J. C. Rhodes,

Punching Machine.

No. 112,381. Patented Mar. 7, 1871.

Fig. 1.

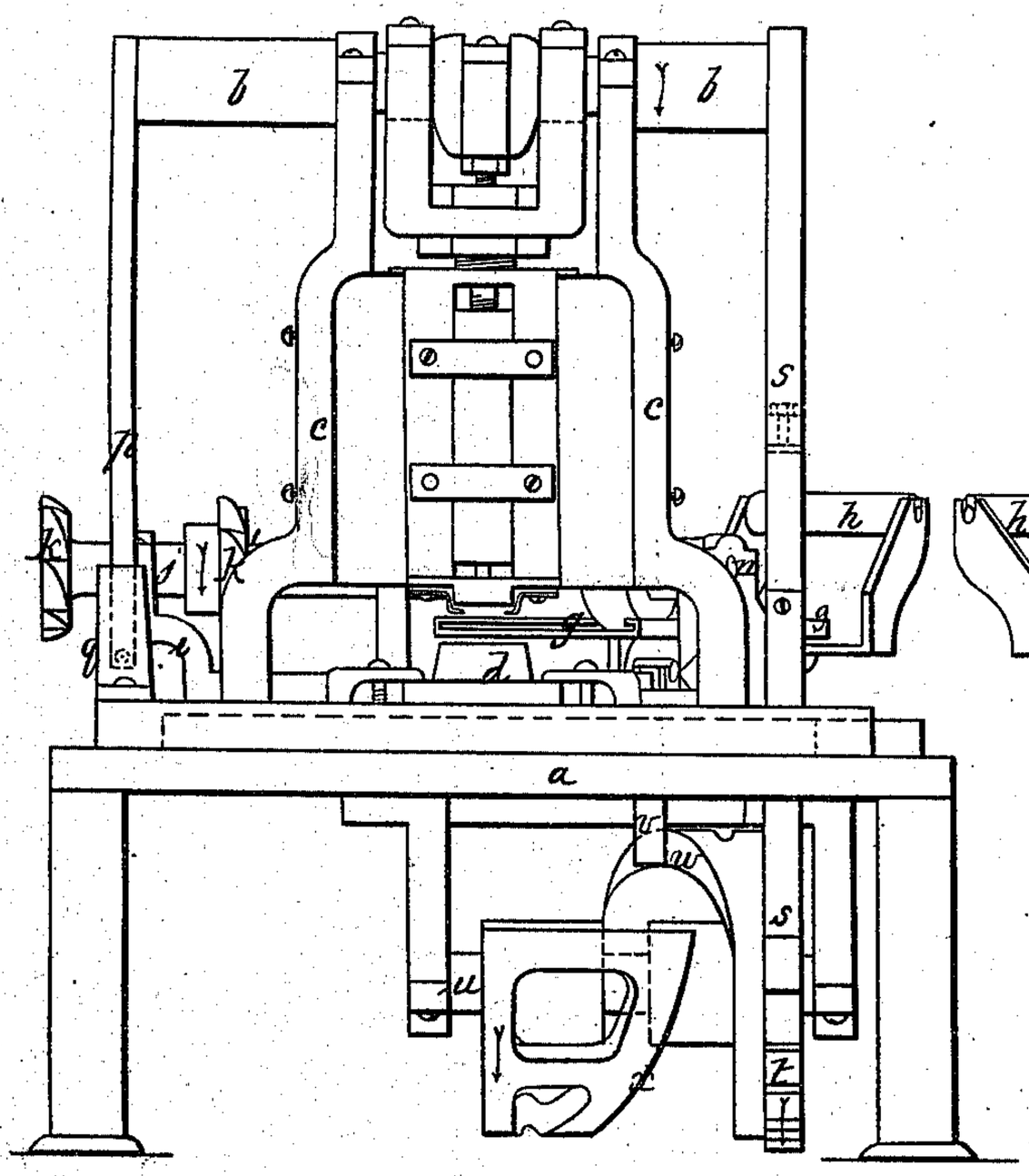


Fig. 2.

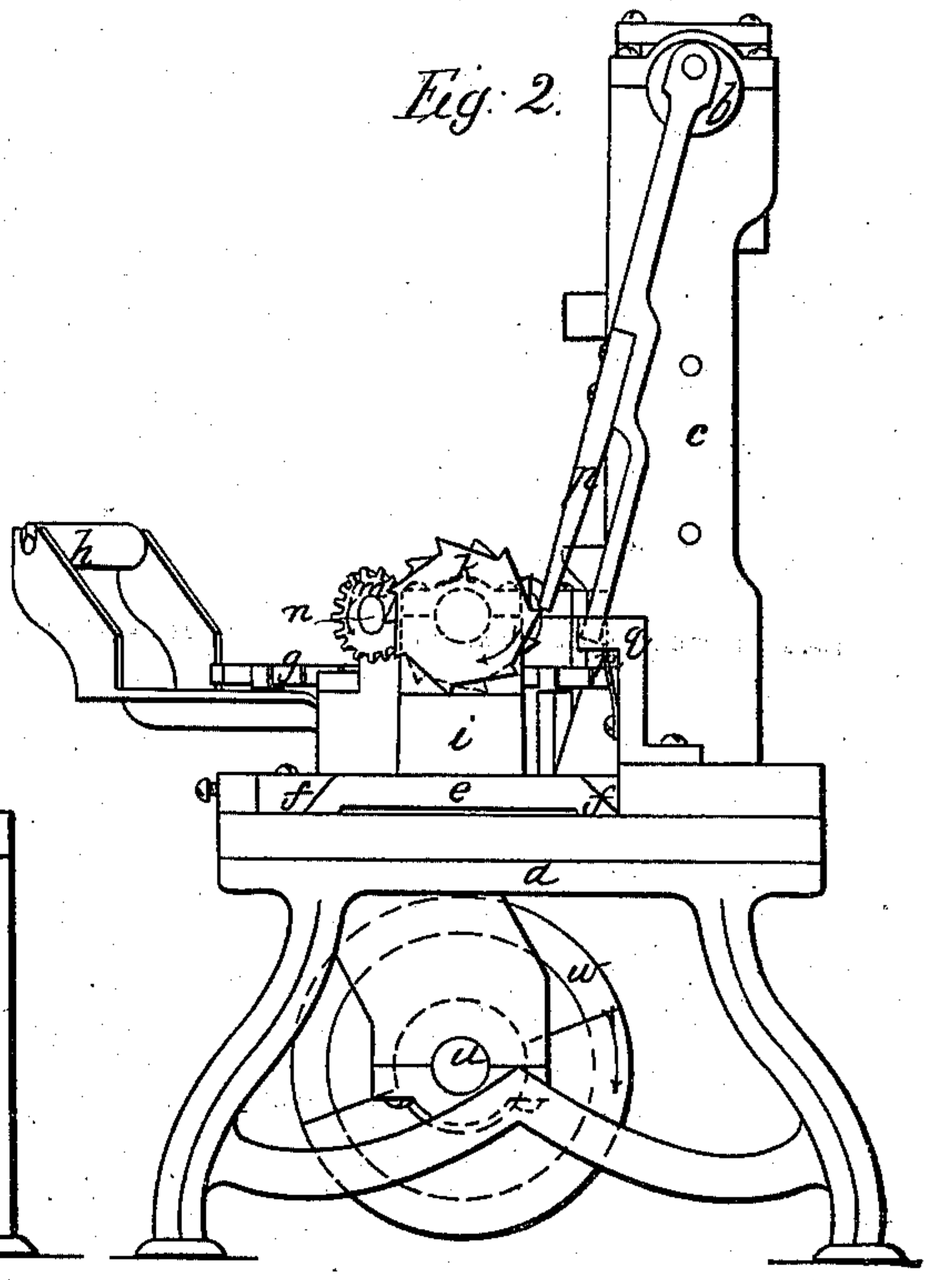


Fig. 3.

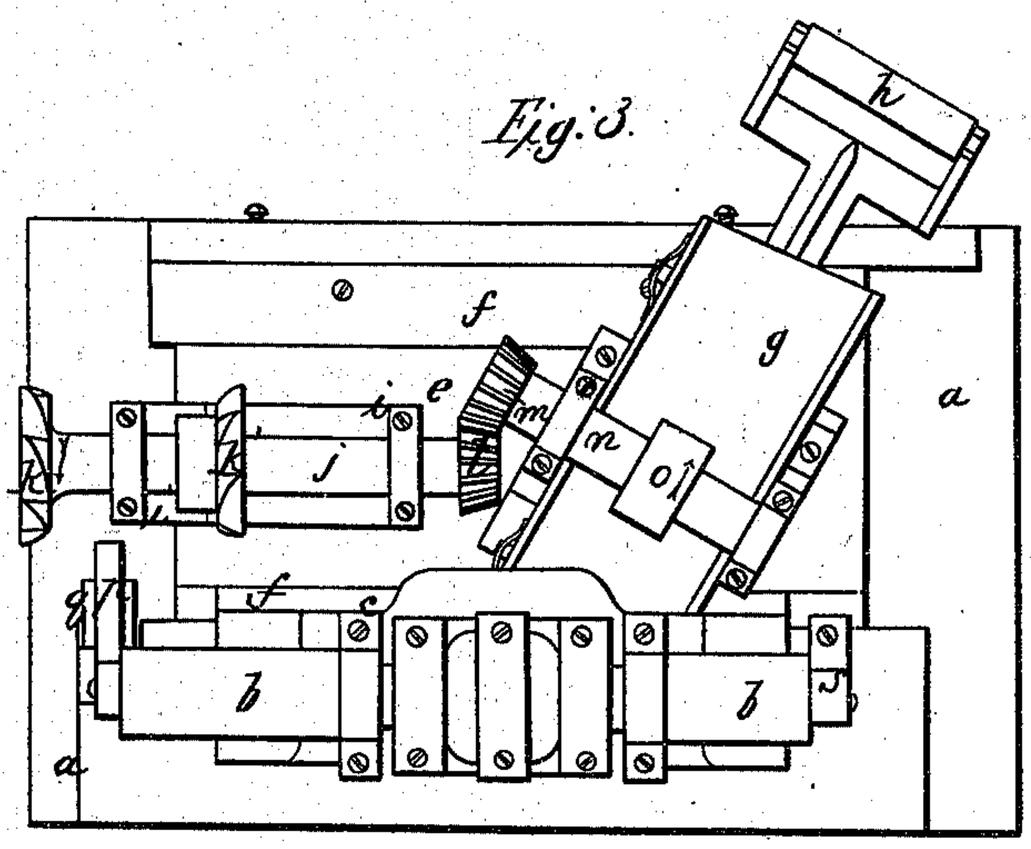


Fig. 4.

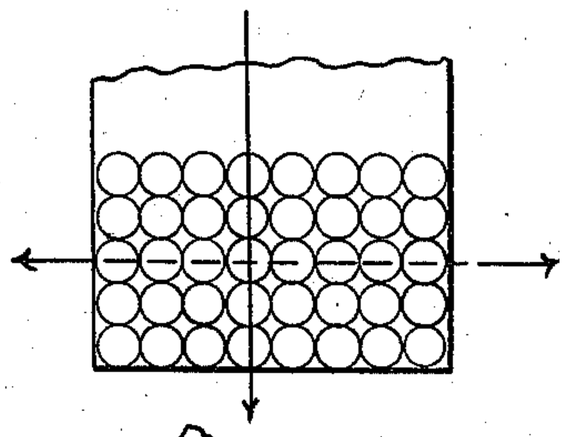
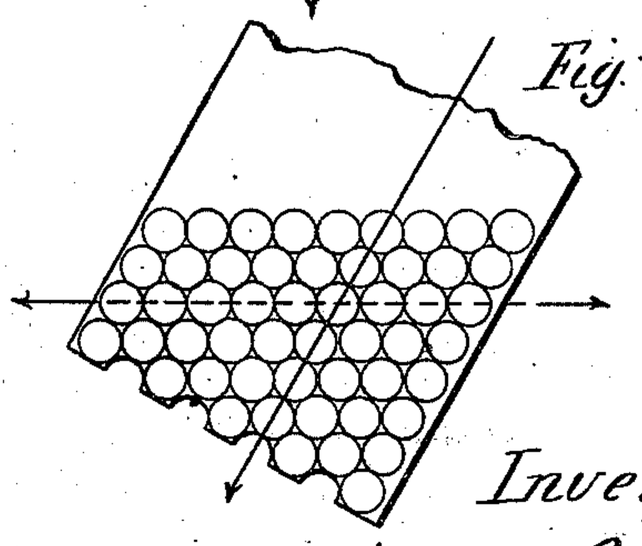


Fig. 5.



Witnesses;
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J. C. RHODES, OF SOUTH ABINGTON, MASSACHUSETTS.

Letters Patent No. 112,381, dated March 7, 1871.

IMPROVEMENT IN PUNCHING-MACHINES.

The Schedule referred to in these Letters Patent and making part of the same.

To all whom it may concern:

Be it known that I, J. C. RHODES, of South Abington, in the county of Plymouth and State of Massachusetts, have invented an Improved Machine for Punching Blanks from Strips of Thin Sheet Metal or other suitable material; and I do hereby declare that the following, taken in connection with the drawing which accompanies and forms part of this specification, is a description of my invention sufficient to enable those skilled in the art to practice it.

Previous to forming circular or other shaped blanks of thin sheet metal or other suitable material, from which blanks eyelets, buttons, &c., are to be made, the metal is made into long strips or ribbon-like forms, and it is an object of considerable importance to produce a machine capable of taking rolls or coils of such material and acting upon it automatically throughout its length and breadth to reduce it, by a cutting or punching operation, into blanks of any desired form, with the minimum of waste.

My invention consists in the details of construction and arrangement of the mechanism herein described, by which long or ribbon-like strips of material are automatically and at regular intermissions fed in two directions to the action of a punch or other suitable cutter for the purpose of cutting the material into blanks.

In the drawing—

Figure 1 shows a front elevation;

Figure 2, a side elevation; and

Figure 3, a plan of a machine embodying my invention.

The table *a* is supported on legs at a height sufficient to allow the attachment and action beneath of part of the feed mechanism, to be described beyond, and to the upper surface of the table are attached other parts of the feeding mechanism and the parts of a cutting or punching mechanism, which operates to cut blanks from the strip of material to be fed thereunto.

The driving-shaft *b*, to which motion is communicated to actuate all of the mechanism, is supported in bearings in the uprights *c*, said shaft having at and near its center a crank and two eccentrics, the eccentrics working a slide, the end of which presses the material to be cut upon a stationary cutter or die, which is to be secured to the block *d*, and the crank working a push-pin, the object of which is to push the blanks through the die or cutter as they are severed from the strip of material.

Back of the punching or cutting-block *d*, and on the surface of the table *a*, is located a slide, *e*, arranged to be moved back and forth between guides, *f*, said slide having fixed upon it near one end, on an angle of thirty degrees, and the supplement thereof to the path of movement of the slide *e*, a table, *g*, on which the material to be cut is fed and guided to the cutter from a reel or spindle, *h*, on which the coil of material is to be mounted, said spindle having its bearings connected to the slide *e*.

At the other end of slide *e* is fixed a stand, *i*, having bearings to receive the shaft *j*, on which are fixed the ratchet-wheels *k k'*, and at the other end of the shaft the bevel-gear *l*, which meshes into and drives the bevel-gear *m* on the feed-roll shaft *n*, said shaft being supported over the table *g* at right angles to its edges, there being beneath said table, and extending up through it, a friction-roll, having its axis parallel with the axis of the feed-roll *o*, the perimeter of the friction-roll extending just above the surface of the table *g*, so that the material, passing from the roll or coil hung on the spindle *h*, may be griped between the feed-roll *o* and the friction-roll, and may be fed forward toward the cutter as and whenever the feed-roll *o* is rotated.

The rotation of the feed-roll is effected as follows:

A crank-pin is inserted in one end of the shaft *b*, said pin moving the long pawl *p*, the operative end of said pawl being kept in its proper plane of movement by a branch therefrom, which fits in a guide, *q*, there being attached to said guide a spring, *r*, which acts to press the pawl toward the ratchets *k k'* and allows the pawl to yield from the ratchets. The pawl vibrates between the ratchets without effecting any motion thereof or of the feed-roll *o* till such times as when, at the extreme points of the reciprocations of the slide *e*, the ratchets are alternately brought into the path of the movement of the pawl, which then acts and turns either ratchet one-half of the angular distance included by one tooth, the ratchet moving out of the path of the movement of the pawl before it makes a third downward stroke.

The ratchets *k* and *k'* are so arranged on the shaft *j* that their teeth are interspaced, so that when pawl *p* has acted on one ratchet-wheel a tooth of the other ratchet-wheel stands ready to receive the action of the pawl and to be moved thereby the angular distance covered by one-half of the angular space of the ratchet-wheel, represented by one tooth thereof.

It will now be obvious that it is only when the bed *g* has arrived at the extremes of its reciprocating movements that the material to be cut or punched is fed forward toward the cutter or punch, and that such forward movement is effected by the action of pawl *p* on the ratchet-wheels *k* and *k'*.

The reciprocating movements of the slide *e*, carrying the bed *g* and the coil or roll of material, are effected as follows:

A crank-pin in one end of the shaft *b* gives motion to a long pawl, *s*, which operates on the teeth of a ratchet-wheel, *t*, fixed on a shaft, *u*, which bears two curvilinear inclines or cams, moved with the shaft by the action on the ratchet *t* of the pawl *s*.

The slide *e* has a pin or friction-roller, *v*, attached,

which projects downward into the path of movement of the said curvilinear inclines or cams, so that when cam or incline *w* acts on *v* the slide *e* is moved toward the pawl *p*, and when the cam or incline *x* acts on pin *v* slide *e* is moved toward the pawl *s*.

It will now be seen that at each rotation of shaft *b* the pawl *s* operates to cause a movement of the material to be punched in one or the other direction, carrying the strip of material at regular intermissions and regular distances over the cutter-bed *d*, the number of intermittent movements and the extent of each, and of all collectively, in either direction, being determined by the proportions of the ratchet-wheel *t* and inclines or cams *w* and *x*, and the adjustment of the pawl *s*, which are made to suit the requirements of the work to be performed.

The bed *g* has a ledge on each side, grooved so that the edges of the material move in the grooves, which keep the material from bending as it is moved over the bed. One of said ledges may be made adjustable on bed *g*, to suit various widths of material, and the ratchet *k'* is made adjustable on shaft *j*, so that the forward feed of the material may be made to take place in accordance with its width.

The inner edges of the ratchets *k k'* are rounded, as shown, so as to press back the pawl *p* and deflect spring *r* as the ratchets approach the pawl.

Reference to the diagrams, Figures 4 and 5, will afford an occular demonstration of the saving in stock effected by moving the strip of material laterally on an angle, as described, with reference to the sides of the strip, instead of moving it laterally square, or at right angles to the sides of the strip.

Fig. 4 shows a strip out of which blanks have been punched in rows at right angles to each other, this being effected by first feeding the strip sidewise square across the cutter, then feeding the strip forward in a right-angular direction to the sidewise-feeding motion.

Fig. 5 shows one end of a partially-punched strip which has been presented to the cutter by a forward movement on an angle of thirty degrees, and the supplement thereof to the direction of the lateral or side movements of the strip.

The blue lines in figs. 4 and 5 show the course of the lateral-feeding movements, and the red lines the forward-feeding movement, the arrow marks on said lines showing the directions of the motions imparted to the strips of material.

I claim—

The combination of the cams *w* and *x*, or their equivalents, the intermittently-reciprocating slide *e*, operated thereby, the bed *g*, feed-roll *o*, shafts *j* and *n*, ratchets *t*, *k*, and *k'*, pawls *p* and *s*, and the punch or punches, the whole arranged in relation to one another and operating substantially as described.

Witnesses: J. C. RHODES.

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