

(Model.)

2 Sheets—Sheet 1.

R. RICHTER.
APPARATUS FOR FORMING SAND MOLDS.

No. 519,350.

Patented May 8, 1894.

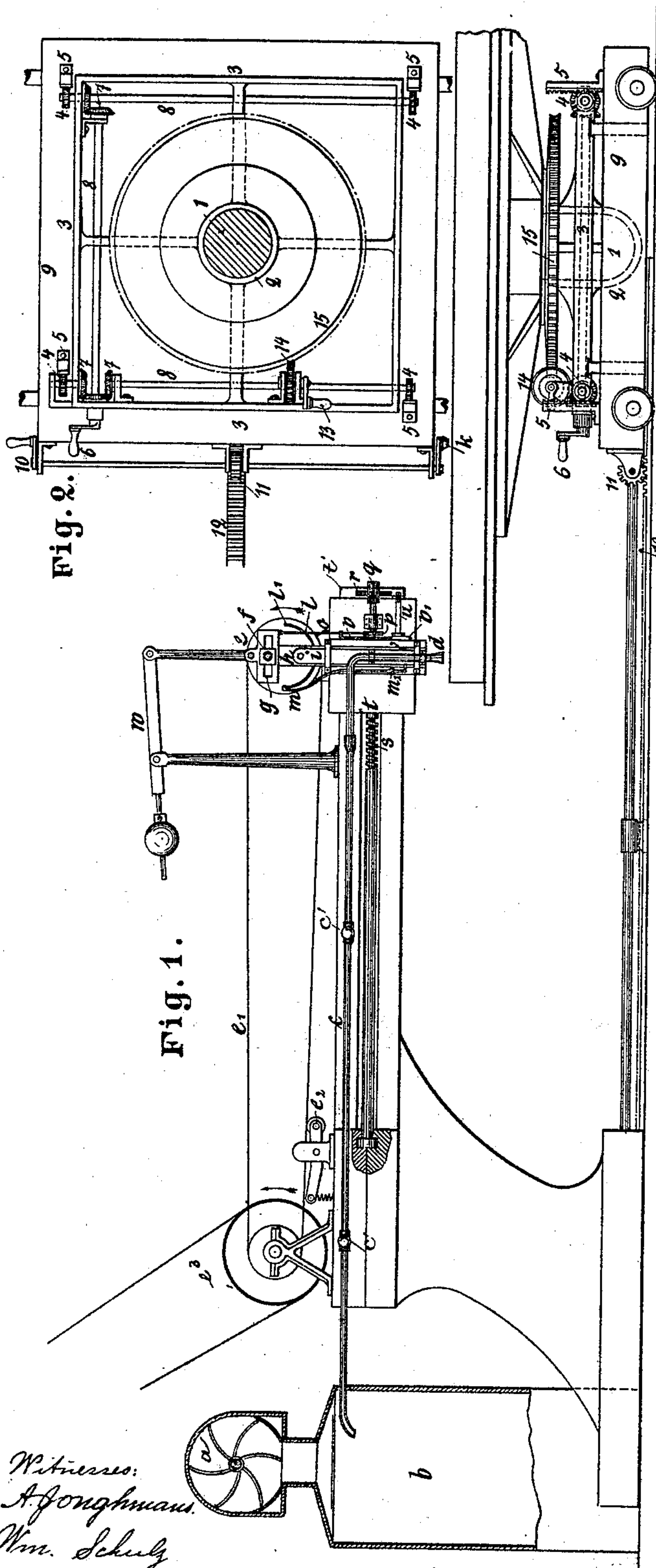


Fig. 1.

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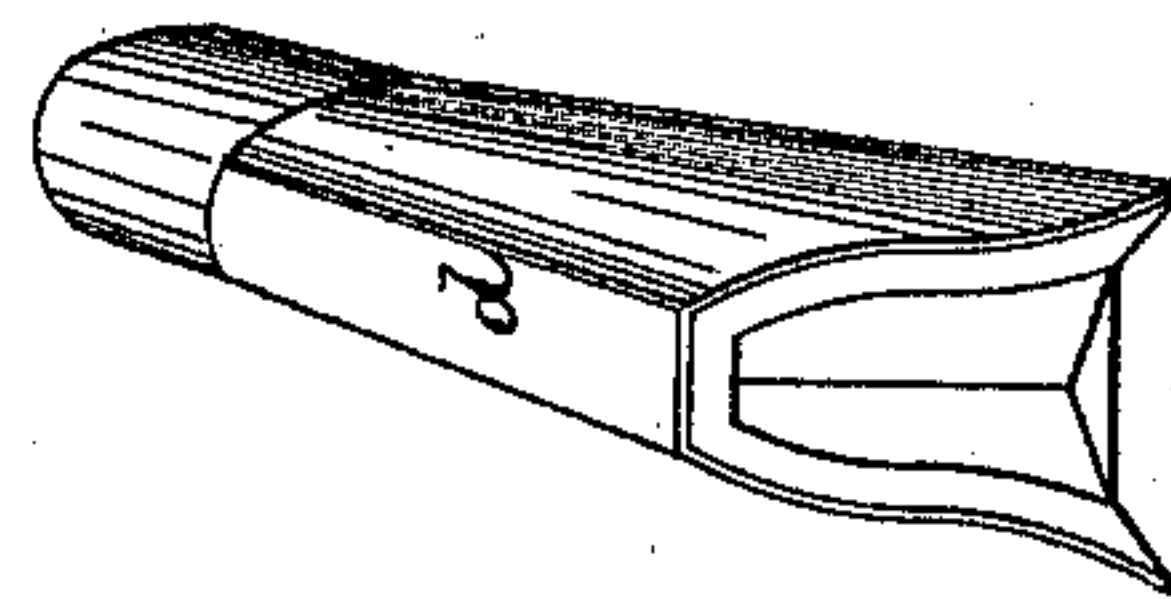


Fig. 8.

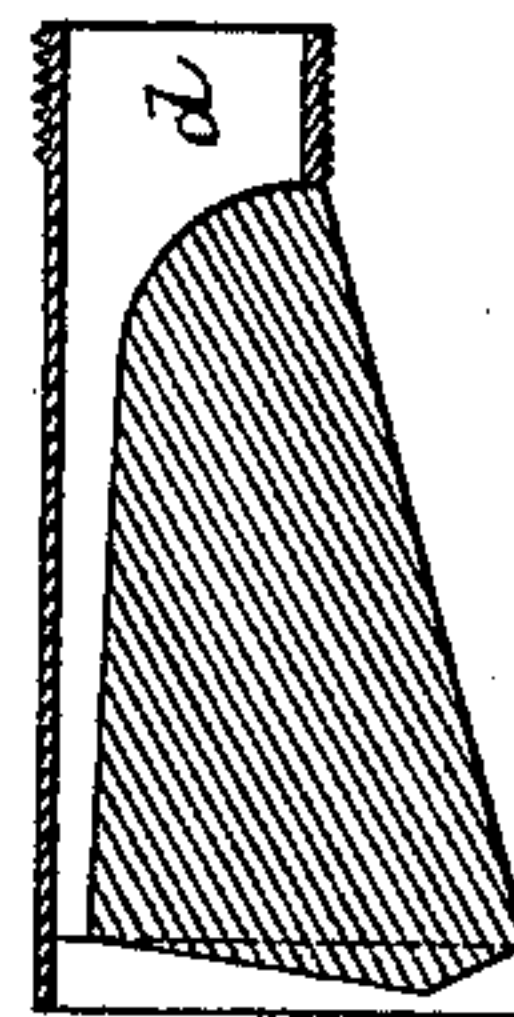


Fig. 7.

Witnesses:
A. Goughman.
Wm. Schulz

Inventor:
R. Richter
per
Roeders & Buehner attys.

(Model.)

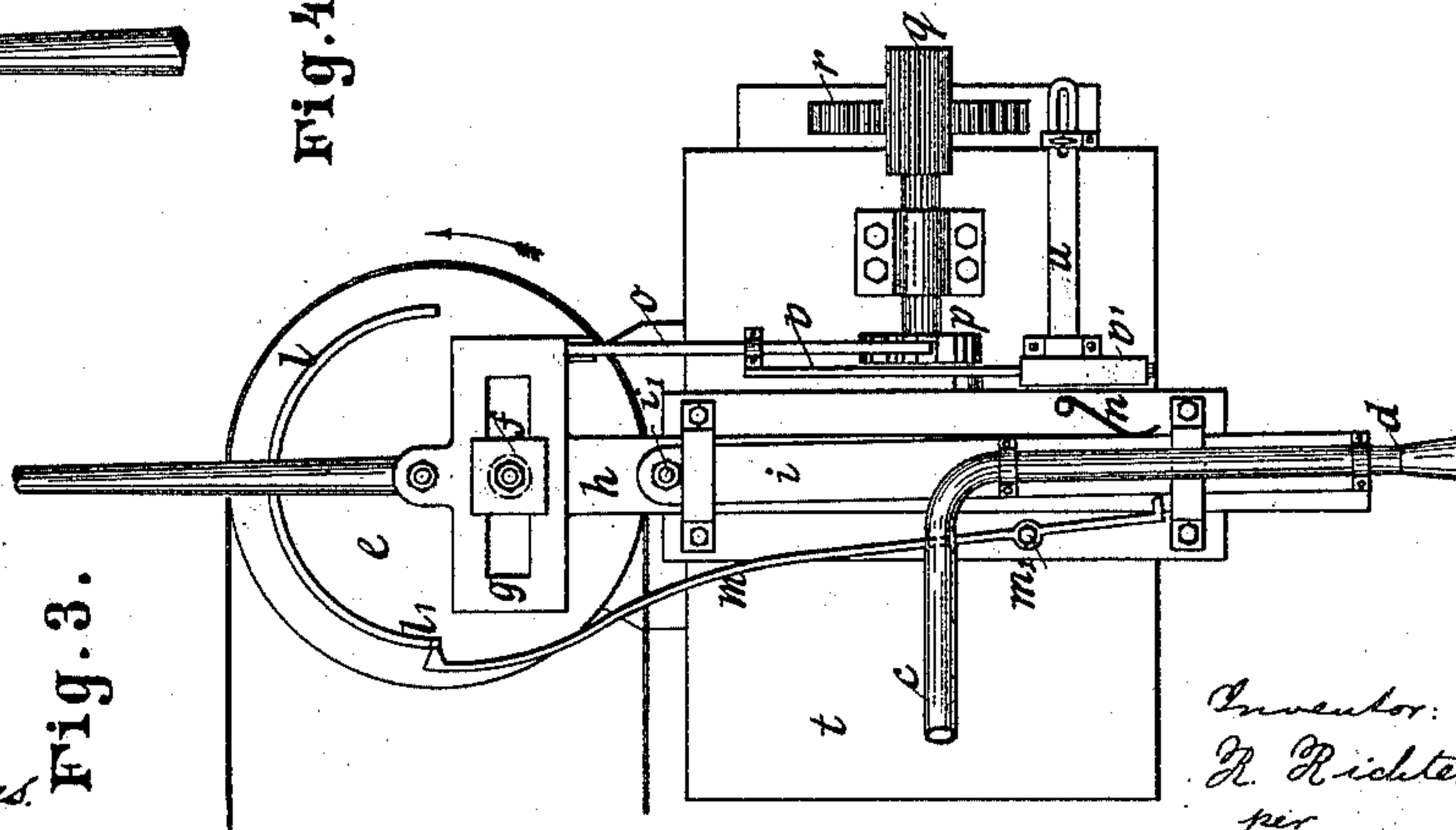
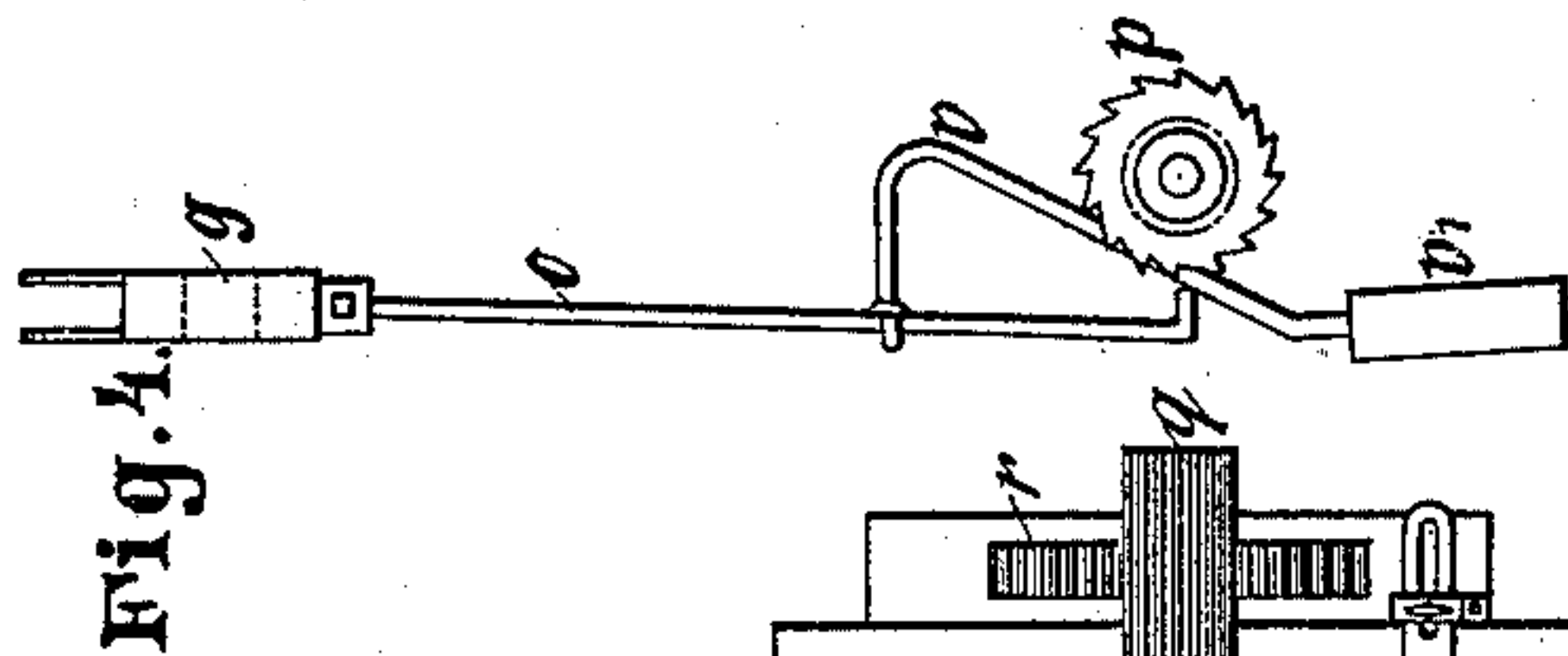
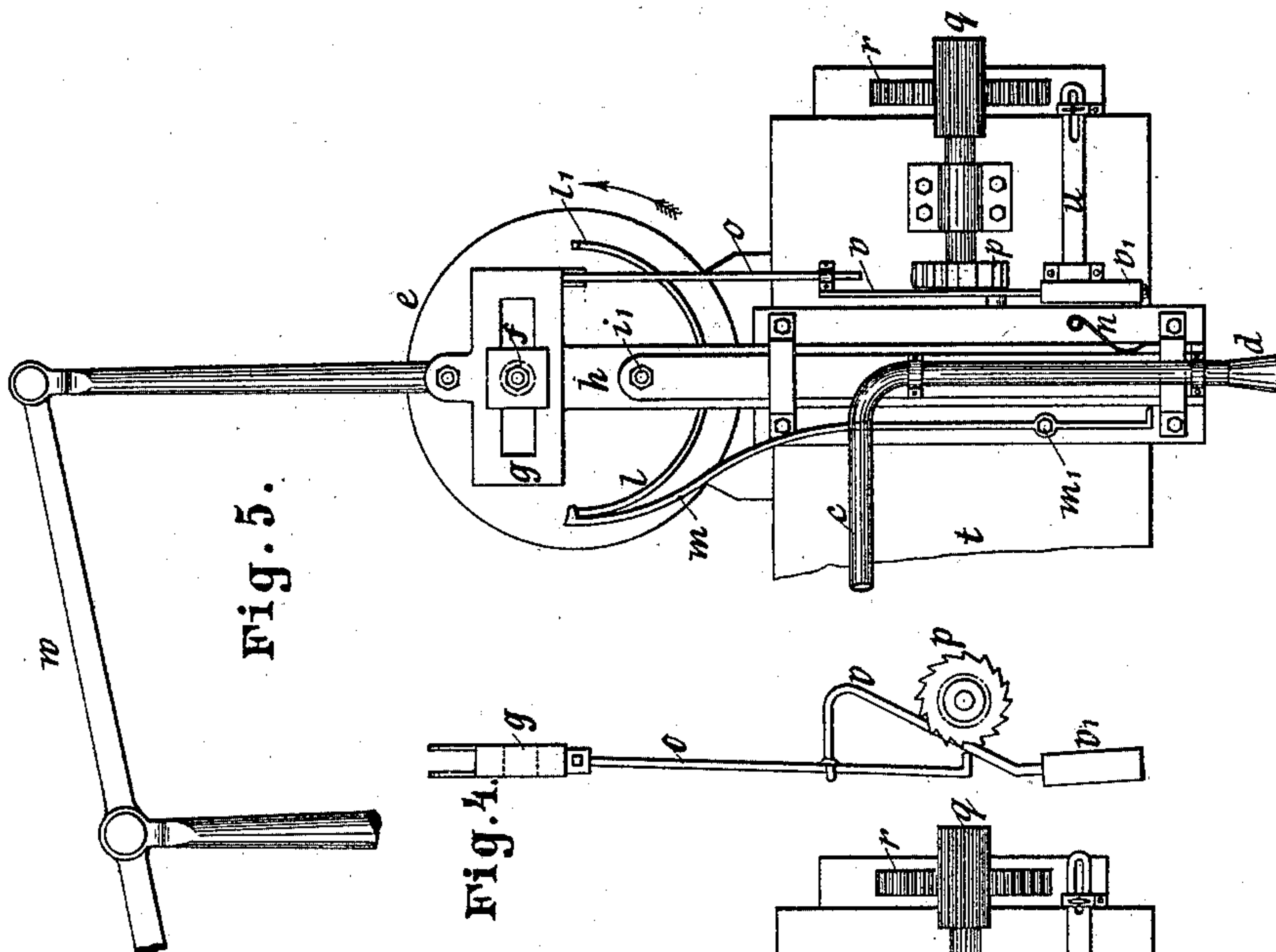
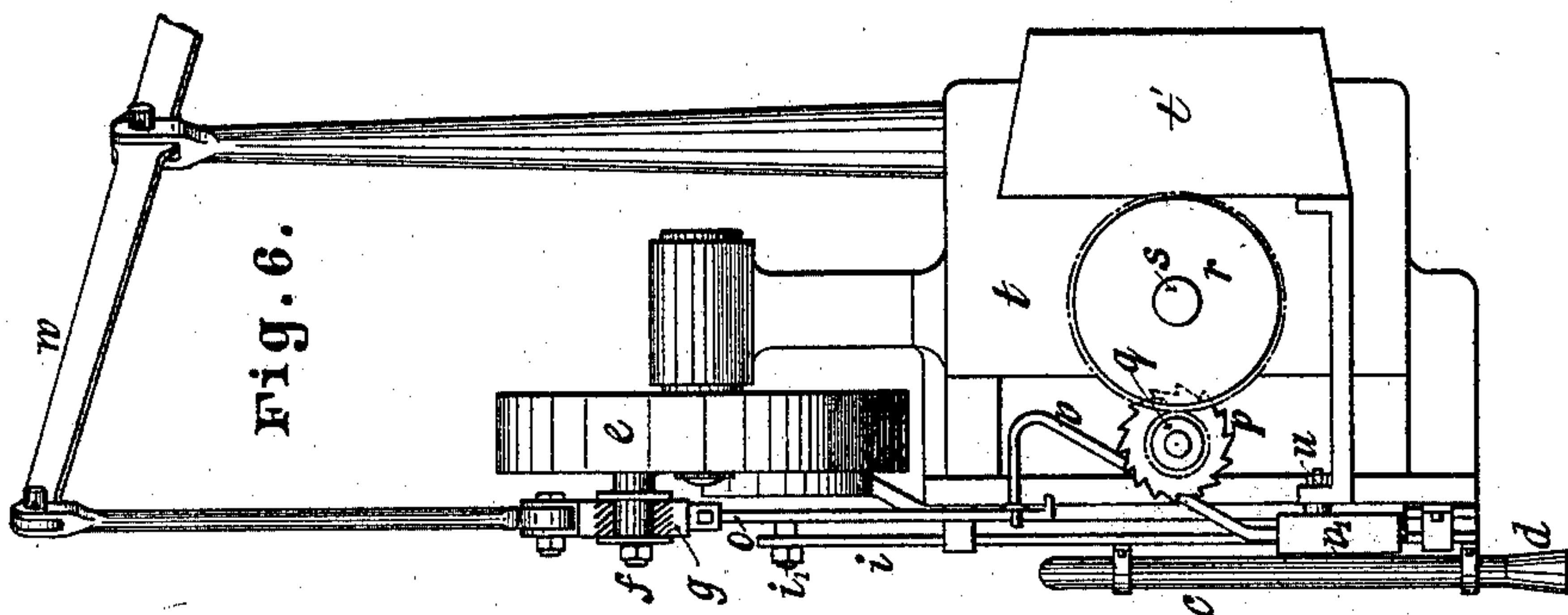
2 Sheets—Sheet 2.

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APPARATUS FOR FORMING SAND MOLDS.

No. 519,350.

Patented May 8, 1894.



Witnesses:
A. J. Goughmans.
W. Schulz

Inventor:
R. Richter
per
Reeder & Pines
attys

UNITED STATES PATENT OFFICE.

REINHOLD RICHTER, OF GABLONZ, AUSTRIA-HUNGARY.

APPARATUS FOR FORMING SAND MOLDS.

SPECIFICATION forming part of Letters Patent No. 519,350, dated May 8, 1894.

Application filed December 15, 1891. Serial No. 415,106. (Model.)

To all whom it may concern:

Be it known that I, REINHOLD RICHTER, a subject of the Emperor of Austria-Hungary, residing at Gablonz, Bohemia, Austria-Hungary, have invented certain new and useful Improvements in Apparatus for forming Sand Molds, of which the following is a specification.

This invention relates to a novel apparatus for forming sand molds by means of a cutting or molding tool and an exhaust that removes the loose sand. The cutting tool is forced down into the sand to the depth required to form the mold, the sand cut off being withdrawn through the hollow cutter into a sand reservoir by an exhaust fan. The tool is then withdrawn from the sand and repeatedly forced into it until the desired shape has been formed, the loose sand being continually removed in the manner described.

In the accompanying drawings Figure 1 is an elevation of the apparatus; Fig. 2 a plan of the mechanism for supporting and adjusting the sand flask; Fig. 3 a front elevation of the mechanism for reciprocating the cutting tool; Fig. 4 a side view of the escapement; Fig. 5 a front view similar to Fig. 3, showing the parts in a different position; Fig. 6 a side elevation thereof. Figs. 7 and 8 are a section and perspective of one of the shapes of the cutting tool.

The letter *a*, represents an exhaust fan connected with a sand reservoir *b*. Into the latter leads a pipe *c*, have a bent end, to which is attached the cutting or molding tool *d*, of any suitable form and connected to the pipe *c* by a flexible tube, to permit the cutter to reciprocate.

To reciprocate and shift the cutting tool *d*, I employ the following mechanism: *e*¹ is a power pulley imparting motion by a belt *e'* to a disk or cam *e*. The belt is provided with the belt tightener *e*². A crank pin engaging the cam is fitted on a block *f*, which slides in a horizontal slot *g*, at the top of a bar *h*, which works vertically in guides upon a laterally movable support *t*, so that the bar is made to rise and fall as the disk is revolved. A second bar *i*, is pivoted at its upper end *i'*, to bar *h*, while its lower end carries the turned down end of the suction pipe *c*. Below the cutting tool is arranged the molding box *k*, filled with sand in a suitable condition and

which can be adjusted in any desired position against the tool. The sand flask or box *k* is journaled by shaft 1 in bearing 2 supported by frame 3. The frame 3 is provided with crank 6, that revolves bevel gears 7 fast on shafts 8. Upon these shafts are mounted gear wheels 4 engaging upright racks 5. Thus by turning the crank, the frame 3 may be raised or lowered. The racks 5 are secured to a truck 9 which may be moved forward or backward by turning crank 10 so as to revolve toothed wheel 11 that engages the rack 12. To rotate the flask, a crank 13 is turned. This crank revolves cog wheel 14 engaging worm wheel 15 fast on the flask. Upon the face of the disk *e*, is formed a semi-circular projection *l*, the advancing end *l'*, of which is adapted to come into contact with a pivoted lever *m*, when the crank pin is at the bottom of its stroke and the projection is on the upper part of the disk, Fig. 3. The lever turns upon its pivot *m'*, fixed in support *t*, and operates upon the bar *i*, in such a manner that the latter swings slightly aside. Thus the rising cutter is removed somewhat from the face of the newly formed sand excavation and the latter retains its clean contour. When the cutter has arrived at the top of its stroke and has left the sand mold, the projection *l*, releases the lever *m*, which together with the cutter is forced by a spring *n*, back to the position for cutting during its down stroke. If the full depth of the mold, (say for the teeth of a spur wheel) cannot be formed at a single stroke, then the whole of the tool carrying mechanism must be moved after the stroke for a short distance, so that the tool takes a fresh cut. For this purpose the slotted rising and falling bar *h*, has connected to it the hook or pawl *o*, the lower end of which engages a ratchet wheel *p*, in such a manner that the latter is revolved for a short distance, when the cutter *d*, is withdrawn from the sand mold. The spindle, which carries the ratchet wheel *p*, bears a toothed wheel *q*, engaging another toothed wheel *r*, which is fixed upon a screw spindle *s*. The wheel being turned, as described, the screw spindle revolves in a nut of the support *t*, for a short distance, so that after each stroke of the cutting tool, the support *t*, together with the tool is fed slightly forward

on its slide *t'* to give the cut for the next stroke. When the full depth of the tooth has been formed, the feed of the cutter must cease. For this purpose a bar *u*, not connected with the moving support, but with the machine frame, is arranged so as to hold back a weighted lever *v*, until the full depth of the tooth has been formed. At that moment the lever *v*, hanging on the support *t*, is removed from the bar *u*, and is caused by its weight *v'*, to turn for a short distance, so that its upper end throws the pawl *o*, forwardly out of gear with the ratchet wheel *p*, Fig. 4. The latter being thus no longer actuated, the feed motion of the apparatus is stopped.

In order to insure an easy and smooth working of the machine, the rising and falling bar *h*, is connected above to a balance lever *w*.

The cutting tool *d*, is of course made of the proper form for shaping the mold.

In the pipe *c*, valves *c'* may be arranged by which the force of the air draft may be regulated.

What I claim is—

1. The combination of an exhaust fan with a tube, a hollow cutting tool connected thereto, a bar *i* supporting the tool, a revolubly supported disk *e* and a bar *h* that receives a crank pin on the disk and is connected to bar *i*, substantially as specified.

2. The combination of revolubly supported disk *e* having projection *l*, lever *m* arranged

to engage the same with its upper end, a support *t*, to which the lever is pivoted, a cutting tool *d* and a bar *i* arranged in the path of the lower end of the lever substantially as specified.

3. The combination of revolubly supported disk *e*, bar *h*, receiving a crank pin on the disk, bar *i* cutter *d* and hook *o* pivoted to bar *h*, ratchet wheel *p* engaged by the hook, toothed wheel *q* connected to wheel *p*, toothed wheel *r* engaged by wheel *q* and having threaded spindle *s*, and with support *t* engaged by the spindle and arranged to slide and carry the disk *e*, bars *h* *i*, hook *o* and wheels *p* *q*, substantially as specified.

4. The combination of a vertically reciprocating slide with a tool-carrying bar pivoted thereto and with a lever for tilting the bar, substantially as specified.

5. The combination of a vertically reciprocating slide with a tool-carrying bar pivoted thereto; a lever for tilting the bar, a movable support upon which the slide is mounted and a feed mechanism for imparting a lateral motion to the support, substantially as specified.

Signed at the United States consulate, at Reichenberg, Austria, this 27th day of November, 1891.

REINHOLD RICHTER.

Witnesses:

EDUARD SHISELY,
FRANZ SIMON.