

T. F. CARVER.
Machine for Making Metal Screws.
No. 222,178. Patented Dec. 2, 1879.

Fig. 3.

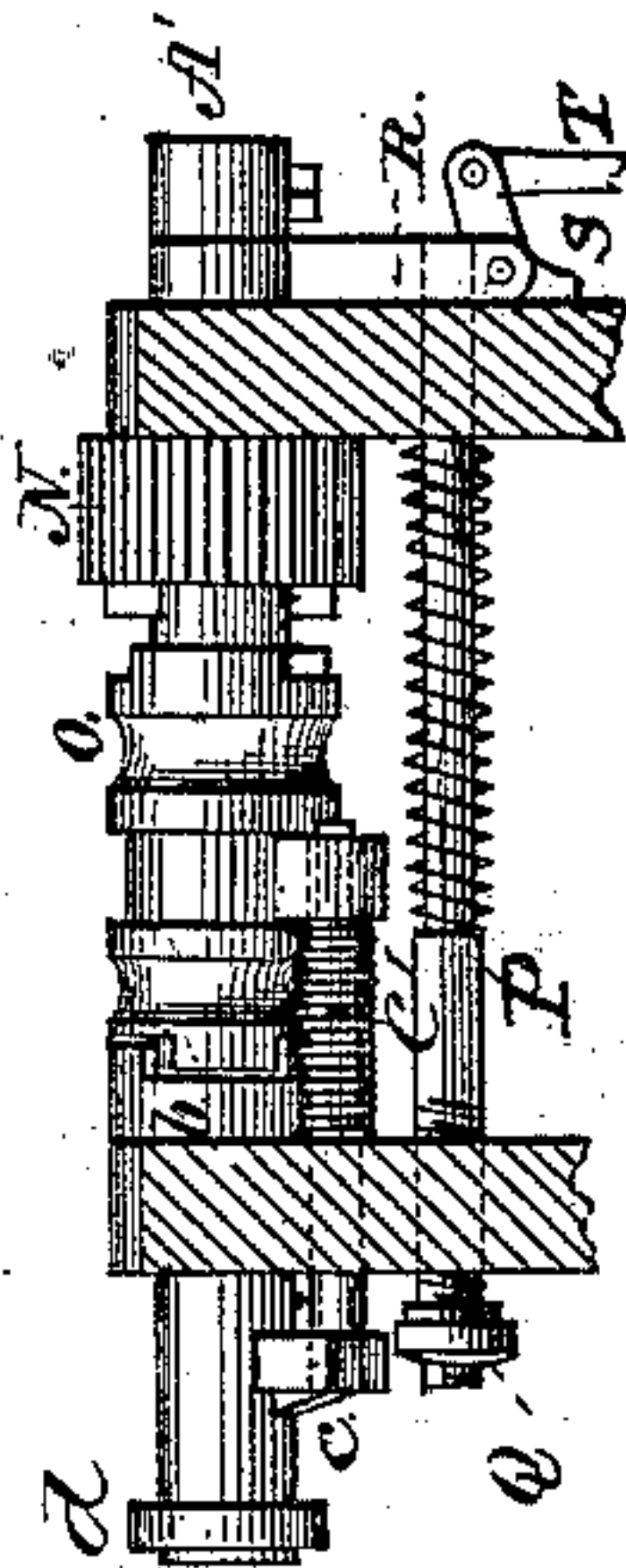


Fig. 1.

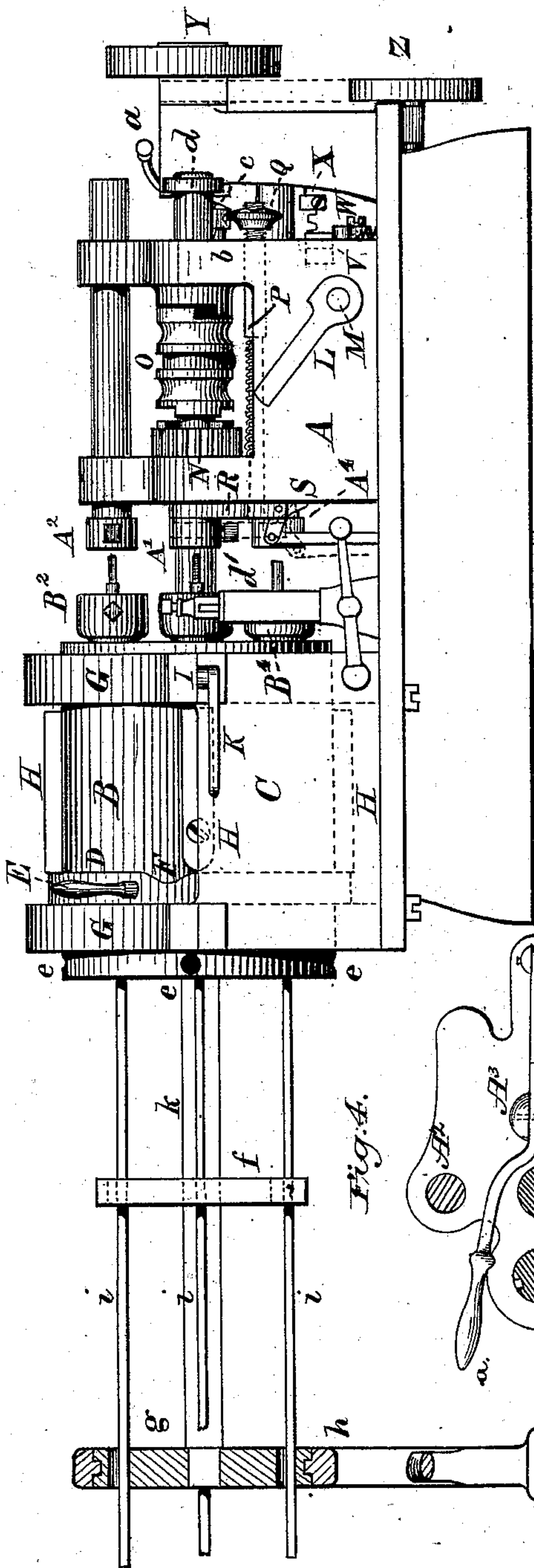


Fig. 4.

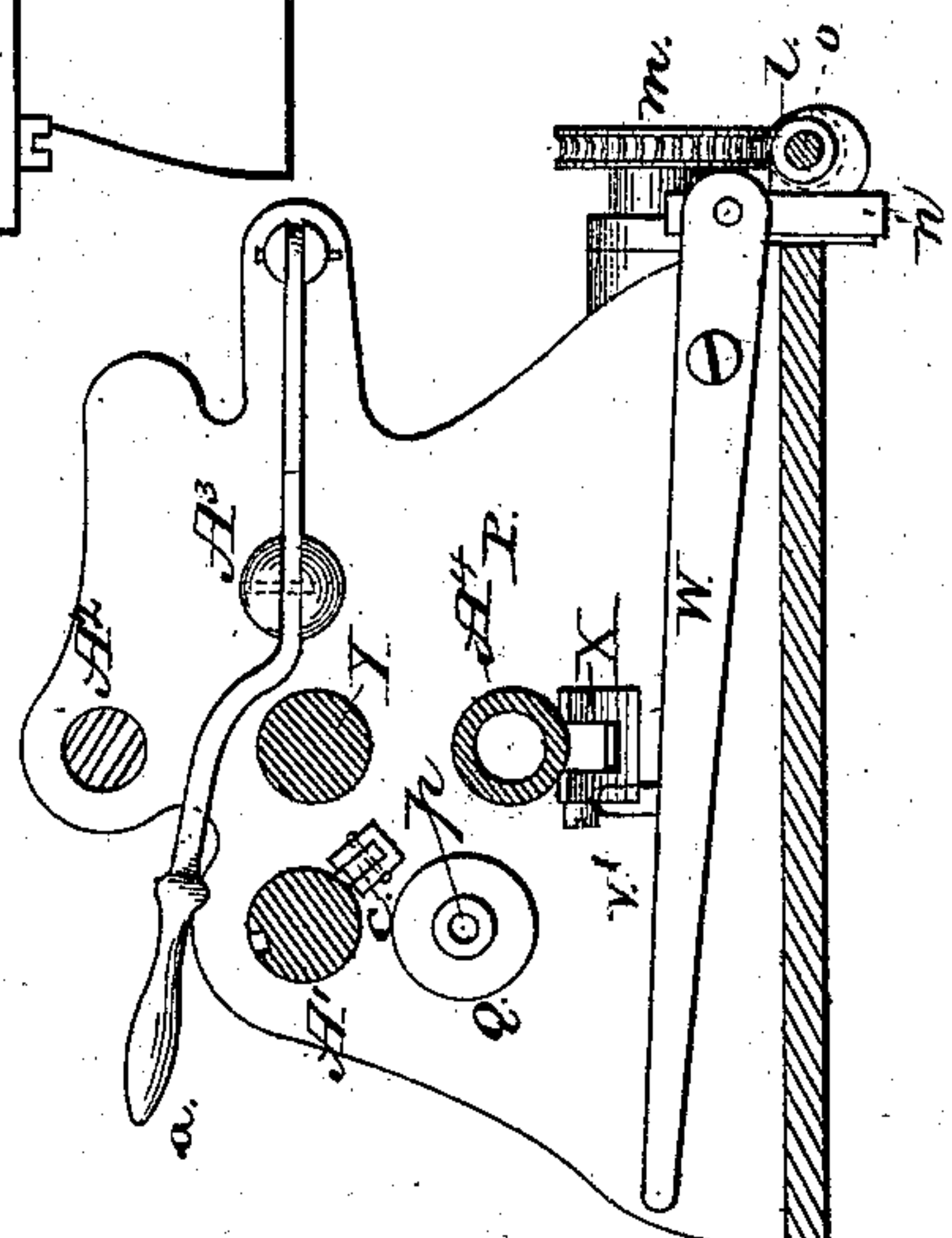
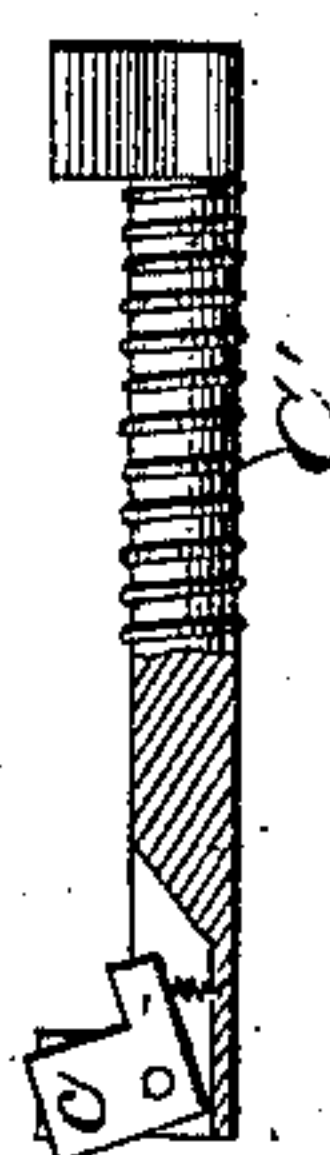


Fig. 5.



WITNESSES;

Edward H. Hill.
Jas. Greene

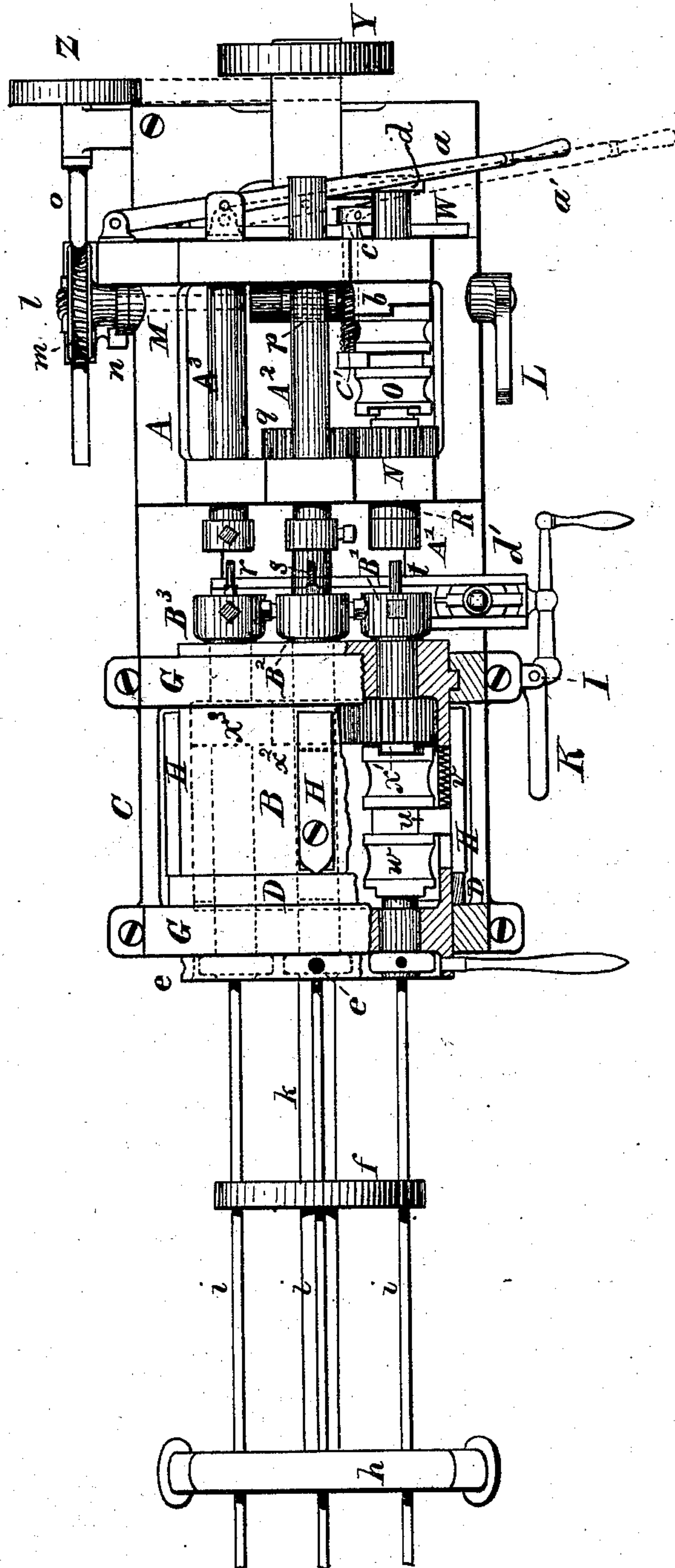
INVENTOR;

Thos. F. Carver.
James G. Arnold

BY HIS ATTY.,

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Fig. 2.



WITNESSES;

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BY HIS ATT'Y.,

UNITED STATES PATENT OFFICE.

THOMAS F. CARVER, OF WORCESTER, MASSACHUSETTS, ASSIGNOR OF ONE-HALF OF HIS RIGHT TO CHARLES C. McCLOUD AND HENRY G. CRANE, OF SAME PLACE.

IMPROVEMENT IN MACHINES FOR MAKING METAL SCREWS.

Specification forming part of Letters Patent No. 222,178, dated December 2, 1879; application filed August 20, 1877.

To all whom it may concern:

Be it known that I, THOMAS F. CARVER, of the city and county of Worcester, State of Massachusetts, have invented a new Machine for Making Metal Screws, which is described in the following specification of an embodiment of my invention, which is of that class that make the screws from the rod direct, or in which the rod is put, without being cut to the particular length for a screw, and a screw is made on it and then cut therefrom.

It is designed to economize both labor and time by the use of two or more rods, and tools so arranged that the rods may be shifted and brought readily to the successive operations, and several of them be simultaneous.

Its nature is fully described in the following description and claims, due reference being had to the accompanying drawings, making part of this specification.

In the accompanying drawings, Figure 1 is a side view, and Fig. 2, a plan of a machine embodying my invention. Figs. 3, 4, and 5 show sectional parts of the same.

B¹, B², B³, and B⁴ are the rod-holders, capable of holding rods of any length, consisting of chucks having screw-jaws, (or other suitable means to hold and turn the rods,) fast on hollow mandrels which have bearings in the drum B, a part of which is represented in Fig. 2 as removed, showing the driving-gear *x'* running loose on the mandrel, the splined clutch *w*, slide H, with its spring *v* and stud *u*, by which said slide moves the clutch *w*, when the notch F of the ring D is brought opposite to slide H. The ring D at other times holds the slide H, and through it keeps the clutch *w* in engagement with the gear *x'*, which receives continuous motion from a gear on the shaft Y. Each of the rod-holders is similarly constructed and equipped.

The drum B is held in the frame C by the bands G G, in which it can be readily turned by the tender, by inserting a rod or handle in the holes *e e e e*, and has notches corresponding to the drivers or holders by means of which the spring-slide I holds the drum B in exact position, the slide I being drawn out and re-

leased by the lever K, when the tender desires to turn the drum B. At *h* is a standard supporting the circular disk *g*, which turns readily in said standard, and is connected to the drum B by the shaft *k*. The disk *g* has holes corresponding to the hollow mandrels to support the loose ends of the rods *iii*. The shaft *k* is grooved or splined, and a loose disk, *f*, slides on it, having similar holes to disk *g* for supporting short ends, and said disk *f* may be used anywhere along shaft *k*.

A¹, A², A³, and A⁴ are sliding tool-holders or arbors supported in the frame A opposite the rod-holders, and in exact line with them when the drum B, in which they are carried, is held by the slide I.

Arbor A¹ is fitted to turn and slide in frame A, and is grooved for the clutch O, which holds it from turning when the clutch is held back to the part *b* by the rod and catch *c*. The gear N then runs loose on the arbor A¹, said gear receiving its motion from gear *q* on the driving-shaft Y. The arbor A¹ has a collar or chuck for holding the threading-die, and also has an adjustable collar, *d*, on the other end, whose function will be described hereinafter. At R is a ring or loose collar, its lower part being fast to the rod P, which is threaded and has a gage-nut, Q, and spring to hold it in the position shown. At S is an elbow or cam lever which may be pivoted in ring R or rod P, and has a connection, T, to a foot-lever, U, which, being depressed, throws out rod P and arbor A¹, as far as allowed by the nut Q, thus forming a gage by which the tender can set or shift each rod to the right length for the desired screw.

The holder A⁴, which carries the milling-tool, has a rack on its under side, into which the gear *p* meshes, said gear being fast on the shaft M, as are also the worm-gear *m* and lever L. The shaft *o* has a worm, *l*, and is journaled in a movable bearing at *n*, while by pulley *z* it receives motion from shaft Y, by the belt shown in broken lines. The box or bearing *n* is raised and lowered by the lever W, in the manner common to feed mechanism, to start or stop the feed by throwing worm *l* into or

out of gear with wheel *m*, lever *W* having catch *v'* to hold the feed into gear until an adjustable stop, *X*, on the rack or arbor hits said catch and releases the feed.

The holder *A*³ carries a tool for pointing or squaring up under the head, or both, and has a lever, *a*, by which it is moved back and forth. Holder *A*² may be used in the same way, or it may be fitted like holder *A'*, to carry a threading-die.

In making a screw, the tender, having one of the rod-drivers *B'* in position, turns the ring *D*, bringing notch *F* opposite the slide *H*, which, being thrown back by spring *V*, releases the clutch *w* from the gear *x'*, and throws its opposite end against a stop on the inside of drum *B*, stopping the driver. He then, putting his foot on lever *U*, throws out the arbor *A'*, while he loosens and shifts the rod *i*, until its end meets holder *A'*, and then secures the rod, and releases the lever *U*, allowing the gaging mechanism to return to its place. Then by pressing lever *K* he releases the drum *B*, and turns it one-quarter, bringing the rod opposite holder *A*⁴, which has the milling-tool. Putting this to the end, he starts the feed by pressing down the lever *W*, which is held by the catch *v'* until the desired length is milled, when the stop *x* releases the catch, stopping the feed; and the milling-tool is run back by turning the shaft *M* and pinion *p* by the lever *L*. By this time another rod has been set at *B'*, in its turn to be brought to holder *A*⁴, and the first is moved to the holder *A*³, where it is squared up under the head, or pointed, or both, while the second is being milled, and the third one-quarter turn of drum *B* brings the first rod to holder *A*², where it is finished or made ready for the threading-die, to which the next one-quarter turn of drum *B* brings it.

The die in holder *A'*, being pushed up by the tender to start, cuts the thread, and the ring *D*, being turned to move the notch *F* away from slide *H*, the rod will be driven by its gearing, as in the other positions, and when the thread is cut the desired length, the collar *d* on holder *A'* hits the catch *c*, and permits the spring *c'* to throw the clutch *O* away from part *b*, allowing the arbor and die to turn with the screw. The clutch being thrown into wheel *N* by its spring, insures the turning of the arbor and die, and the tender, turning ring *D*, stops the driver and rod in the manner be-

fore described, and the motion of holder *A'* runs the die off of the screw, after which the tender starts the driver and rod by turning ring *D*, and by a cutting-off tool in the slide-rest *d'* cuts off a finished screw, and, stopping the drivers, again sets the rod for another screw, as before described.

Thus it will be seen the different operations are more or less in the act of being performed simultaneously, according to the nature of the screw or work, as where the milling requires the most time they may be performed, as stated, or where less time is needed the arbor *A*² may be fitted with a gear and clutch like *A'*, and the threading done there, leaving the cutting off and gaging or setting for holder *A'*, and thus more nearly equalize the work.

Instead of a single driving pulley on shaft, *Y*, a cone of pulleys may be used in the ordinary way, and various other minor changes be made in adapting my invention to the different kinds of screws it is capable of making.

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

1. The combination of two or more hollow arbors, *B'* *B*² *B*³ *B*⁴, having clutches and a governing-slide, *H*, with the drum *B*, ring *D*, and its notch *F*, substantially as and for the purposes described.

2. The combination of a series of two or more interchangeable rod-drivers, *B'* *B*² *B*³ *B*⁴, the revolving disk *g*, having corresponding holes, and a stand, *h*, substantially as and for the purpose set forth.

3. The combination of the hollow rod-driver *B'* and movable rest or disk *f*, substantially as and for the purpose specified.

4. The combination of the sliding arbor *A'* and the gaging mechanism, consisting of collar *R*, rod *P*, and its adjustable nut *Q*, and spring, substantially as and for the purpose set forth.

5. The combination of a series of two or more rod-drivers, *B'* *B*² *B*³ *B*⁴, and the milling-slide *A*⁴, having an automatic stop-feed, consisting of the rack-pinion and its shaft *M*, gears *l m*, lever *W*, with its catch, and the adjustable stop *x*, substantially as and for the purpose described.

THOMAS F. CARVER.

Witnesses:

CHAS. C. MCCLOUD,
HENRY G. CRANE.