forth.

11. In a cloth cutting machine, the combination with a standard, of a reciprocating knife having its rear edge bearing against the front edge of said standard, the sides or lateral faces of said knife and standard lying flush or in a plane with each other, and means for retaining the knife against the standard; substantially as set forth.

12. In a cloth cutting machine, the combination with the standard, of a reciprocating knife and an inter-locking connection between the meeting edges of said knife and standard, the sides or lateral faces of said knife and standard lying flush or in a plane with each other, substantially as set forth.

13. In a cloth cutting machine, the combination with a standard, of a reciprocating knife having a curved back fulcrumed upon or against the front edge of said standard a yielding connection for holding said knife against the standard, and means for guiding said knife, substantially as set forth.

14. In a cloth cutting machine, the combination with the standard, of a reciprocating knife having a curved back fulcrumed upon or against the front edge of said standard, a yielding connection for holding said knife against the standard and an inter-locking connection between the meeting edges of said knife and standard, substantially as set forth.

15. In a cloth cutting machine, the combination with a standard, of a reciprocating knife having a curved back fulcrumed upon or against the front edge of said standard, a yielding connection for holding said knife against the standard an inter-locking connection between the meeting edges of said knife or standard and means for guiding said knife, substantially as set forth.

16. In a cloth cutting machine, the combination with a standard, a lever, a knife block pivotally secured to said lever, and means for

oscillating said lever, of a knife having a curved back resting against said standard, said knife being detachably secured to the knife block, and a spring secured at one end of the knife block, and at the other end to the machine frame for holding said knife against the standard, substantially as set forth.

17. In a cloth cutting machine, the combination with a standard, a lever, a knife block pivotally secured to said lever, and means for oscillating said lever, of a knife having a curved back resting against said standard, said knife being detachably and adjustably secured to the knife block, and a spring secured at one end of the knife block, and at the other end to the machine frame for holding said knife against the standard, substantially as set forth.

18. In a cloth cutting machine, the combination with a standard, a lever, a knife block pivotally secured to said lever, and means for oscillating said lever, of a knife having a curved back resting against said standard, said knife being detachably secured to the knife block, and a spring secured at one end of the knife block, and at the other end adjustably secured to the machine frame for holding said knife against the standard, substantially as set forth.

19. In a cloth cutting machine, the combination with a standard, a lever, a knife block pivotally secured to said lever, and means for oscillating said lever, of a knife having a curved back resting against said standard, said knife being detachably and adjustably secured to the knife block, and a spring secured to one end of the knife block, and at the other end adjustably secured to the machine frame for holding said knife against the standard, substantially as set forth.

20. In a cloth cutting machine, the combination with a knife having a shifting fulcrum between its ends, an arm or lever actuating said knife and means for oscillating said lever, of an adjustably pivoted bearing for said arm or lever comprising an upright slotted post, a bearing block fitting in said post and provided with a stud bolt, a handle having a screw threaded socket for reception of said bolt, and a filling or clamping block interposed between said handle and the post, substantially as set forth.

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Witnesses:

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W. D. CROSS.