

No. 610,128.

Patented Aug. 30, 1898.

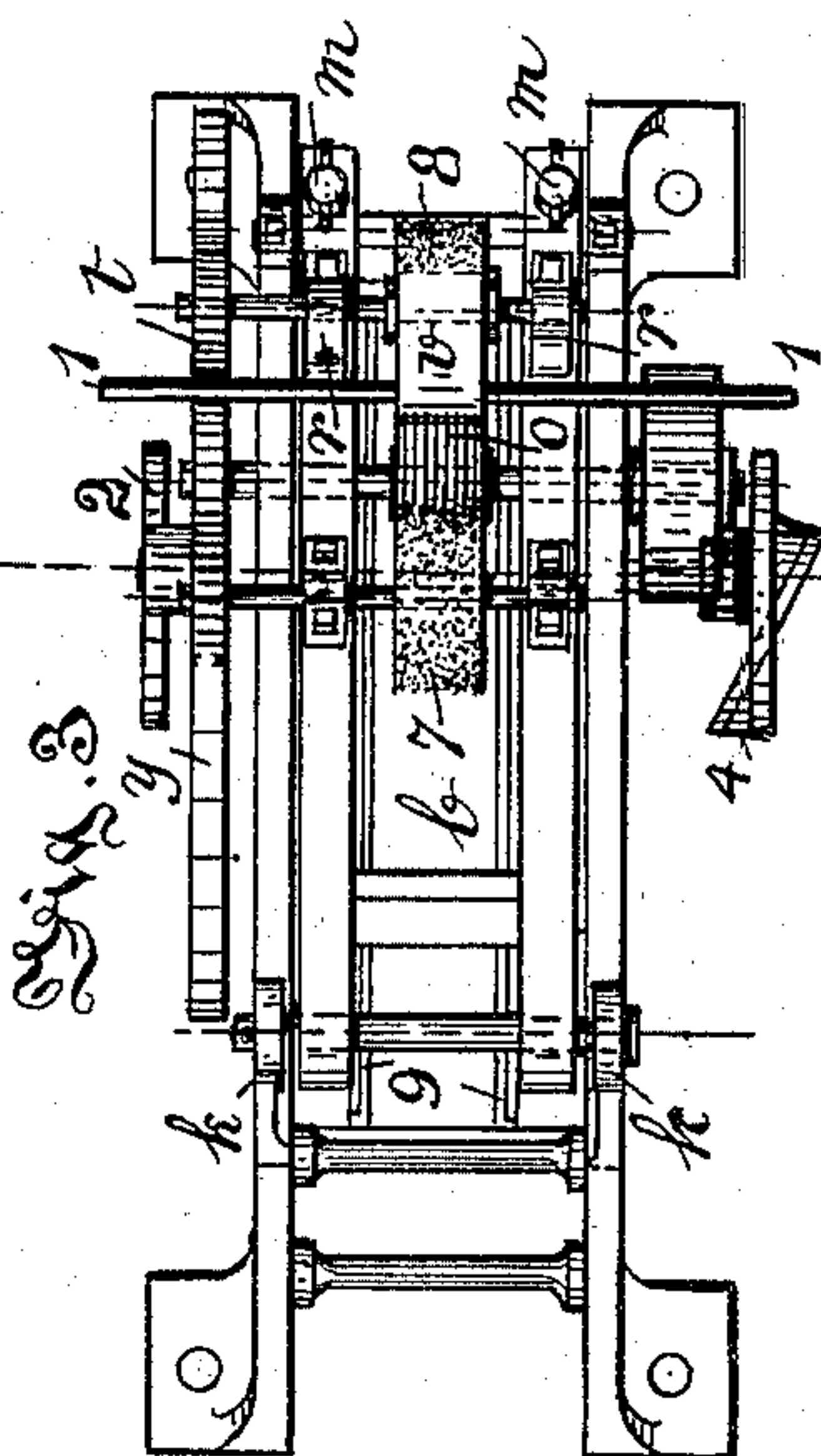
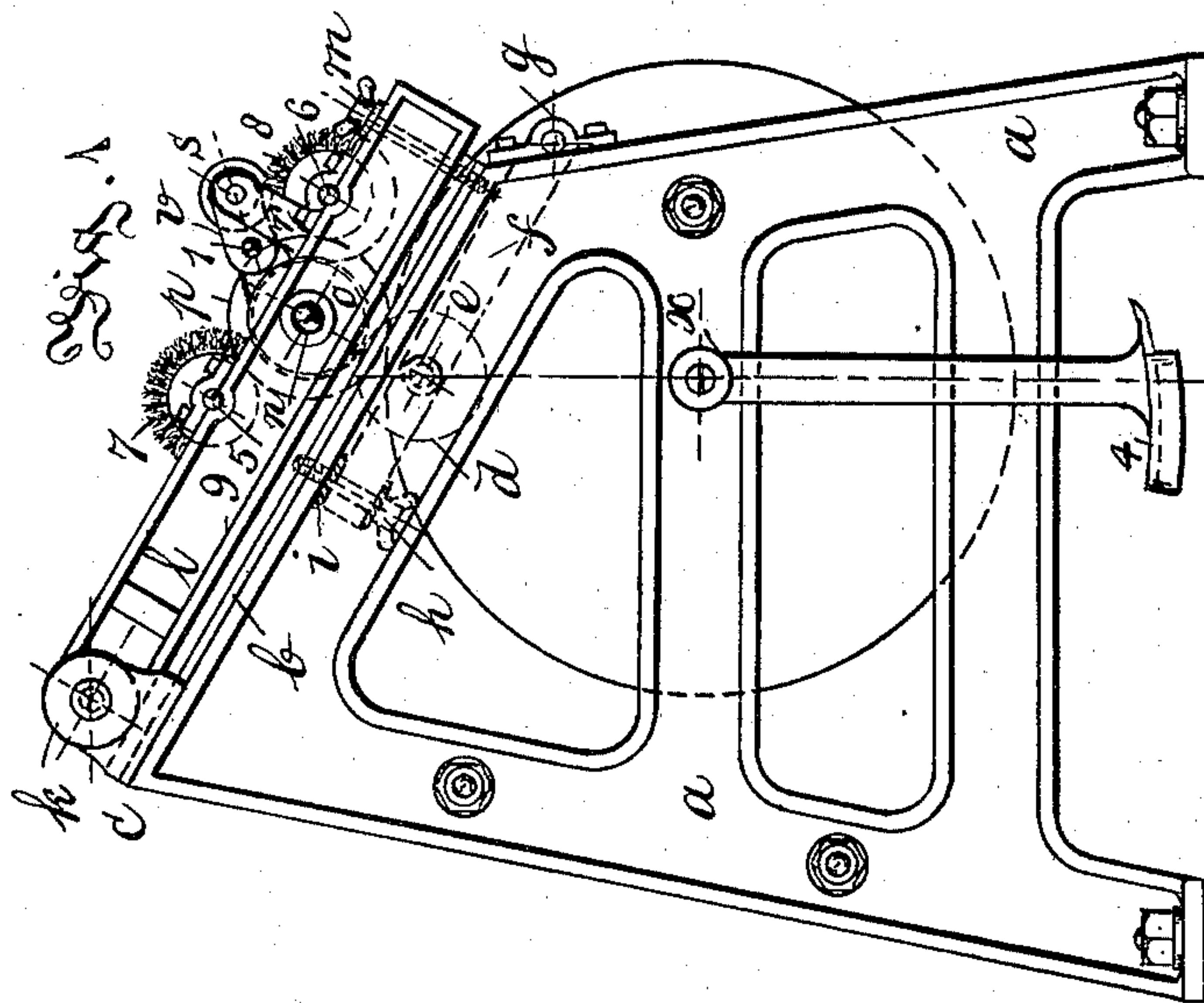
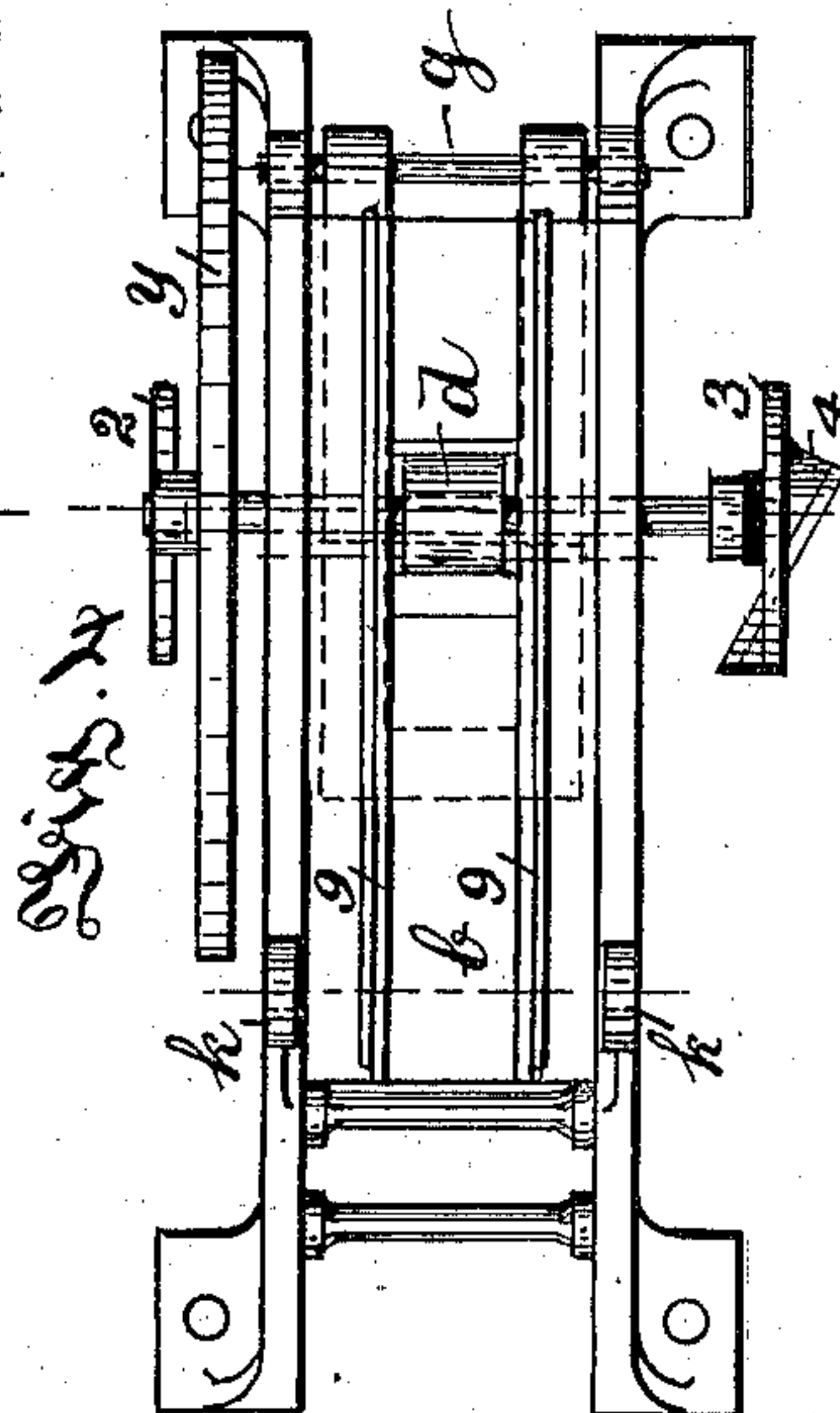
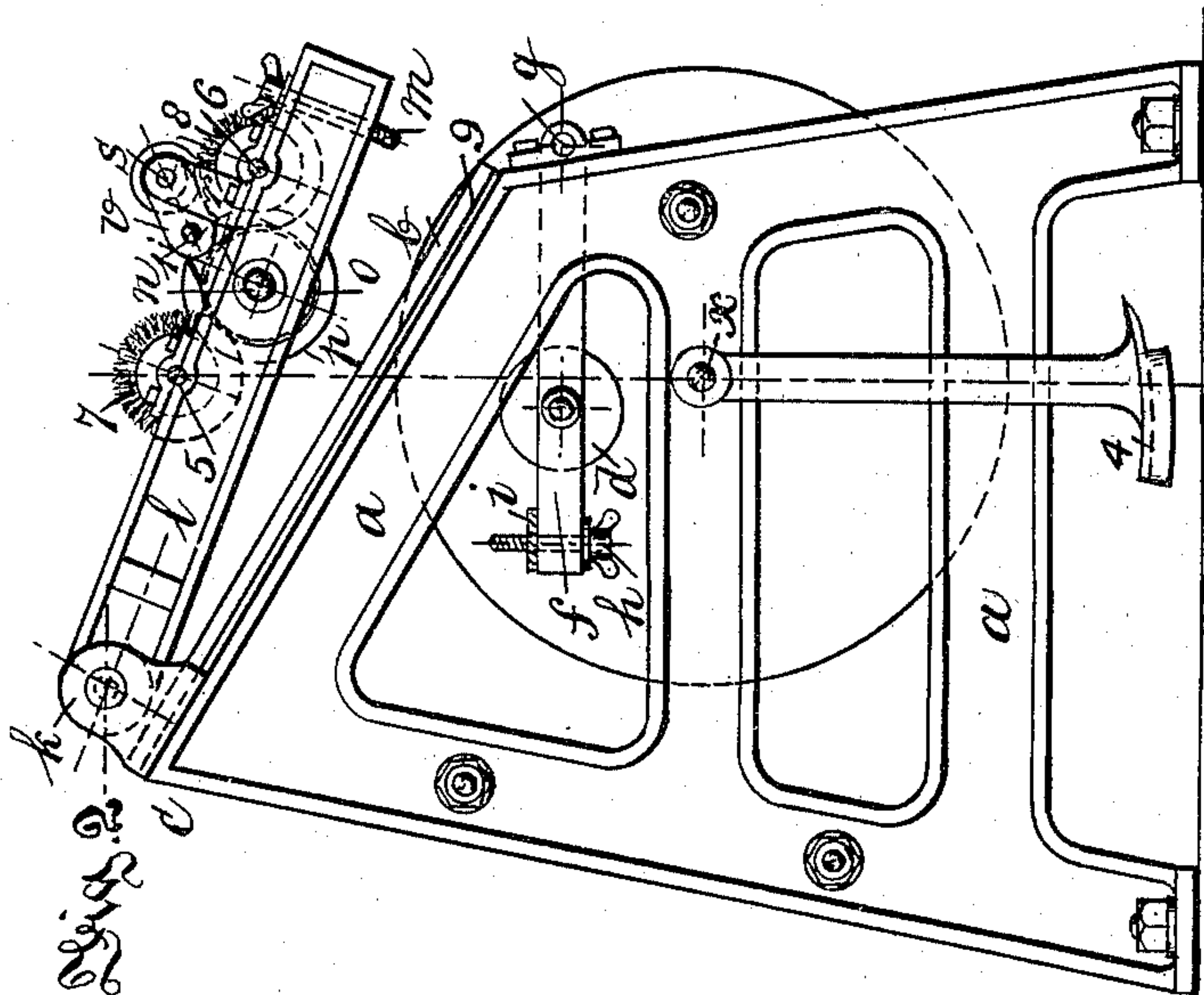
R. J. EDWARDS.

MACHINE FOR MAKING EMERY OR GLASS CLOTH OR PAPER.

(Application filed Dec. 10, 1897.)

(No Model.)

2 Sheets—Sheet 1.



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2 Sheets—Sheet 2.

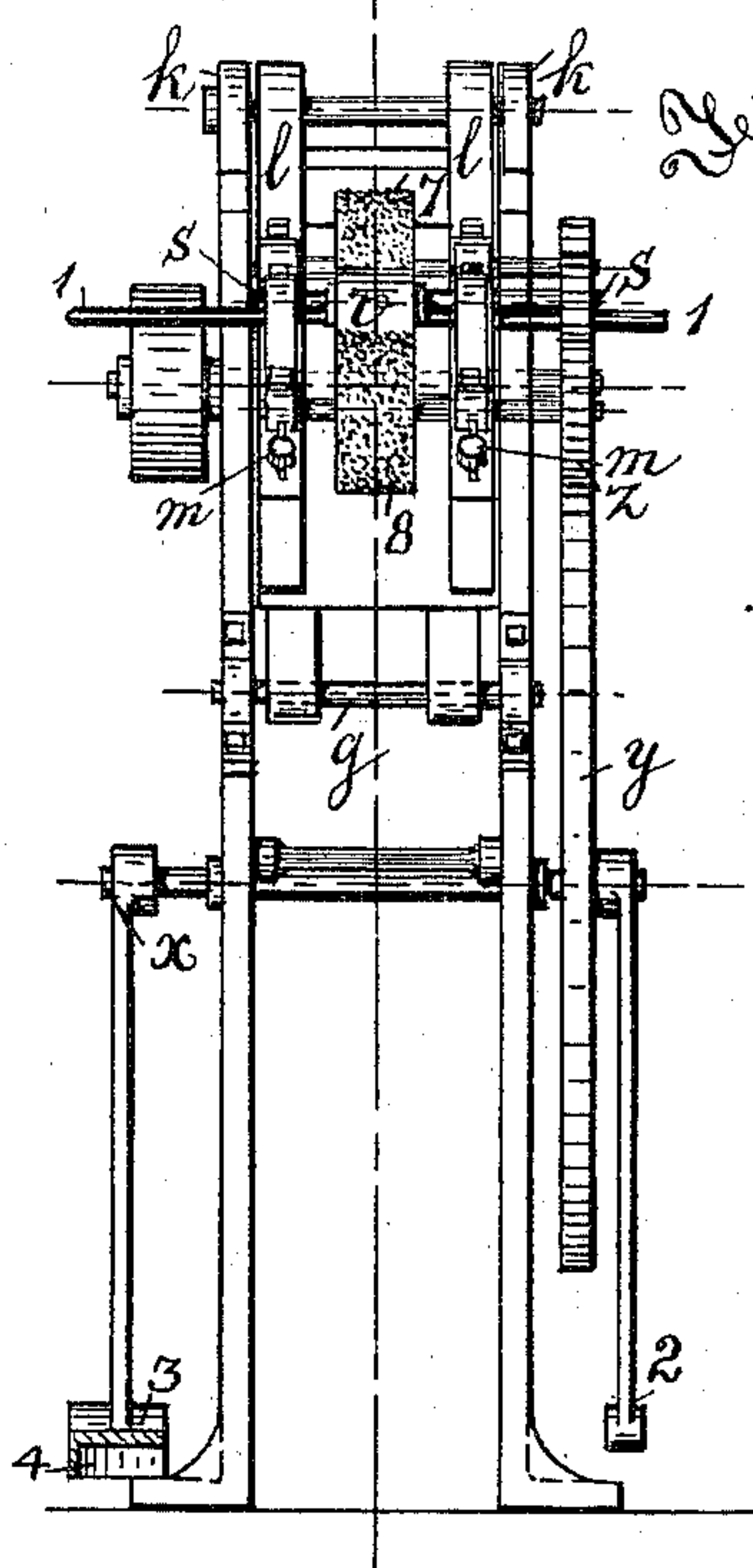


Fig. 5

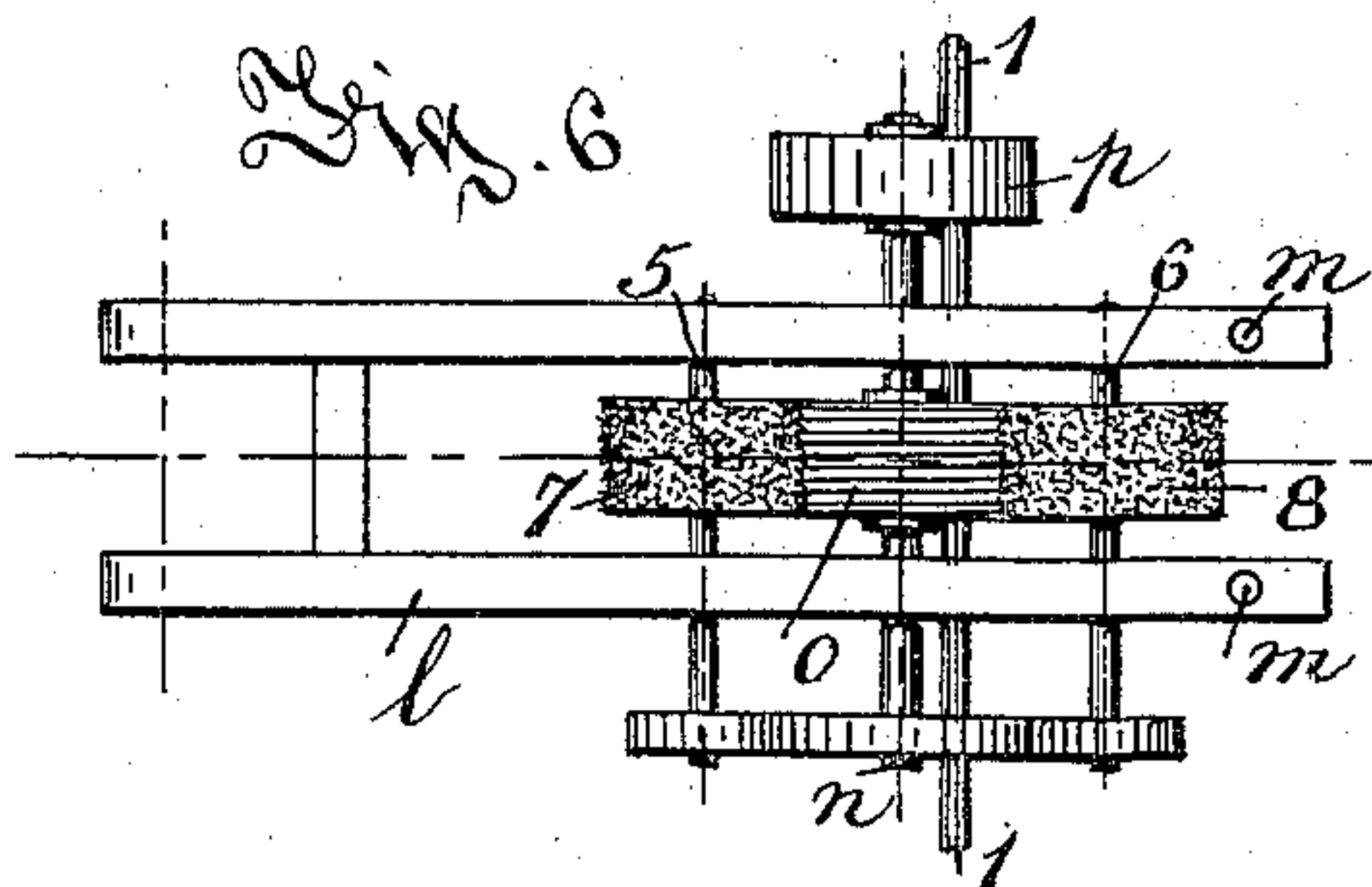


Fig. 6

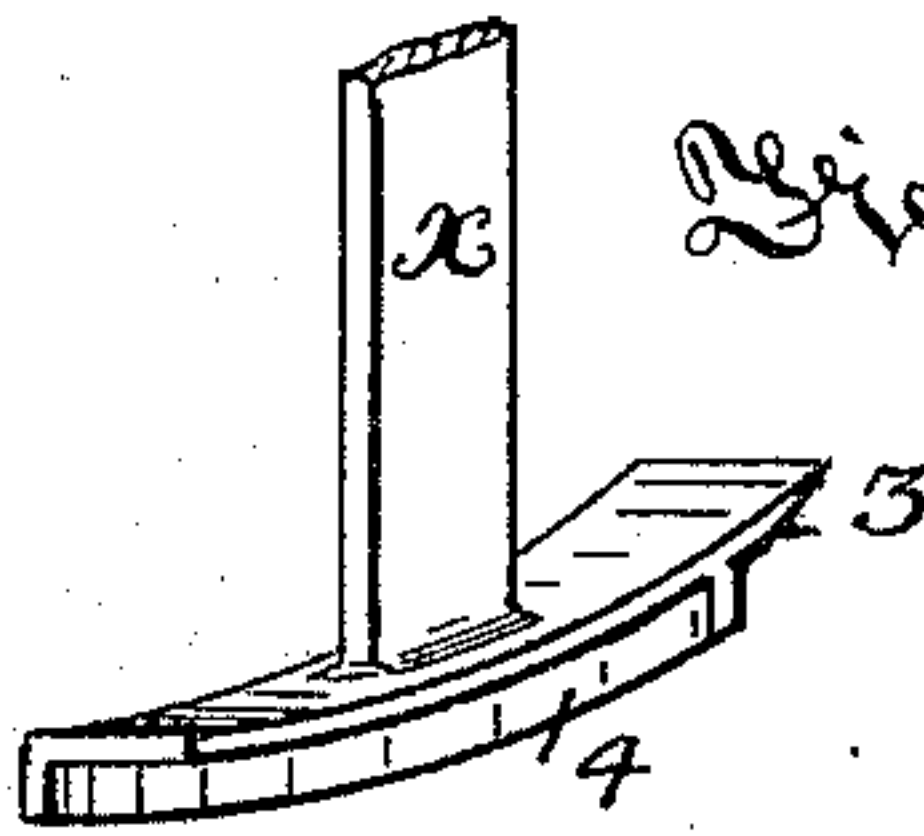


Fig. 11

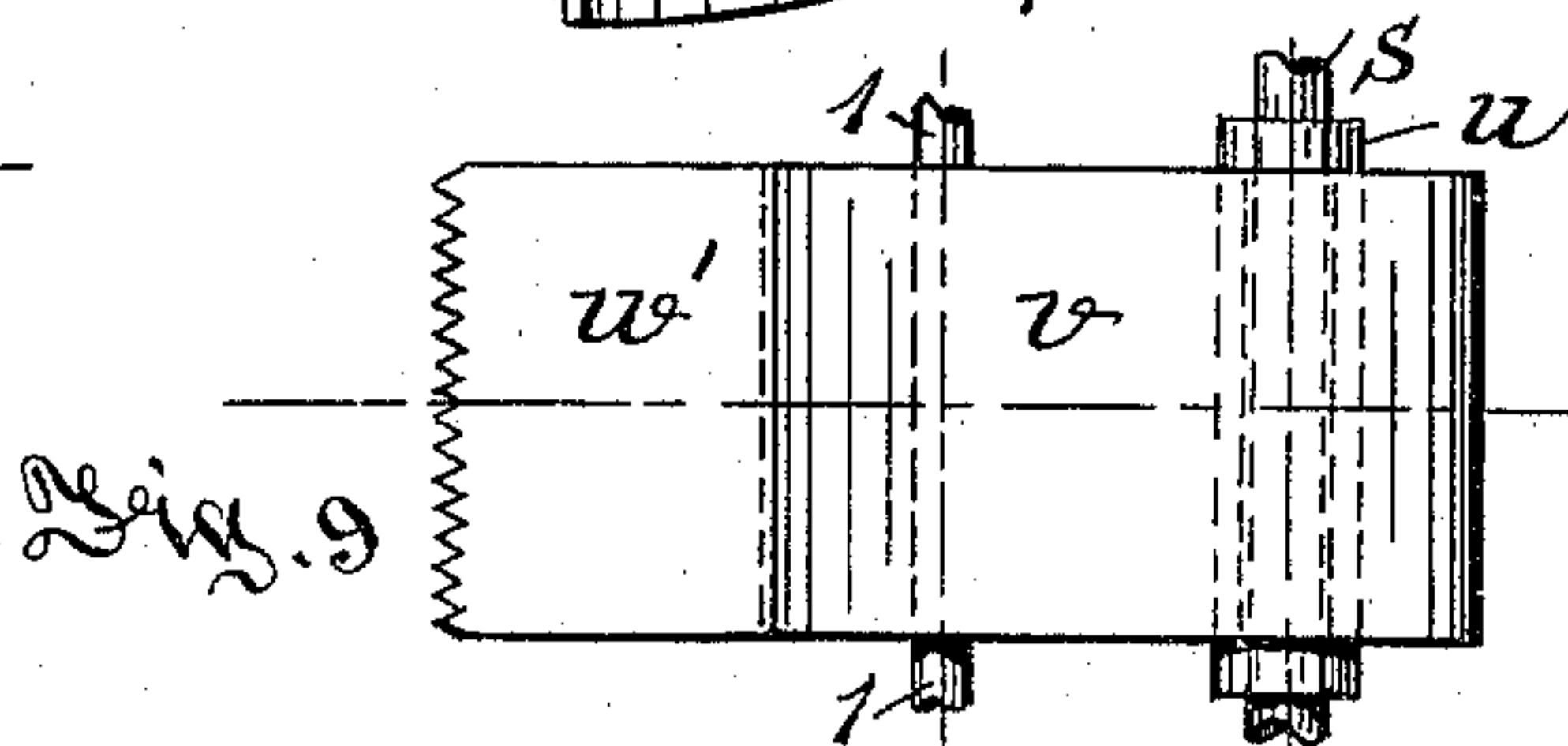


Fig. 9

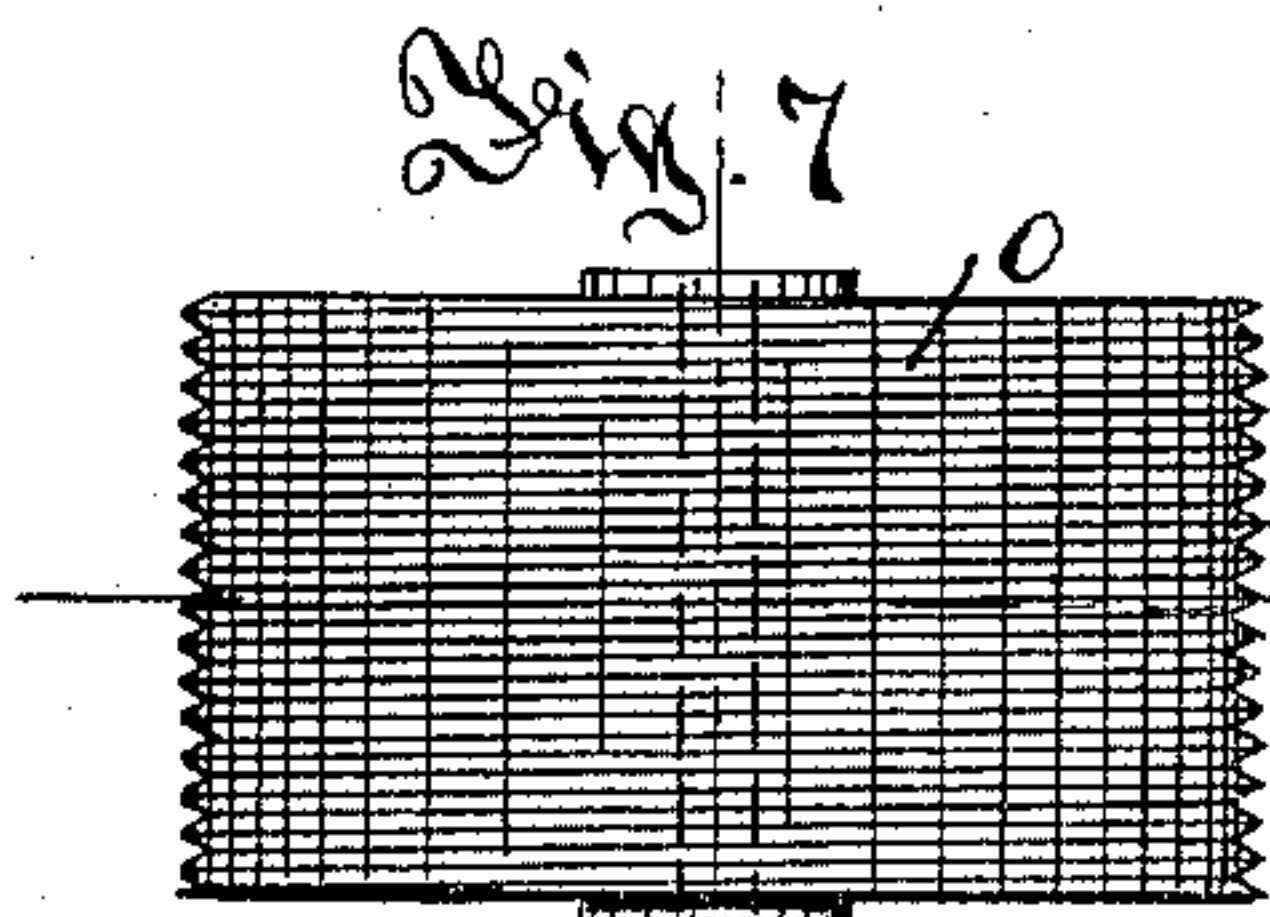


Fig. 7

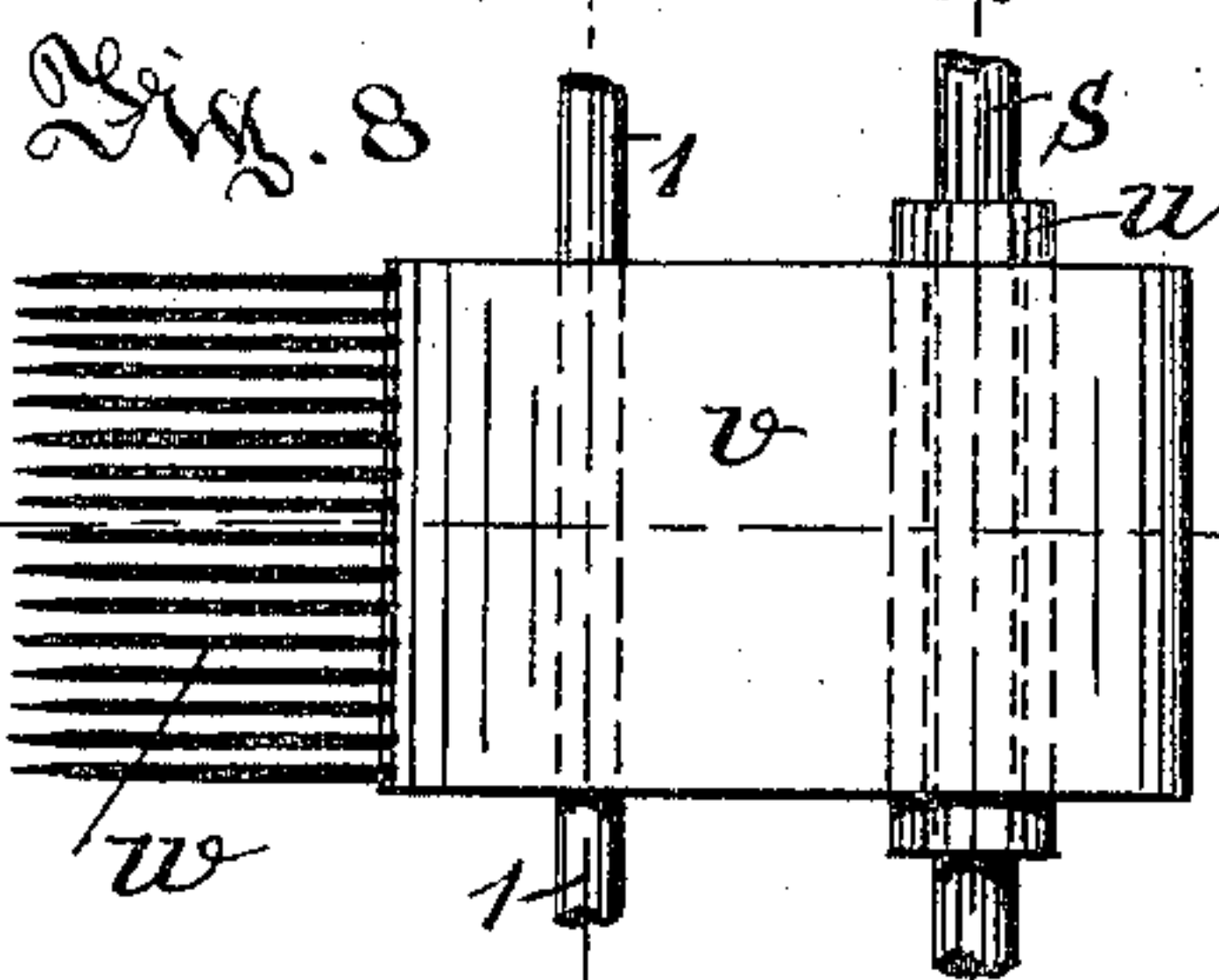


Fig. 8

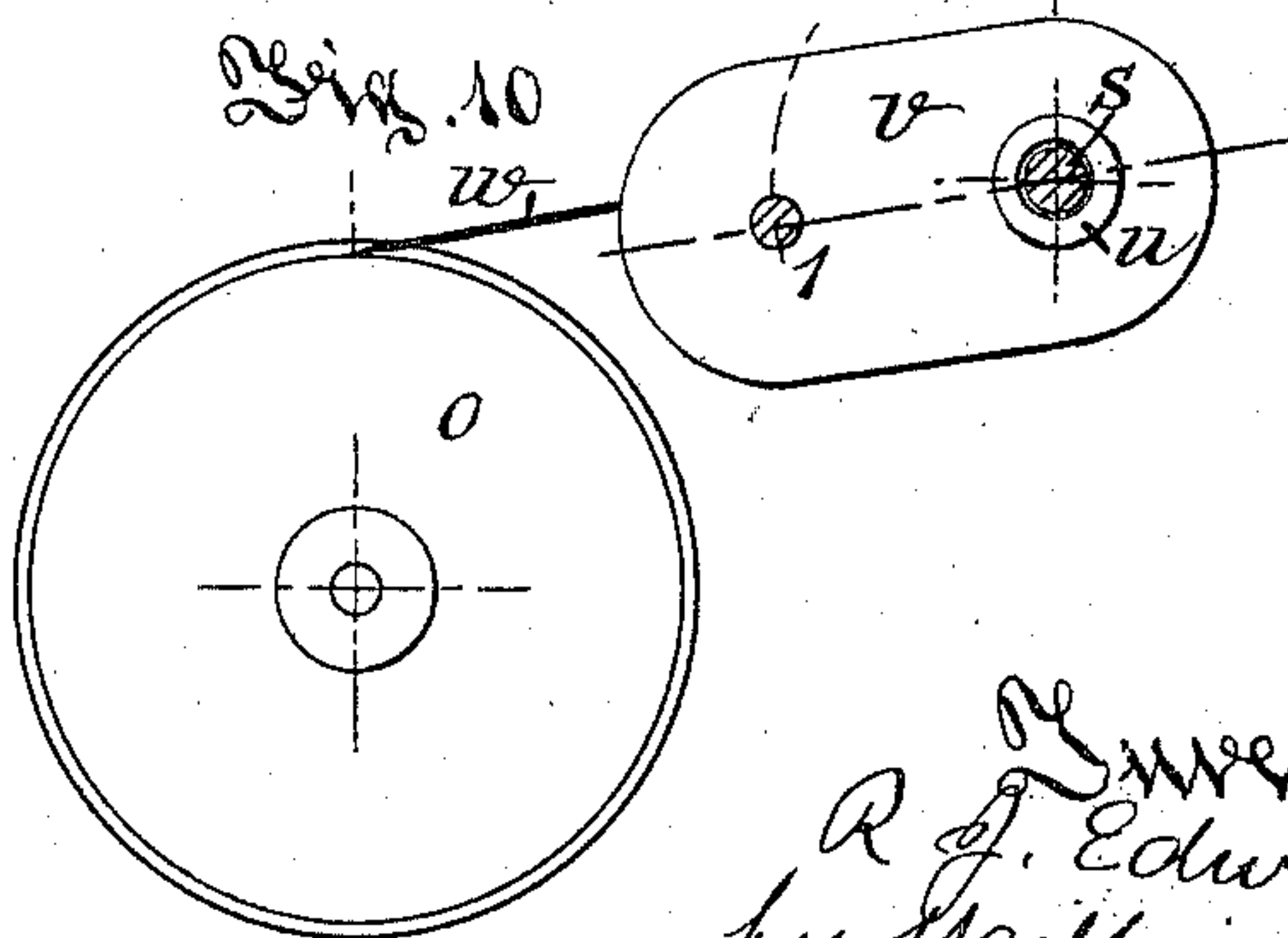


Fig. 10

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UNITED STATES PATENT OFFICE.

RICHARD JOHN EDWARDS, OF LONDON, ENGLAND.

MACHINE FOR MAKING EMERY OR GLASS CLOTH OR PAPER.

SPECIFICATION forming part of Letters Patent No. 610,128, dated August 30, 1898.

Application filed December 10, 1897. Serial No. 661,445. (No model.) Patented in England April 13, 1897, No. 9,364, and in France September 24, 1897, No. 270,715.

To all whom it may concern:

Be it known that I, RICHARD JOHN EDWARDS, a subject of the Queen of Great Britain, residing at London, England, have invented certain new and useful Improvements in Machines for Making Emery or Glass Cloth or Paper, (for which I have obtained a patent in Great Britain, numbered 9,364 and bearing date the 13th day of April, 1897, and in France, numbered 270,715, dated September 24, 1897,) of which the following is a specification.

My invention relates to improvements in machinery for making emery or glass cloth or paper in lengths, and more especially for making strips of abrasive material consisting of bands or tapes of strong woven fabrics, the surface of which is coated with emery or other suitable abrasive powder, this coating being provided with longitudinal parallel angular ridges and being especially useful for sharpening the teeth of the cards used in carding-engines, for which purpose the abrasive strip is wound helically upon the circumference of a drum or cylinder, by which when set in revolution the teeth of the cards are ground and sharpened.

The accompanying drawings are in illustration of my invention.

Figures 1 and 2 are side views of a machine. Fig. 3 is a plan from above of Fig. 1; Fig. 4, a similar plan with the upper hinged part removed; Fig. 5, an end view; Fig. 6, a separate view from above of the upper hinged part; Fig. 7, a separate view of the grooved roller; and Fig. 8, a plan, on a larger scale, of the cleaning device. Fig. 9 is a similar plan of a slightly-modified form of the cleaning device. Fig. 10 is a side view of Fig. 8; and Fig. 11 shows, on a larger scale, the cams by which the cleaning needles or teeth are raised and adjusted.

The same letters and numerals of reference indicate the same parts in the several figures.

Assuming that my improved machine or apparatus is to be applied to the purpose of making strips coated with abrasive material of the kind and for the purposes just described, I so construct it that when in operation the strip or tape previously coated in any convenient way with glue or a suitable cement, and emery in grains of appropriate size

is gradually drawn forward between rollers, the bottom one of which supports the back of the tape, while the upper one, of metal, is provided with a helical groove around its circumference from end to end, the groove, as well as the ridge between its adjoining threads, being angular in cross-section, so that as the roller revolves in contact with and draws forward the prepared surface of the tape a number of parallel longitudinal ribs are formed upon the latter, which when finished and dried afford an abrasive strip admirably adapted for winding around a drum to be used for the purpose of grinding and sharpening the teeth of cards, as above described.

It is essential that the helical groove around the roller should be kept perfectly clean and free from abrasive material, and for this purpose I sometimes use, if necessary, a series of parallel needles or suitable pointed instruments adjusted and fixed in a movable frame, the points being pressed into the grooves between the helical threads on the cylinder or roller, and as these cleaning needles or points necessarily travel longitudinally along the cylinder as the helical thread revolves in contact with them I arrange a device by which when they have so traveled as far as is allowable they are automatically brought back to the position where they originally started, and so on at regular intervals. I also arrange revolving brushes, which come in contact with the revolving surface of the helically-grooved cylinders and aid in keeping it clean.

The machine consists of a strong frame *a* of suitable material, such as cast-iron, consisting of two sides connected together by stays. The upper part of this frame carries a table *b*, (which is inclined at a convenient angle, as shown, or may be horizontal,) along which the flexible strip or tape of cloth or paper previously coated with glue and emery-powder in a soft or half-set state is made to travel, being fed in at the lower end of the table *b* and delivered and carried away to be dried at the upper end of the latter at *c*. This table has through it at a suitable part of its length an opening through which protrudes from below an adjustable pressure-roller *d*, over the upper surface of which the prepared tape or strip passes. This roller *d* is fixed on

a transverse spindle *e*, carried by bearings in a separate frame or beam *f*, the lower end of which is hinged at *g* to the table, under the lower end of the latter, while its other end is
 5 attached to the lower side of the table (above the part where the opening for the roller *d* is situated) by one or more thumb-screws *h*, with the intervention of a block of india-rubber *i*,
 10 so that the extent of protrusion of the roller *d* through the opening in the table *b* can be exactly adjusted by compressing the india-rubber *i* more or less by means of the thumb-screws *h*.

At the sides of the upper end of the table
 15 *b* described are formed or fixed two projecting ears or brackets *k*, carrying a transverse pivot in which can turn the upper end of a frame or table *l*, somewhat resembling the lower one, but having its working face below
 20 instead of above. Its other or lower end fits down when in its working position upon the lower end of the lower table *b*, to which it can be fixed by one or more bolts or thumb-screws *m m*. The object of this arrangement is that
 25 when necessary by unscrewing the thumb-screws *m* the whole upper frame *l* can be turned upon the hinge at its upper end, thus affording free access to the surface of the lower table *b* to its own lower surface and to
 30 the parts which they respectively carry.

The upper hinged frame *l* carries bearings, in which turns a transverse spindle *n*, upon which is fitted and fixed the metal helically-grooved roller *o*, already first described, the
 35 bearings being so situated that when the upper hinged frame *l* is fixed down in its place the grooved roller *o* is exactly above or opposite to the lower supporting-roller *d* and at such a distance from the latter that when at
 40 work the helical grooves and ribs upon its surface enter for a sufficient distance into the still soft glue and emery, and as the strip is drawn forward make a number of parallel angular grooves of corresponding depth in
 45 the prepared surface of the tape.

The grooved cylinder *o* projects down for a sufficient distance through an opening in the upper hinged table *l*, the lower surface of which may be provided with a removable
 50 metal or other lining, which can be renewed as it is worn by the emery passing under it.

The spindle or axle *n* of the grooved roller *o* is made to revolve by means of a driving-pulley *p* of suitable size, actuated by a belt
 55 driven by any convenient power. This pulley *p* is fixed upon the spindle by adjustable friction-gear of the usual kind, the friction of which can be varied, so that it can be made just sufficient to draw the material forward
 60 between the rollers, keeping it properly stretched, while if the speed of the roller be too great the frictional connection slips without injuring the material being operated on.

Through brackets or ears *r* above the upper hinged table *l* passes and turns a transverse spindle *s*, which is made to revolve at
 65 a moderate speed by a friction-roller *t* at one

end, driven by means of a corresponding friction-roller upon the driving-axle of the grooved cylinder, and upon this transverse
 70 spindle *s*, between its bearings, is fitted a short tube *u*, (shown on a larger scale in Figs. 8, 9, and 10,) which can turn freely upon the spindle *s* and can also move freely longitudinally upon the latter for a sufficient distance back-
 75 ward and forward between the bearings or brackets *r*. Upon this tube *u* is firmly fixed or formed a loaded lever *v*, the lower end of which forms a frame, in which are adjusted and fixed side by side a sufficient number of
 80 needles or equivalent instruments *W*—such as a steel plate having a serrated edge, as shown in Fig. 9—so that the points of the needles or the teeth at the edge of the plate
 85 rest in and scrape clean the parallel threads of the helical groove around the grooved cylinder *o*. As, however, in the arrangement described the needles or cleaning-teeth are
 90 gradually traversed endwise by the helical grooves on the cylinder *o*, in which they fit, the tube *u*, which carries them, also moving
 95 endwise upon the revolving spindle *s*, which carries and turns in it, it is necessary that when the cleaning needles or teeth have so traversed for a sufficient distance they should
 100 be returned to the point from which they started. In order to effect this, I arrange across the frame of the machine at some distance below, but parallel with, the axle of the driving-shaft and grooved cylinder a
 105 second axle *x*, turning freely in bearings in the frame *a* and provided with a pulley or disk *y*, driven by friction from a corresponding smaller friction-pulley *z* upon the driving-axle. The loaded lever *v* is also fitted near its
 110 lower end with a transverse spindle or bar *1* fixed to it and extending laterally beyond the frames *a* of the machine at each side. By this spindle *1* the cleaning needles or teeth
 115 can be lifted out of the helical groove on the cylinder *o* and (together with the tube *u* which carries them) can be moved endwise upon the spindle *s*, which as it is continuously revolving in the tube does not adhere to the latter or prevent its free movement.

Upon each end of the spindle *x* in the lower part of the frame is fixed an eccentric cam 2 and 3 of suitable diameter, the speed of rotation of the cams and their exact position being so adjusted that when it is necessary to
 120 lift and move back the cleaning needles or teeth *w* the cams 2 and 3 raise the ends of the spindle *1*, carried by the loaded lever *v*, sufficiently to free the cleaning needles or teeth from the grooves upon the cylinder *o*,
 125 and a lateral incline at 4 upon one of the cams 3 then comes in contact with the end of the spindle *1* and moves the latter, together with the cleaning needles or teeth *w*, the loaded lever *v*, and the tube *u*, which carries them,
 130 endwise for a sufficient distance and then allows them to descend again until the cleaning needles or teeth *w* again enter the helical groove around the cylinder *o*. This operation

is repeated automatically whenever necessary.

In Fig. 9 is shown a modification of the arrangement described, in which instead of the needles *w* a plate *w'*, having teeth fitting in the grooves, is used.

Across the upper hinged table *l* are arranged, in front of and behind the helically-grooved cylinder *o*, respectively, two transverse spindles 5 and 6, turning in bearings and provided with circular revolving brushes or cleaning devices 7 and 8, which come in contact with the grooved cylinder *o* and also assist to keep the grooves clean. The brush-spindles are driven by friction-rollers upon the driving-axle actuating corresponding friction-rollers upon the brush-spindles or by pulleys and cords, as may be found most convenient. Instead of two three or more brushes may be used.

The upper surface of the lower table *b* is provided with parallel guiding-strips 9 at a suitable distance apart, between which the strip of abrasive material passes as it enters the lower end of the machine and from which it is delivered as it passes away at the upper end of the machine, as already described.

As the strip of coated material, upon the soft surface of which the required angular parallel grooves have now been formed, passes away between the guides upon the lower inclined table its edges may be cleaned and trimmed by means of straight or curved knife-blades fixed at the edges of the said guides, but not shown on the drawings.

It is desirable that the revolving brushes should be kept slightly oiled, and for this purpose I arrange a movable and adjustable cistern or tank (not shown on the drawings) above and attached to the upper hinged table, and I keep this cistern supplied with oil. From it I lead two broad strips of fibrous and absorbent material, one to each brush, the strips hanging over the edge of the cistern and conveying the oil to the brushes by capillary and siphonic action.

By the machinery or apparatus described the strips of grooved abrasive material are very quickly, effectively, and cheaply made, while there is practically no limit to the length which they may be made.

The details and the size and proportions of the several parts may be modified more or less, as may be found advisable to suit varying circumstances. If instead of a helical groove around the cylinder, as described, a series of similarly-shaped parallel grooves are

used, the devices described for lifting and shifting the cleaning needles or instruments are no longer necessary.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In machinery or apparatus for making emery or glass cloth or paper in lengths, the combination of the frame *a*, table *b*, pressure-roller *d*, a frame *f* carrying said pressure-roller and hinged at *g* to the table *b*, adjusting-screws *h*, and elastic block *i*, frame *l*, pivoted to the table *b*, screws *m*, transverse spindle *n* and revolving helically-grooved roller *o*, transverse spindle *s*, tube *u*, weighted lever *v*, needles or teeth *w*, and transverse bar 1, spindle *x* and cams 2 and 3, transverse spindles 5 and 6 and brushes 7 and 8, and driving-pulleys, belts and friction-gear, arranged and operating substantially in the manner and for the purposes described and illustrated.

2. In machinery or apparatus for making emery or glass cloth or paper in lengths, the combination of a frame *a*, table *b*, pressure-roller *d*, a frame carrying said pressure-roller, adjusting-screws *h* and elastic block *i*, frame *l* pivoted to the table *b*, screws *m*, transverse spindle *n*, and revolving grooved roller *o*, arranged and operating substantially as and for the purpose described and illustrated.

3. In machinery or apparatus for making emery or glass cloth or paper, the combination with the helically-grooved roller *o*, of the transverse revolving spindle *s*, tube *u*, weighted lever *v*, needles or teeth *w* for cleaning the helical grooves in the revolving roller *o*, and revolving cams 2 and 3, arranged and operating substantially as and for the purpose described and illustrated.

4. In machinery or apparatus for making emery or glass cloth or paper, the combination with the revolving grooved roller *o*, of the transverse revolving spindles 5 and 6 and brushes 7 and 8, arranged and operating substantially as and for the purpose described and illustrated.

5. In combination with the revolving grooved rollers *o*, and revolving brushes 7 and 8, means for slightly oiling the brushes, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two witnesses.

RICHARD JOHN EDWARDS.

Witnesses:

PERCY G. MATTOCKS,
WM. O. BROWN.