(No Model.) 5 Sheets—Sheet 1.

C. E. REED.

PATTERN TRACING AND CUTTING MACHINE.

No. 520,500. Patented May 29, 1894.

FIG. 1.

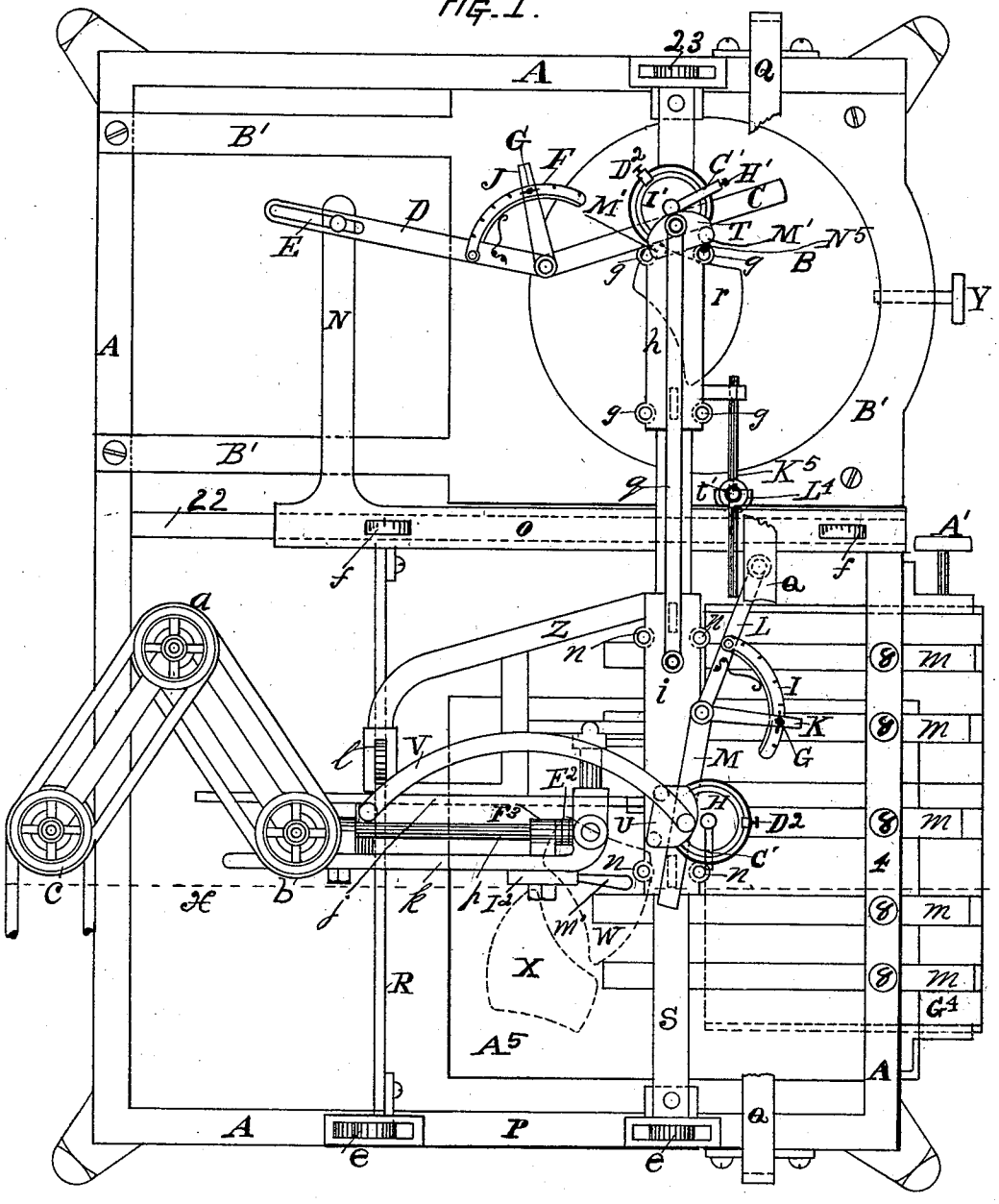

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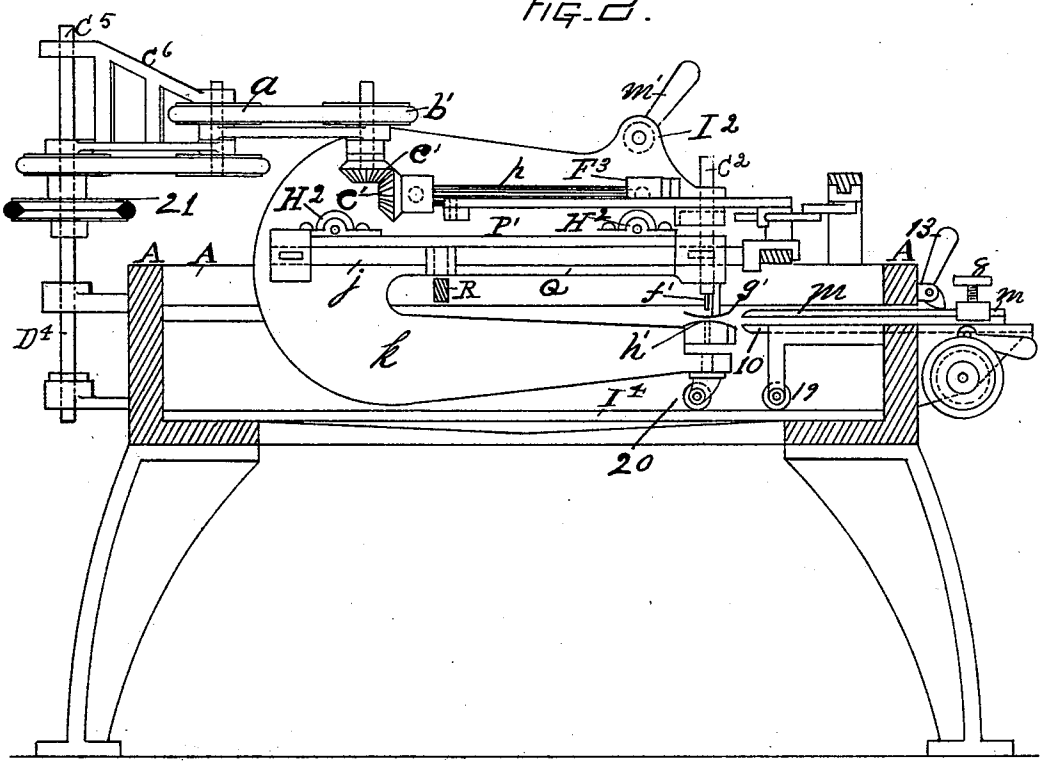
FIG. 2.



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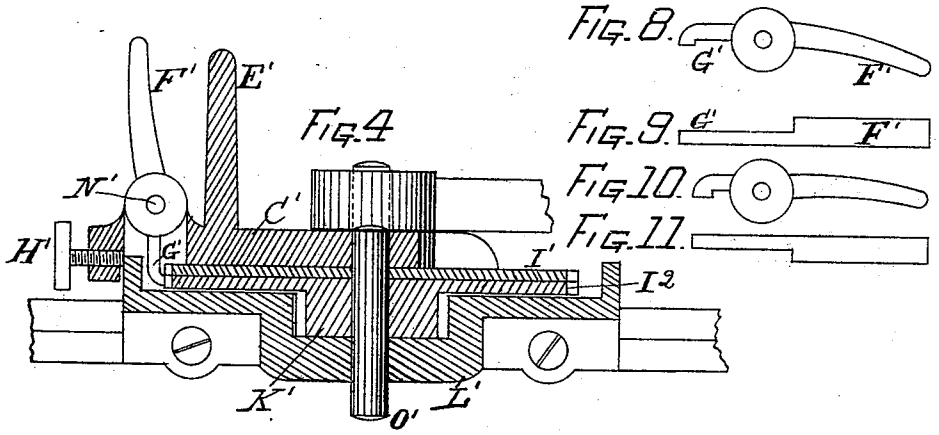

FIG. 4

FIG. 8.

FIG. 9.

FIG. 10.

FIG. 11.

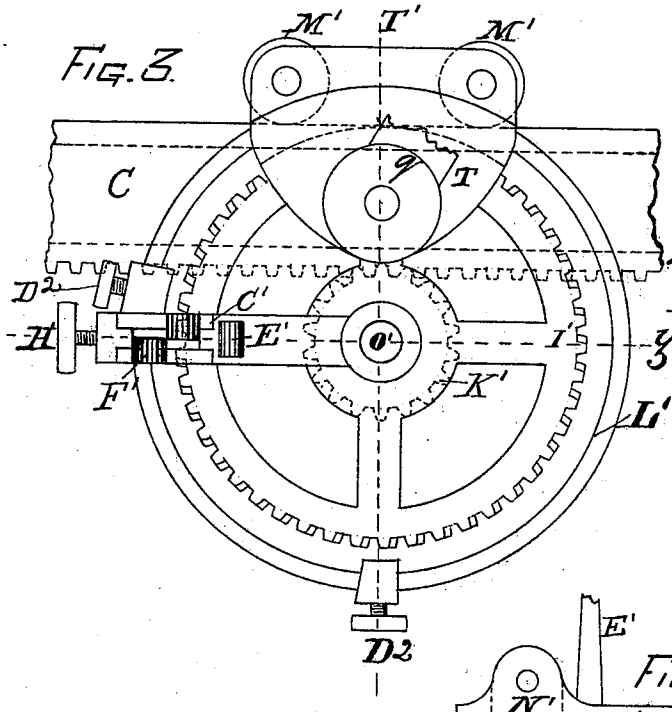

FIG. 3.

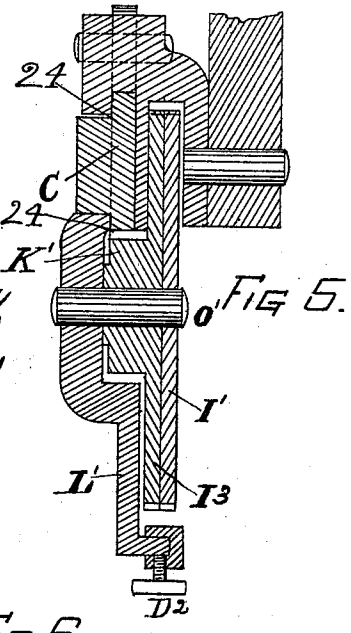

FIG 5.

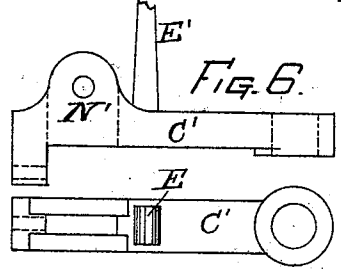

FIG. 6.

FIG. 7.

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FIG. 12.

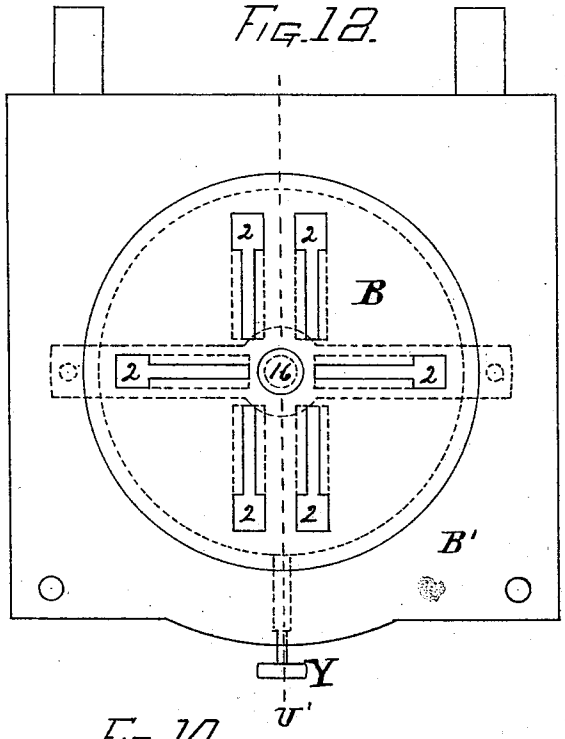

FIG. 13.

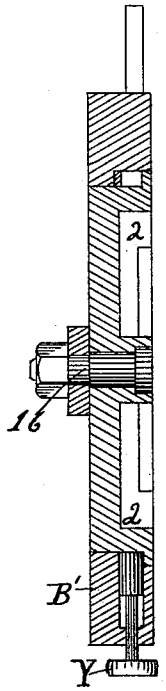

FIG. 16.

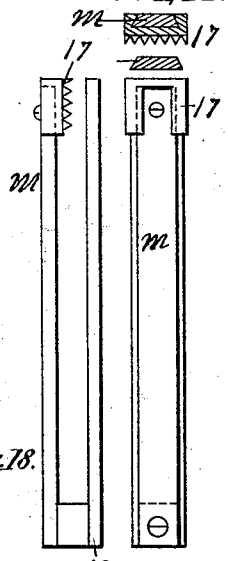

Fig. 19.

FIG. 14.

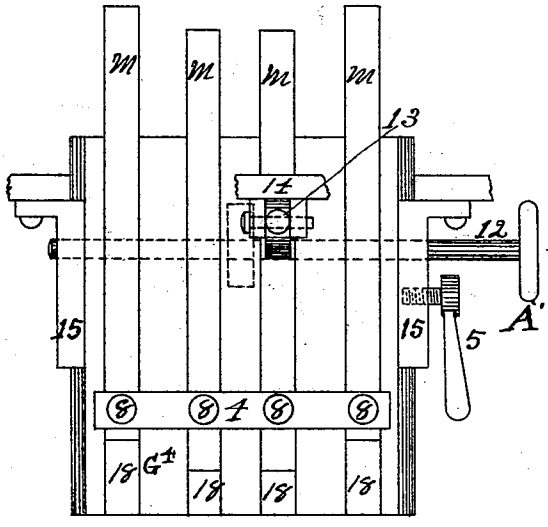

FIG. 15.

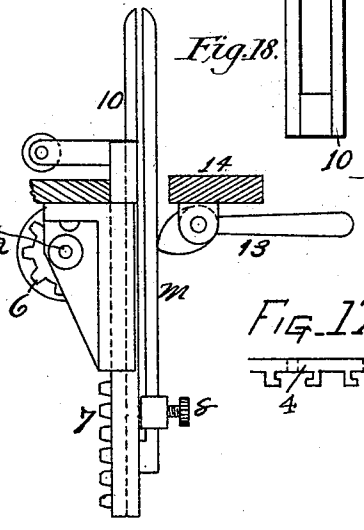

Fig. 18.

FIG. 17.

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PATTERN TRACING AND CUTTING MACHINE.

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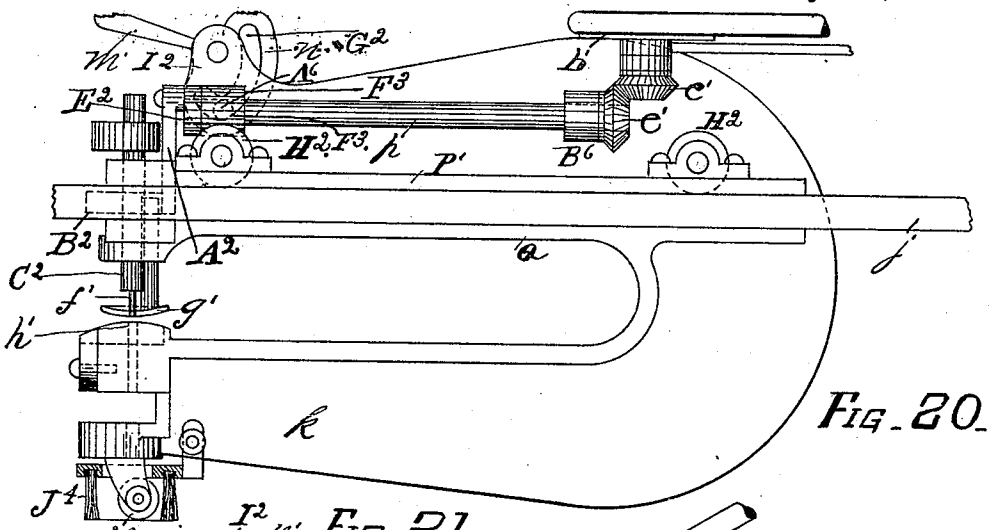

FIG. 20.

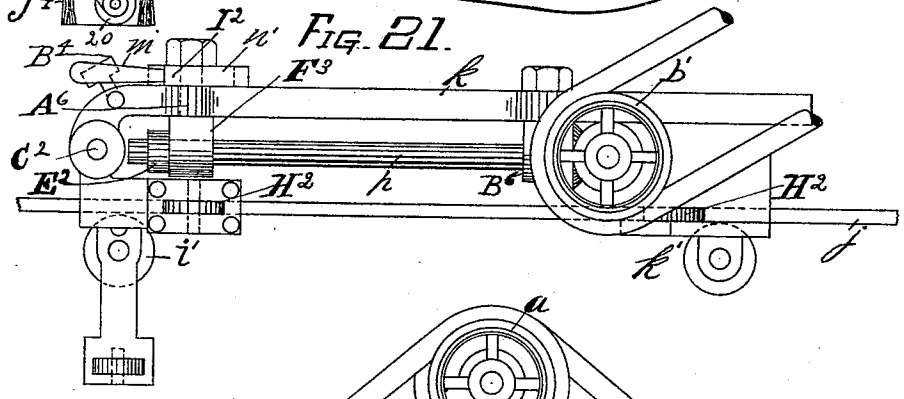

FIG. 21.

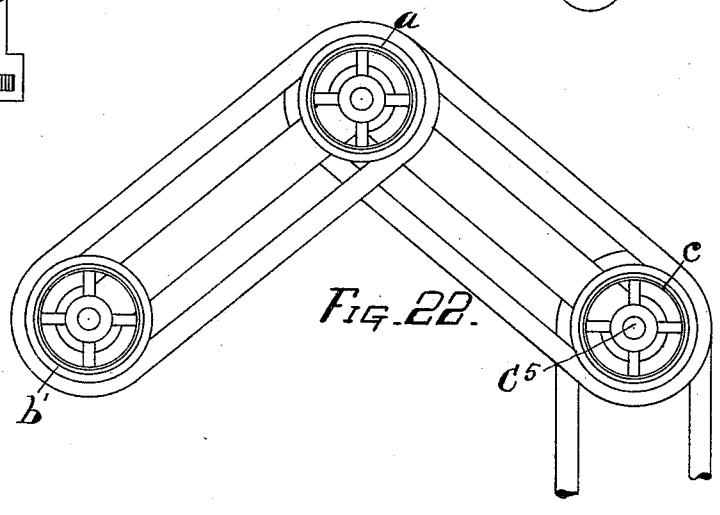

FIG. 22.

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UNITED STATES PATENT OFFICE.

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PATTERN TRACING AND CUTTING MACHINE.

SPECIFICATION forming part of Letters Patent No. 520,500, dated May 29, 1894.

Application filed November 6, 1893. Serial No. 490,192. (No model.)

To all whom it may concern:

Be it known that I, CHARLES E. REED, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Machines to Cut Patterns, of which the following is a specification, reference being had to the accompanying drawings, five sheets, illustrating the invention, in which—

Figure 1, Sheet 1, is a plan view of the entire machine showing the mechanism in working position. Fig. 2, Sheet 2, is a sectional elevation of the machine on line X Fig. 1, showing the cutting and driving devices and retaining clamps. Fig. 3, Sheet 3, is a plan view of the indexing mechanism, detached. Fig. 4, is a sectional view of Fig. 3. Fig. 5, is a sectional view of Fig. 3, on line T′. Fig. 6, is a side elevation of the radial operating arm, detached. Fig. 7, is a plan view of the same. Fig. 8, is a side elevation of the right hand engaging lever or dog. Fig. 9, is a plan view of the same. Fig. 10, is a side elevation of the left hand engaging lever to be used when a double toothed directing wheel is employed. Fig. 11, is a plan view of the same. Fig. 12, Sheet 4, is a plan view showing the revolving table and its bed or frame plate. Fig. 13, is a sectional view on line U′ in Fig. 12. Fig. 14, is a plan view showing a table for supporting the material from which patterns are to be cut, its guides and means for adjustment. Fig. 15, is a side elevation of the same showing retaining clamps in position. Fig. 16, is a sectional view of the clamps and the removable toothed end pieces used to hold some kinds of material, fastened to the end of the clamp with a set screw. Fig. 17, is a broken elevation of the bar on the table and devices in which the clamps are inserted and held. Fig. 18, is a side elevation of the clamps with one toothed end piece in position. Fig. 19, is a plan view of Fig. 18, showing the removable toothed end. Fig. 20, Sheet 5, is a side elevation of the movable yoke head and connecting devices detached from the machine. Fig. 21, is a plan view of Fig. 20. Fig. 22, is an enlarged plan view of the universal power transmitter, showing belt connections. Figs. 2, 3, 4, 5, 6, 7, 20 and 21 are enlarged.

This invention relates to novel mechanism and combination of mechanisms, by which patterns are cut corresponding to forms or blanks which are secured to and are reversible by means of a revolving table.

The nature of the invention, novelty of the mechanism, and the method of operation will be fully comprehended by the following detail description:

A, A, represent, as shown at Figs. 1, 2, &c., a substantial frame of iron, or other suitable material, which supports the mechanism hereinafter described.

R, S, P, O, N, represent a reciprocating carriage which supports the operating mechanism of the machine. The bars R, S, are parallel and at one end of the machine, they are connected by a bar P. At or near the bar connections are pivoted vertical rollers *e*, *e*, which travel on one end of the frame piece A as a track. The bar R, at its opposite ends is made rigid to a transverse bar *o*, which is near to the mid-length of the machine and has a support on a parallel bar 22, underneath by means of rollers *f*, *f*. The bar S, is rigid to the bar *o*, and its farther end is supported to travel on the farther end frame piece of the machine by means of a vertical roller 23. Projecting horizontally from the bar *o*, as a part thereof, is an arm N. This construction is such that the carriage and arm may have a reciprocating movement parallel with the end frames of the machine. B, is a circular table which is formed to be turned within a bed plate B′ which is secured to the frame of the machine by bolts, or other suitable means. The purpose of forming the table B to rotate is that the position of the profile pattern on the wheel may be reversed relative to the patterns to be cut out of the material A^5, as shown by dotted lines X and W, Fig. 1, whereby the largest number of patterns may be cut from the given material employed. A directing wheel I′ Figs. 1, 3, 4 and 5 turns on a post *o′* which is affixed to its own frame L′; and to the under concentric portion thereof is affixed a pinion K′, which meshes into the teeth of a rack lever C, so that when the wheel I′ is turned

the wheel will travel to the right or left on the rack-lever C. The rack-lever is held in relation to the pinion K′, by means of guide rabbets 24, 24, Fig. 5, which are within the said frame L′. The rack-lever C, is rigid to an elbow lever J, and also pivoted to a lever D, which by means of a slot E and a pin, is adjustable on the arm N, which moves with the carriage R, S, P, O, and the lever D carries a quadrant F, Fig. 1, on which the arm J is adjusted by means of a suitable set screw G. This construction is such that when the set screw G, is loosened, and the wheel I′ is turned, the levers C and D will have different relative angles to each other; and if the pinion K′, travels on the rack-lever C to the right the angle between the levers C and D will be more acute and if turned to the left the angle will be less acute. The means of adjusting the wheel I′ with reference to the radial arm C′ consists of the dog F′ G′ pivoted to said arm and provided at its lower end with a thin engaging portion which engages the cogs in the wheel I′; and the means for locking the arm C′ and consequently the wheel I′ to the frame L′ consists of a set screw H′ tapped through the outer end of the arm to bear against the rim of said frame. The pinion K′ being rigid to the wheel I′ is governed in rotation by the turn of the wheel I′; and the longitudinal movement of the rack-lever C is governed by the same means. Sometimes, to save the necessity of cutting the fine teeth on wheel I′, I employ a sub-wheel I^2, and set the wheel I^2 so that its teeth will overlap half of the interspace between the teeth of the wheel I′. In such case I employ an extra support and dog, as shown at Figs. 3, 10 and 11. D^2, D^2 show two adjustable stops on the rim of the frame L′ to regulate the throw which the radial portion C′ may require. A cap T, a rigid portion of frame L′, extends over a portion of the wheel I′, and to it are affixed rollers M′ which bear against the outer edge of the rack-lever C and hold the teeth in mesh with the pinion K′. A reciprocating carriage *h*, Fig. 1, is provided with rollers *g*, and fitted readily to travel on the portion S of the main carriage, and its outer end is connected with the frame L′ of the wheel I′. Distant from the carriage *h*, is a carriage *i*, which is provided with rollers *n*, to engage and travel also on the main carriage portion S. A rod *q*, connects by pivots with the carriage *i*, and the opposite end is pivoted to the cap T of frame L′, by which the movement of wheel I′ is communicated to wheel H, whereby any change in position, given to the carriage *h* by the point N^5 encompassing the pattern *r*, on the table B, will be communicated longitudinally to the carriage *i*, having a lateral support in an arm Z which is rigid thereto, and is supported by a roller *l*, to travel on the bar R of the main carriage. A directing wheel H, in all respects a duplicate of wheel I′, and carrying a like pinion and operating in a like frame, and having an over-lapping portion U, similar to T, has its frame portion attached to the carriage *i*, and the mechanism shown at M, K, I, L and G, is identical with the mechanism shown at C, J, F, D, and G, heretofore described. The inner end, however, of the lever L, is pivoted to a fixed bar Q, by which the angles formed by the levers C, D, will be duplicated by the levers L, M.

k, Figs. 1, 2, 20 and 21, represents the yoke head of the machine which by means of rollers H^2 and *k′* and *i′*, is arranged to have a reciprocating movement on a track *j*, and by roller 20 to travel on bar I^4, the brushes J^4 being employed to keep the bar free from chips. The bars, or tracks, *j*, I^4 are secured to the main carriage of the machine. A connecting bar V is at one end pivoted to the over-lapping portion U, of the frame of the directing wheel H, and at the opposite end is pivoted to the yoke head *k*, whereby any change in the angles formed by the levers L, M, by the turn of the wheel H, will move the head *k* longitudinally on the bar, or track, *j*.

From this description it will be seen that I provide three distinct movements, one of the main carriage transversely with the machine, a movement by means of the carriages *i*, and the post *h*, longitudinally with the machine, and a reciprocating movement of the yoke head *k* independent of the movement of the main carriage; by this means sufficient expansion in the mechanism is attained to cut a pattern from the material A^5 in any forms of curves of the pattern *r*.

In the enlarged view, Fig. 20, *h′*, represents the convex die which is provided with a vertical hole corresponding to the diameter of the round punch *f′*, such form of die giving a better cutting edge than one flat on its top portion. The die post C^2, has a vertical bearing in the yoke head *k*, and an angular connecting rod A^2, B^2, engages the post and is pivoted to an eccentric E^2, which is concentrically connected with a shaft *p*, and is driven by it to give to the punch *f′* a vertical reciprocating motion.

F^3 represents an adjustable shaft bearing adjoining the eccentric, and is vertically adjustable by means of a pin A^6 secured thereto and projecting through a slotted segment *n′*, G^3, *n′* being the segment and G^2 the slot which guides said pin. An elbow lever *m′*, is pivoted to a fixed lug I^2 and its lower end engages the pin A^6; so that when the lever is brought down the bearing F^3, shaft *p*, post C^2, and punch *f′*, will be elevated above the material which bears on the die *h′*; whereby the punch is kept in motion, but it does not cut while the machine is being adjusted to cut on a different portion of the material, A^5.

B^6 represents the bearing to the opposite end of the shaft, and *e′ c′* are the bevel gears which connect the shaft with the gear *b′*, which, with the wheel *a*, is changeable in position relative to the wheel *c*. A frame C^6 swings on a post D^4, Fig. 2, and the post is

driven by any suitable power applied to wheel 21; by this means the wheels *a*, *b'*, *c*, and the gear *e'* are driven with such speed that the punch *f'* cuts the edges of a pattern W, Fig. 1, so evenly that it can be bound with metal without trimming.

g', Fig. 20, represents a suitable foot attached to a depending standard on upper portion of the yoke head *k*, to keep the material to be cut, from rising from the die. This construction differs from the somewhat like part in the sewing machine, in that a flat or concave ended punch is preferably employed, and the mechanism is such that the punch constantly has its reciprocating motion the same when raised above the material to be cut as when operating in the die; and the yoke head *k* has a reciprocating movement on a track, or bar, while the head or arm of a sewing machine is a fixture on the table; again, the purpose is not analogous.

The table for holding and adjusting the material to be cut is shown at G^4, and in it are formed a series of dovetail grooves, 18, &c., suitable in number to support the necessary two-pronged sliding clamps *m*, 10, &c., to grasp and present the material to be cut between the die *h'* and the foot *g*, four such clamps being shown at Fig. 4 and five at Fig. 1. The detail of these clamps is more clearly shown at Figs. 15, 16, 17, 18 and 19.

The lower prongs 10, run in the grooves 18, shown also in a portion of the side elevation of the bar 4, at Fig. 17. This cross bar 4, is secured to the table G^4, and through it are tapped set screws 8, 8, &c., by which any one clamp may be adjusted longitudinally in its groove in the table. Preferably the upper prongs *m*, are provided with teeth 17, Figs. 16, 18, and 19, firmly to hold the material in place. Better to accomplish this purpose a bar 14, is made to extend transversely across the table and is rigid thereto, and to the bar are pivoted cam levers 13, one for each clamp, whereby the upper prongs *m*, can be made to clamp with suitable force the material between the two prongs. The table G^4, is fitted to run in ways 15, 15, secured to the frame of the machine, Fig. 14, and to the table is attached a rack 7, and the ways serve as bearings for a shaft 12 on which is mounted a pinion 6, engaging said rack, whereby when a wheel A' mounted on the shaft is turned the table will be moved in, or out, of the ways as may be required to bring the material from which the patterns are to be cut to the punch.

K^5, represents a rod which is rigid to the carriage *h*, by means of an arm, and extends through a guide block L^4 and a set screw *t'* is tapped into the block to lock the carriage *h*, to the portion *o*, of the main carriage, when an adjustment is being made.

In Fig. 1, *r*, is the profile pattern around which the point N^5 of the pantograph mechanism traverses.

A^5 is the material from which the pattern W, dotted lines, is to be cut, the same being a duplicate of the profile pattern *r*, secured to the table B. When one pattern is cut, the table B is to be turned half round and then another pattern is to be cut. Suppose a different profile pattern be employed, the levers D, C, and L, M, are to be adjusted so that the circumscribing point N^5 will traverse the edge of the new pattern. When the said parts are adjusted, the set screws heretofore mentioned hold the parts rigid. The traversing point N^5 is moved round the profile pattern by the hand engaging the carriage *h*.

Having thus described my invention, I do not broadly claim a pantograph or the cutting of patterns from a profile pattern; but

What I do claim, and desire to secure by Letters Patent of the United States, is—

1. In a machine for cutting patterns from profile patterns, the toothed directing wheel I' carrying the pinion K'; its surrounding frame L'; the pivoted radial portion C' carrying a pivoted dog, engaging said toothed wheel; the reciprocating carriage *h* joined to the said frame; the elbow lever J, C; quadrant F, in combination with an arm N on the main carriage; a table for the support of the profile pattern and a traversing point; as and for the purpose specified.

2. A revoluble table supporting the profile pattern in combination with a suitable frame seat; a set screw extending through the frame and engaging the revoluble table, and a traversing point engaging the edge of the profile pattern in combination with a directing wheel having a surrounding frame and adjustable on a post therein, a guide in the frame and the lever C operating therein the levers J, D, and quadrant F, the carriage *h* mounted on the bar S, and a rod K^5 affixed to the carriage and adjustable on the main carriage, as and for the purpose specified.

3. The directing wheel H, rack-lever M, the elbow K, lever L, quadrant I, the carriage *i* and the rod *q* connecting it with the carriage *h*, and the bar V pivoted to the portion U, of the frame of wheel H and with the frame of the yoke head *k*, of the machine, and the head carrying the punching mechanism and having a reciprocating movement on the bar *j*; substantially as specified and shown.

4. The reciprocating yoke head *k*, carrying the drive shaft *p*, and an eccentric on the shaft operating the post of the punch, a die on the lower bar of the yoke head, and the punch operating in the die in combination with a reciprocating feed table provided at its top portion with two-pronged arms and cam levers for shutting the prongs together, as specified and shown.

5. The reciprocating yoke head carrying a main drive-shaft, the reciprocating post and punch therein, an eccentric on the shaft operating the post, and a lever and guide attachment by which the punch while in motion is held above the die in combination with the main reciprocating carriage, the con-

necting bar V, the wheel H, its frame and cap portions U, levers L, M, K, quadrant I, carriages *i*, *h*, and connecting rod *q*, as specified and shown.

6. The table G^4, provided with dovetail grooves, and the lower prongs of two-prong clamps adjustable longitudinally therein, means for adjusting the table on the machine, and cam levers operating on the upper prongs of the clamps, substantially as specified.

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