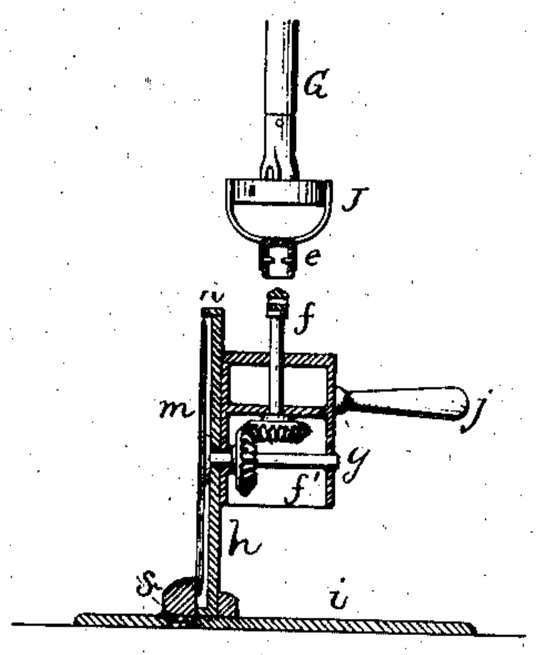
(No Model.)

W. R. FOWLER.

CLOTH CUTTING MACHINE.

No. 245,151. Patented Aug. 2, 1881.

FIG. 2.



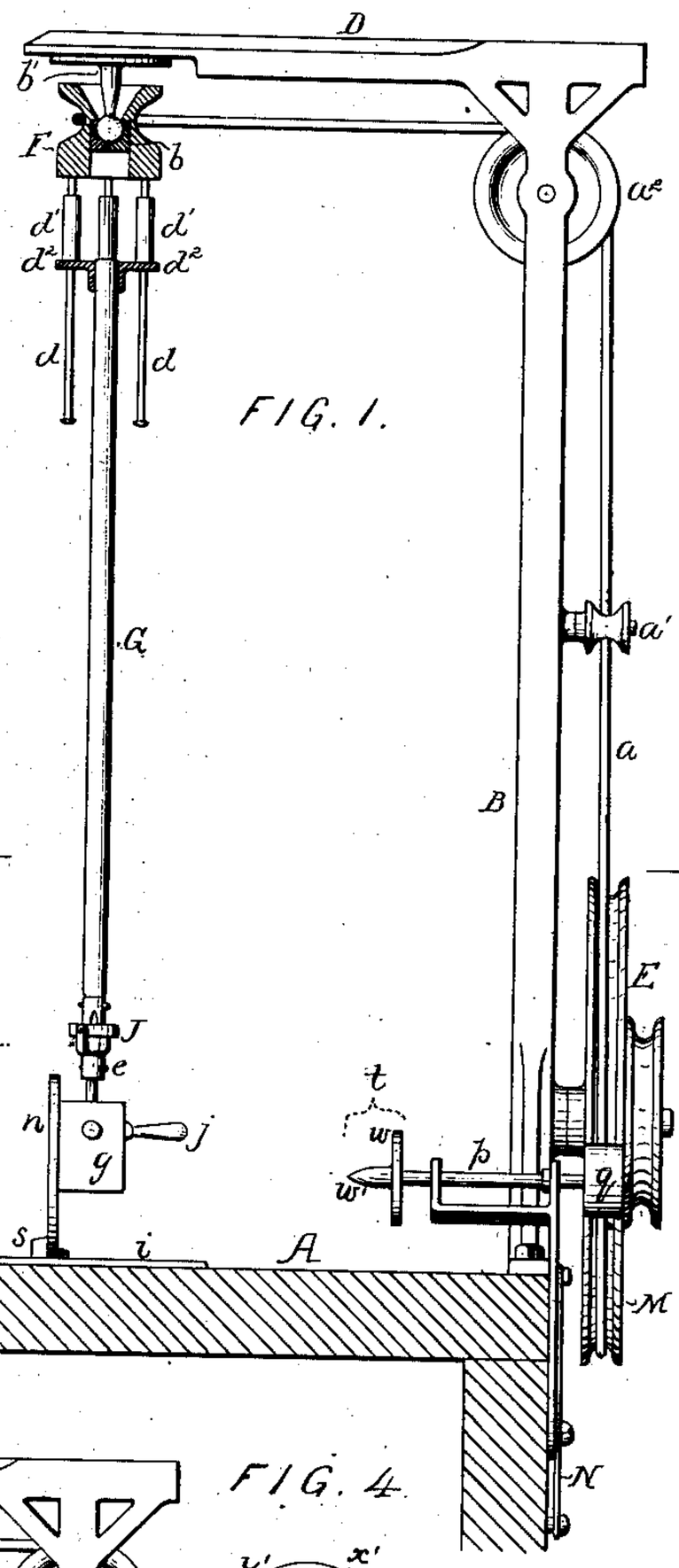


FIG. 1.

FIG. 3.

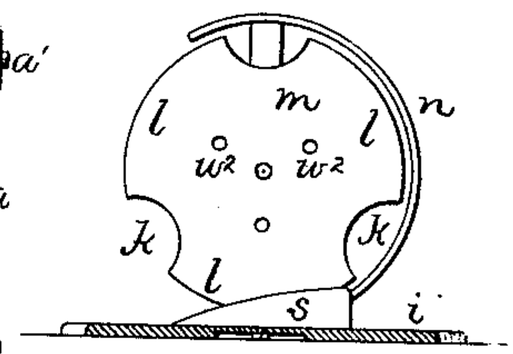


FIG. 7.

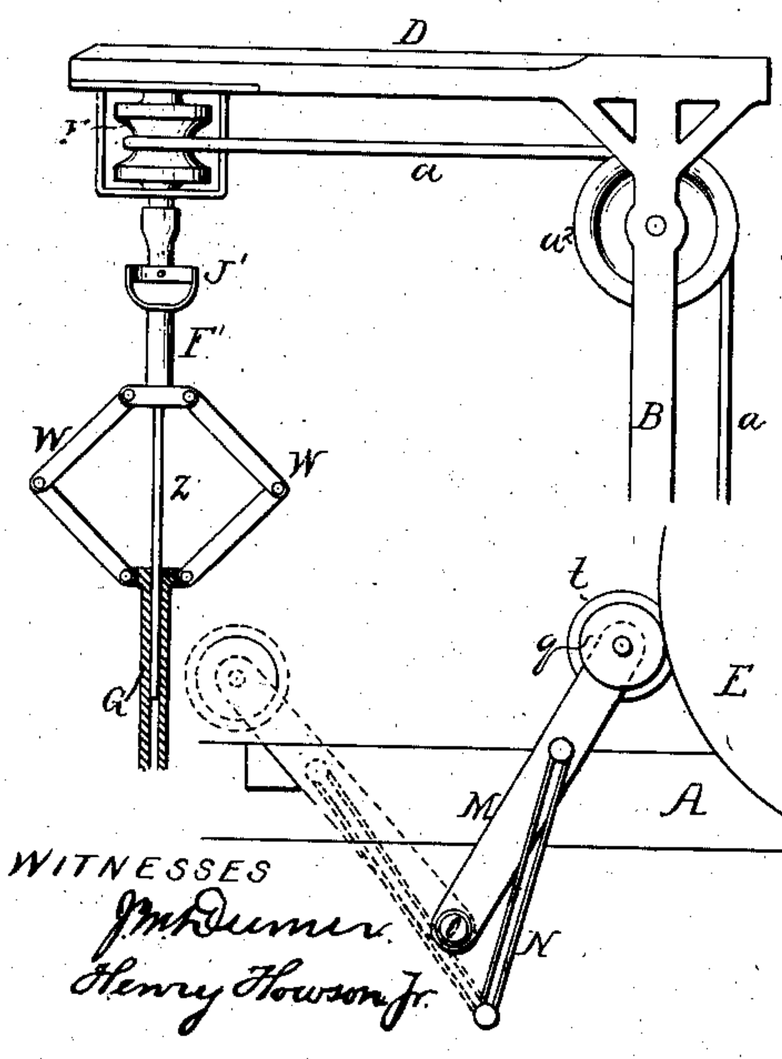


FIG. 4.

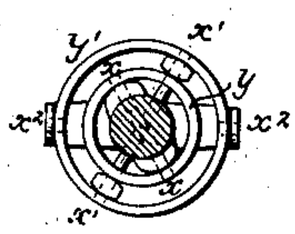
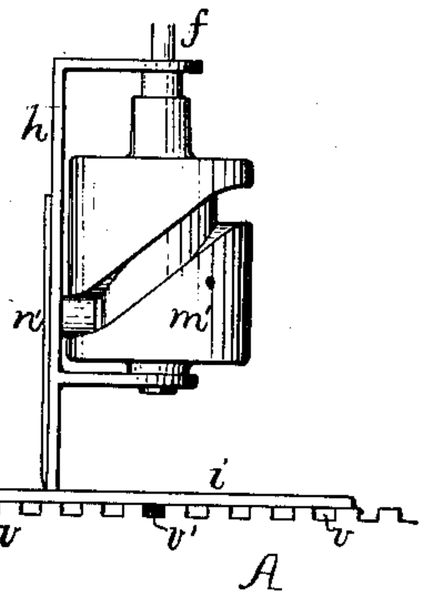


FIG. 5.

FIG. 6.



WITNESSES

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CLOTH-CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 245,151, dated August 2, 1881.

Application filed July 7, 1881. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM R. FOWLER, a citizen of the United States, residing in Philadelphia, Pennsylvania, have invented certain Improvements in Machines for Cutting Cloth and other Materials, of which the following is a specification.

My invention relates to an improvement in that class of cutting-machines in which a frame carrying a knife and knife-operating devices and adapted to be traversed over a table containing the material to be cut is combined with flexible driving mechanism, whereby power is transmitted to the knife-operating devices from a stationary shaft or pulley.

The main object of my invention is to so construct such a machine as to insure perfect freedom of movement of the knife-carrying frame without interfering with the proper transmission of power, other objects being the improvement of minor parts of the cutting device, all as hereinafter fully set forth.

In the accompanying drawings, Figure 1 is a side view, partly in section, of my improved cutting-machine; Fig. 2, a sectional view of part of the same drawn to an enlarged scale; Fig. 3, a front view of part of Fig. 2; Fig. 4, a plan view of part of Fig. 2; Fig. 5, an end view of part of Fig. 1; Fig. 6, a detached view, showing one of the features of my invention in connection with a modified knife-operating device, and Fig. 7 a view showing a modified form of shaft-operating mechanism.

In Fig. 1, A represents part of the work-table, to one edge of which is secured a vertical standard, B, having at the top a horizontal arm, D, projecting over the table. The standard B has a stud on which turns a vertical pulley, E, power being applied to the latter either directly or by means of belts or other gearing from an adjacent power-driven shaft.

A belt, *a*, passes around the pulley E, over idler-pulleys *a'* and a^2, and around a horizontal pulley, F, to the central opening of which is fitted the two-part socket *b*, adapted to a ball at the lower end of a stem, *b'*, secured to and projecting downward from the arm D of the standard B, the ball and socket occupying such a position in the pulley that the latter can swing freely without danger of casting off the belt *a*.

From the pulley F project downward a series of pins, *d*, which are adapted to and can slide freely in tubes *d'* carried by a ring, d^2, on the upper end of a shaft, G, the lower end of the latter carrying a universal joint, J, of the peculiar construction described hereinafter. The joint J has a socket, *e*, to which is adapted the enlarged upper end of a vertical spindle, *f*, which turns in a bearing in a barrel, *g*, secured to a vertical standard, *h*, on a plate, *i*, the lower end of said spindle *f* carrying a bevel-wheel which gears with a bevel-pinion on a horizontal shaft, *f'*, adapted to bearings in the standard *h* and barrel *g* and carrying a rotary cutting-knife, *m*. The latter may consist of a simple circular plate of steel with sharpened edge; but I prefer to make it in the form of a circular disk, with recesses *k* in the edge, so as to form a series of cutting-segments *l*, and thereby facilitate the action of the knife.

The plate *i*, standard *h*, and barrel *g* form what I term a "knife-carrying" frame, H, which also carries the gearing for operating said knife. The barrel *g* has a handle, *j*, by which it may be readily manipulated by the operator, and in order to prevent accident I protect the rear edge of the knife *m* by means of a segmental guard-plate, *n*, secured to the standard *h* and overlapping the edge of the knife, (see Figs. 2 and 3.)

The plate *i* rests upon the table A, and the cloth or other material to be cut rests on said plate, which, with the cutting-knife and its driving devices, is moved about over the table so as to follow the lines of a pattern marked on the cloth, the latter being brought under the action of the knife by a wedge-shaped block, *s*, arranged adjacent to the cutting-edge of said knife, and secured to the plate *i*, so as to be adjustable thereon as the knife becomes worn and necessitates a greater elevation of the cloth in order to effect the cutting of the same.

The universal joint J on the lower end of the transmitting-shaft G is shown in Figs. 2 and 4, on reference to which it will be ob-

served that the lower end of the shaft G is forked and pivoted at x to a ring, y, which is pivoted at x' to an outer ring, y', the latter being pivoted at x^2 to the forked upper end of the socket e, which receives, and when the device is in use forms in effect part of, the spindle f.

It will be observed that the centers x, x', and x^2 are equidistant from each other, so that the spindle f has three equidistant centers of vibration in respect to the shaft G, more perfect freedom of movement being thus insured than can be gained by the use of an ordinary universal joint having but two centers of vibration at right angles to each other.

The number of centers of vibration in my improved joint can be increased by simply increasing the number of rings y y', &c., the centers being so arranged as to be equidistant.

The construction and arrangement of the driving devices above described permits the ready movement of the plate i with the cutting-knife and its operating devices to any part of the table, the universal joint in the pulley F permitting the transmitting-shaft to be inclined in any direction, and the connection between the said shaft and pulley being capable of expanding and contracting to the extent demanded by such movement, while the univeral joint J insures the maintenance of the plate i and the cutting-knife in proper operative position whatever angle may be assumed by the transmitting-shaft G.

In cases where it is necessary to cut from the cloth or other material numbers of strips of uniform width throughout, I form in the top of the table A, or in a plate to be attached thereto, a number of parallel grooves, v, and secure to the under side of the plate i a lug, v', adapted to said grooves, the latter serving as guides for the cutting device and enabling the cutting operation to be performed more rapidly and accurately than where the cutting device has to be guided by the operator. After traversing one groove v the lug v' of the plate i is adapted to another groove at the proper distance from the first and another cut made, the operation being repeated until the desired number of strips have been cut. The grooves, being equidistant, furnish a means of readily gaging the width of the cut strips, so as to insure the perfect uniformity of the latter.

It should be understood that the lug v' is detachable from the plate i, so that it does not interfere with the ordinary use of the latter.

Hung to one edge of the table A is a frame, M, carrying a shaft, p, on one end of which is a friction-wheel, q, the opposite end of the shaft carrying an emery-wheel, t, for grinding the knife m, the said wheel being made in the form of a disk, w, with central conical or tapering projection w'.

The cutting-edges of the segmental portions l of the knife m are sharpened by pressing the same against the flat face of the disk w, the knife, as well as the emery-wheel, being revolved, if desired. In grinding the recessed portions of the knife, however, the conical or tapering projection w' is used, and in this case it is necessary to detach the knife and its operating devices from the shaft G in order to effect the proper manipulation of said knife in respect to the emery-wheel, the knife being prevented from turning by means of a suitable instrument introduced into the openings w^2, shown in Fig. 3.

The frame M is acted upon by a spring, N, the tendency of which is to retain the said frame either in the operative position shown by full lines in Fig. 5—that is to say, with the friction-wheel q in contact with the periphery of the pulley E—or in the position shown by dotted lines in said Fig. 5, the frame M, in the latter case, resting against a suitable stop, and the wheel q being free from contact with the pulley E.

In Fig. 6 I have shown a modification of my invention in which a reciprocating knife is substituted for the rotating knife, a pin on the knife being adapted to the slot of a rotating cam, m', the spindle f of which is adapted to bearings on the standard h.

One of the features of my invention is the formation on the universal joint J at the lower end of the shaft G of a socket, e, adapted for the reception and retention of the upper end of the spindle f of the knife-operating device, for by this means one cutting device can be readily detached and another substituted when a change in the character of the work, an accident to the knife, or other cause demands such a substitution.

The means employed for retaining the end of the spindle in the socket and preventing the same from turning independently thereof may be spring-pins adapted to openings in the spindle, as shown in Fig. 2; or a transverse pin or set-screw or other device capable of ready application and removal, and serving to effect the secure retention of the spindle, may be employed.

In Fig. 7 I have shown a modification of the devices for driving the transmitting-shaft G. In this case the pulley F is carried by a spindle, F′, adapted to fixed bearings, but having its continuity interrupted by a universal joint, J′, similar to the joint J, arms on the spindle F′ and on the shaft G being connected by two pairs of jointed links, W, lateral strain on which is prevented by means of a rod, z, projecting from the spindle F′ and adapted to the tubular upper end of the shaft G. In this case, although the construction and arrangement of the universal joint and expansion-driving device are different from those shown in Fig. 1, the effect, so far as regards the rotation of the shaft G and the inclination of the same, are precisely similar.

I claim as my invention—

1. The combination, in a cutting-machine, of a table, A, a driving pulley or spindle hung above the same, a frame carrying the knife

and knife-operating devices, a shaft suspended from the elevated driving pulley or spindle and serving to transmit power from the latter to the knife-operating devices, a universal joint for permitting the inclination of said shaft, a device connecting the shaft and the driving pulley or spindle and capable of expansion and contraction, and a universal joint between said shaft and the knife-operating devices, all substantially as set forth.

2. The combination of the transmitting-shaft G and spindle *f* with a universal joint, comprising the two rings *y y'*, and the three sets of pivots, *x*, *x'*, and x^2, equidistantly arranged, as set forth.

3. The combination of a frame carrying a cutting-knife and knife-operating devices, and a shaft, G, having a universal joint, J, with socket *e*, adapted for the reception and retention of the end of the spindle *f* of the knife-operating devices, as set forth.

4. The combination of a grooved work table or plate with a frame carrying the knife and knife-operating gearing, and having a base-plate provided with a lug adapted to the grooves of said table or plate, as specified.

5. The combination of the table A and pulley E with the pivoted frame M, carrying the shaft *p*, with friction-wheel *q* and emery-wheel *t*, and the spring N for acting on said frame, as set forth.

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

WM. R. FOWLER.

Witnesses:
JAMES F. TOBIN,
HARRY SMITH.