No. 640,192. Patented Jan. 2, 1900.

F. GARDNER.

ELECTRIC CLOTH CUTTER.

(Application filed Jan. 13, 1898.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 2.

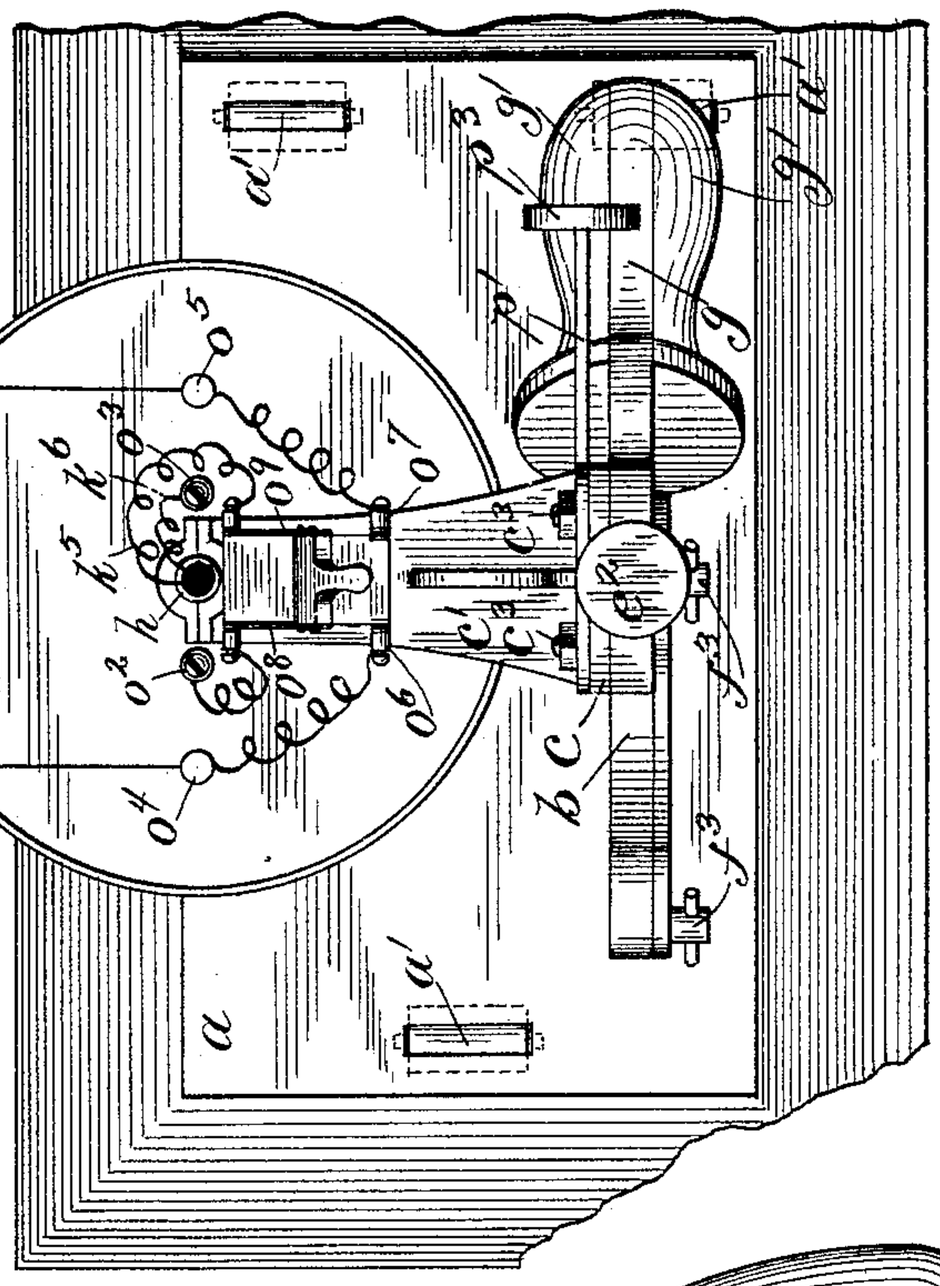

Fig. 4.

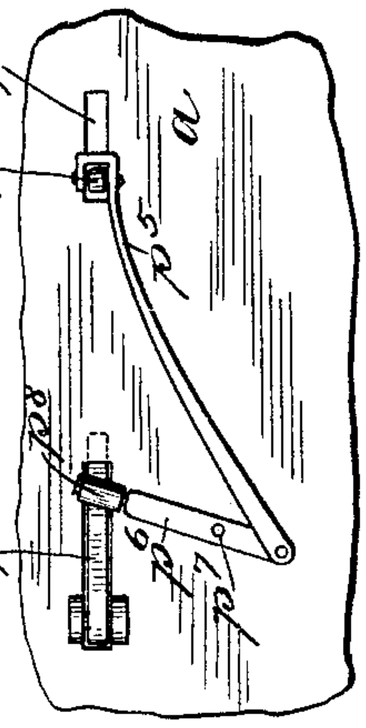

Fig. 4a.

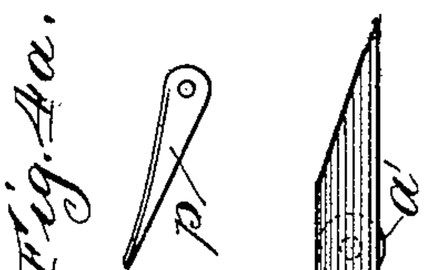

Fig. 1.

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Fig. 6.

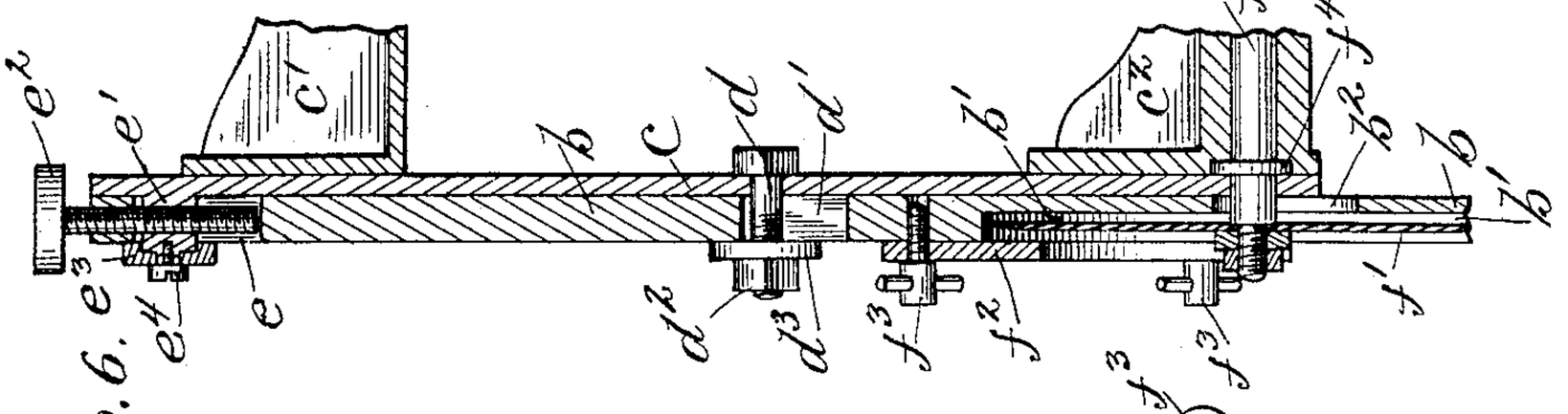

Fig. 5.

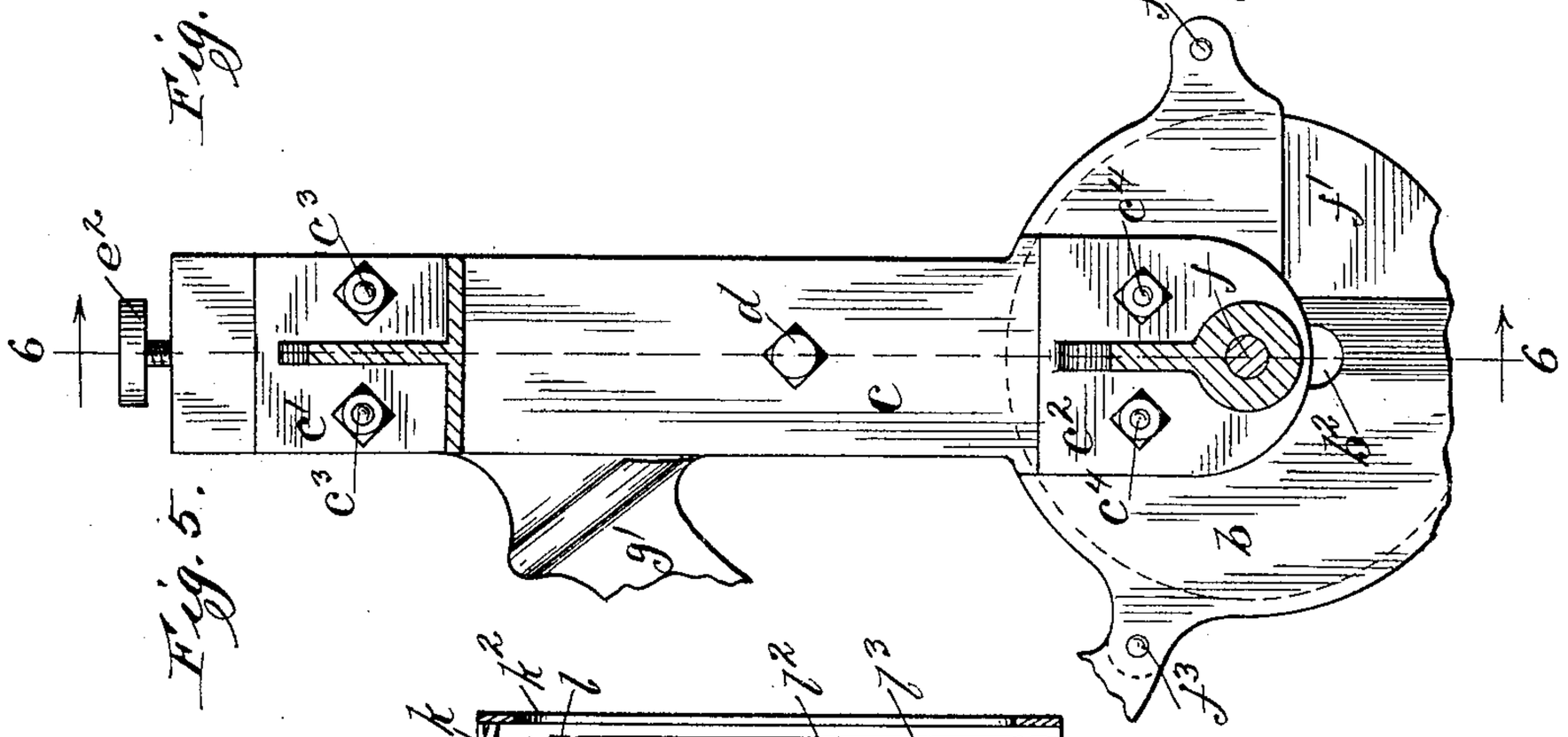

Fig. 3.

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UNITED STATES PATENT OFFICE.

FULTON GARDNER, OF CHICAGO, ILLINOIS.

ELECTRIC CLOTH-CUTTER.

SPECIFICATION forming part of Letters Patent No. 640,192, dated January 2, 1900.

Application filed January 13, 1898. Serial No. 666,493. (No model.)

To all whom it may concern:

Be it known that I, FULTON GARDNER, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a certain new and useful Improvement in Electric Rotary Cutters, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to a rotary electric cutter for cutting cloth and other similar materials, my object being to provide an improved and novel construction whereby the cutter may be efficiently and effectively operated, and, furthermore, to provide means for readily adjusting the cutter to knives of different sizes.

I have illustrated my invention in the accompanying drawings, in which—

Figure 1 is a view in elevation of the rotary cutter of my invention. Fig. 2 is a plan view of the rotary cutter. Fig. 3 is a partial sectional view of the cutter. Fig. 4 is a view of the bottom of the base-plate, illustrating the mechanisms for raising the shearing device. Fig. 4^a is a detail view of the raising and shearing finger. Fig. 5 is a sectional view on line 5 5, Fig. 3. Fig. 6 is a sectional view on line 6 6, Fig. 5.

Like letters refer to like parts in the several figures.

The base-plate a is preferably mounted upon rollers a' a' and supports the standard or plate b, the lower end of which is securely fastened to the base-plate. Upon the rear of the standard b is a plate c, adjustably mounted upon the standard b. The plate c carries the brackets c' c^2, which support the electric motor and the shaft of the rotary knife, the bracket c' being secured to the plate c by means of bolts c^3 c^3, while the bracket c^2 is secured to said plate c by means of bolts c^4 c^4. The plate c carries a bolt d, which extends through a slot d', provided in the standard b, and a nut d^2 screws upon the end of said bolt and against a washer d^3 to clamp the plate c against the standard b. At the upper end of the standard b is provided a slot e, into which extends a lug e', provided upon the face of plate c, and a thumb-screw e^2 passes freely through the upper end of the standard and engages a tapped hole in the lug e' and rests by its end against the bottom of the slot e. A plate e^3 is mounted against the end of the lug e' by means of a screw e^4 to guide the plate c. By loosening the nut d^2 and turning the screw e^2 the plate c may be raised or lowered, as desired, and clamped in any position through the agency of the nut d^2. The shaft f, which carries the rotary knife f', is journaled in a bearing provided upon the bracket c^2, and the knife rests in the recess b', formed in the face of the standard b. An arc-shaped guard-plate f^2 fits against the face of the standard b and incloses and guards the upper half of the periphery of the rotary knife. The guard-plate is held in position by means of the thumb-screws f^3 f^3. A slot b^2 is provided in the standard b to permit the adjustment of the shaft f. A collar f^4 is preferably provided upon the shaft f, which fits in the corresponding recess to prevent the longitudinal movement of the shaft. The plate comprising the standard b is preferably cut into such form that the central portion of the handle g is formed integral with the standard, pieces g' g' being mounted upon opposite sides of this central portion to provide a firm handhold, whereby the cutter may be moved and guided over a cutting-table.

The electric motor which drives the rotary knife is mounted with its axis in a vertical position. A hollow spindle or shaft h is secured at the upper end in the bracket c' and is joined to a solid portion h', which is threaded at the lower end and screws into a shell or support h^2, adapted to be secured in any position by means of a set-screw h^3. Upon the hollow spindle or shaft h, which is thus held stationary, is mounted a disk k, which is held in position by a set-screw k'. Upon the periphery of the disk k is mounted a cage k^2, which surrounds and incloses the motor to prevent the hands or other objects from coming in contact with the moving parts thereof. The field-magnet k^3 of the motor is mounted fixedly upon the spindle h, and the winding k^4 thereof is connected with conductors k^5 k^6, which extend through the hollow interior of the spindle. Rotating about the spindle is a disk l, between which and a disk l' the armature-core l^2 is mounted, the core being wound with the armature-coils l^3. To

the lower end of the disk l' is secured the bevel-gear l^4, which meshes with bevel-gear l^5, mounted upon the end of shaft f. The bevel-gear l^4 preferably rests upon the shell h^2, so that the weight of the motor may not come upon the bevel-gears. Upon the face of the disk l are provided segments m m of a commutator, which are connected with the armature-coils, these segments being arranged in a circle, and upon the segments rest the brushes m' m', from which extend the conductors o o'. The conductors o o' are connected, respectively, with the binding-posts o^2 o^3, Fig. 2. The opposite sides of the supply-circuit are connected with binding-posts o^4 o^5, from which extend conductors to the contacts o^6 o^7 of the switch, the arms o^8 o^9 of which are connected one with the binding-post o^2 and the other with the conductor k^5, while the conductor k^6 is connected with binding-post o^3. The circuit of the motor is thus traced from binding-post o^5 to contact o^7, thence through the switch to contact o^9, to conductor k^5, through the binding-post of the field-magnet to conductor k^6, binding-post o^3, through the armature of the motor to binding-post o^2, thence through the switch-arm o^8 to contact o^6, to binding-post o^4, to the opposite side of the line. The connection is this for a series motor, although a shunt or other form of motor may be employed when desired. While I have described a specific form of motor, which I preferably employ, it is evident that other forms of motors may be employed without departing from the spirit of my invention. I preferably employ, however, an electric motor of the type illustrated, wherein the field-magnet is placed upon the interior of a surrounding rotating armature. By this construction the core of the armature, which may be made of any desired weight, serves as a fly-wheel to store up energy, which produces an effective rotation of the circular knife that is not materially impeded even when cutting through the thickest cloth or layers of cloth. Furthermore, the provision of an exterior rotating armature increases materially the lever-arm through which the magnetic driving force acts, thereby increasing the torque of the motor for a given exterior dimension of the motor. I usually form the circular knife with as small a diameter as is consistent with the work to be done, so that the lever-arm of the resistance met by the cutting edge of the knife will be as small as possible. The above construction of motor I find particularly adapted for rotary cloth-cutters, especially where the cutter is connected with the motor through the agency of toothed gearing, which should be subjected to as little shock and sudden strain as possible. By providing an exterior rotating armature I am enabled to entirely dispense with a fly-wheel, thus materially reducing the weight, size, and cost of the machine.

Upon the base-plate a is pivoted a shearing-lever p, the edge of which is preferably sharpened like the shear of a pair of scissors, and the lever when raised is adapted to shear along the surface of the circular knife to raise the cloth and at the same time sever the same, so that the end of the cut will be perpendicular to the face of the cloth. The lever p is provided with a sharpened end adapted to pierce and engage the cloth to prevent the slipping of the same during the cutting operation. This attachment is particularly desirable in cutting thick cloth or several layers laid together, as when it is desired to cut into the cloth and leave the end of the incision perpendicular to the face of the cloth. The shearing-lever is raised to move the cloth into position perpendicular to the cutting edge of the knife. In order that the shearing-lever may effectively coact with the rotary knife, the knife is preferably sharpened only on the edge opposite that engaged by the shearing-lever, so as to leave the other face of the cutter smooth to coöperate with the shearing-lever. To operate the shearing-lever, an operating-lever p' is pivoted to the standard at p^2 and carries a thumb-piece p^3 on the end placed in position to be readily depressed by the finger or thumb. The lower end of the lever p' passes through a slot p^4 in the base-plate and engages the end of a link p^5, connected with the end of a lever p^6, pivoted at p^7 and carrying upon the end a roller p^8, adapted to bear against the lower edge of the shearing-lever p. When the thumb-piece is depressed to rock lever p', the lever p^6 is rocked and causes the roller to travel along the lower edge of the shearing-lever, thus raising the same, as shown in Fig. 1.

It will be observed that the circular knife being set within a recess provided in the face of the plate comprising the standard has its periphery entirely surrounded and inclosed with the exception of the forward and lower quadrant, which is the cutting edge—that is, the upper half and the rear quadrant of the cutting edge of the knife are inclosed and guarded to prevent objects from coming in contact therewith. The knife, being thus inset, is in the plane of the standard, and the section of the plate opposite the forward and lower sector of the knife is cut away, Figs. 1 and 5, to expose both sides of the knife throughout this portion, and the vertical edge of the standard is beveled or sharpened to facilitate the passage of the material being cut.

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

1. The combination with a base-plate, of a standard-plate mounted thereon, a vertically-adjustable plate mounted upon said standard-plate, brackets mounted upon said adjustable plate an electric motor supported in said brackets with the axis thereof vertical, a horizontal shaft geared to the motor and carrying the rotary knife, an adjusting-screw for raising and lowering the adjustable plate,

and a clamping-screw for clamping the adjustable plate in position, substantially as described.

2. The combination with a base-plate of a standard-plate thereon an adjustable plate mounted on said standard-plate and carrying the electric motor, a horizontal shaft carried by said adjustable plate, a slot in the standard-plate through which said shaft passes, means for adjusting said adjustable plate in position, and a rotary knife mounted upon said shaft at the side of the standard-plate, substantially as described.

3. The combination with a base-plate, of a standard-plate mounted thereon, a vertically-adjustable plate mounted upon said standard-plate, brackets mounted upon said adjustable plate, an electric motor supported in said brackets having the axis thereof vertical, a horizontal shaft geared to the motor and carrying the rotary knife and means for permitting the adjustment of said adjustable plate relatively to the standard-plate, substantially as described.

In witness whereof I have hereunto subscribed my name in the presence of two witnesses.

FULTON GARDNER.

Witnesses:
JAMES M. COBHAM,
W. CLYDE JONES.