

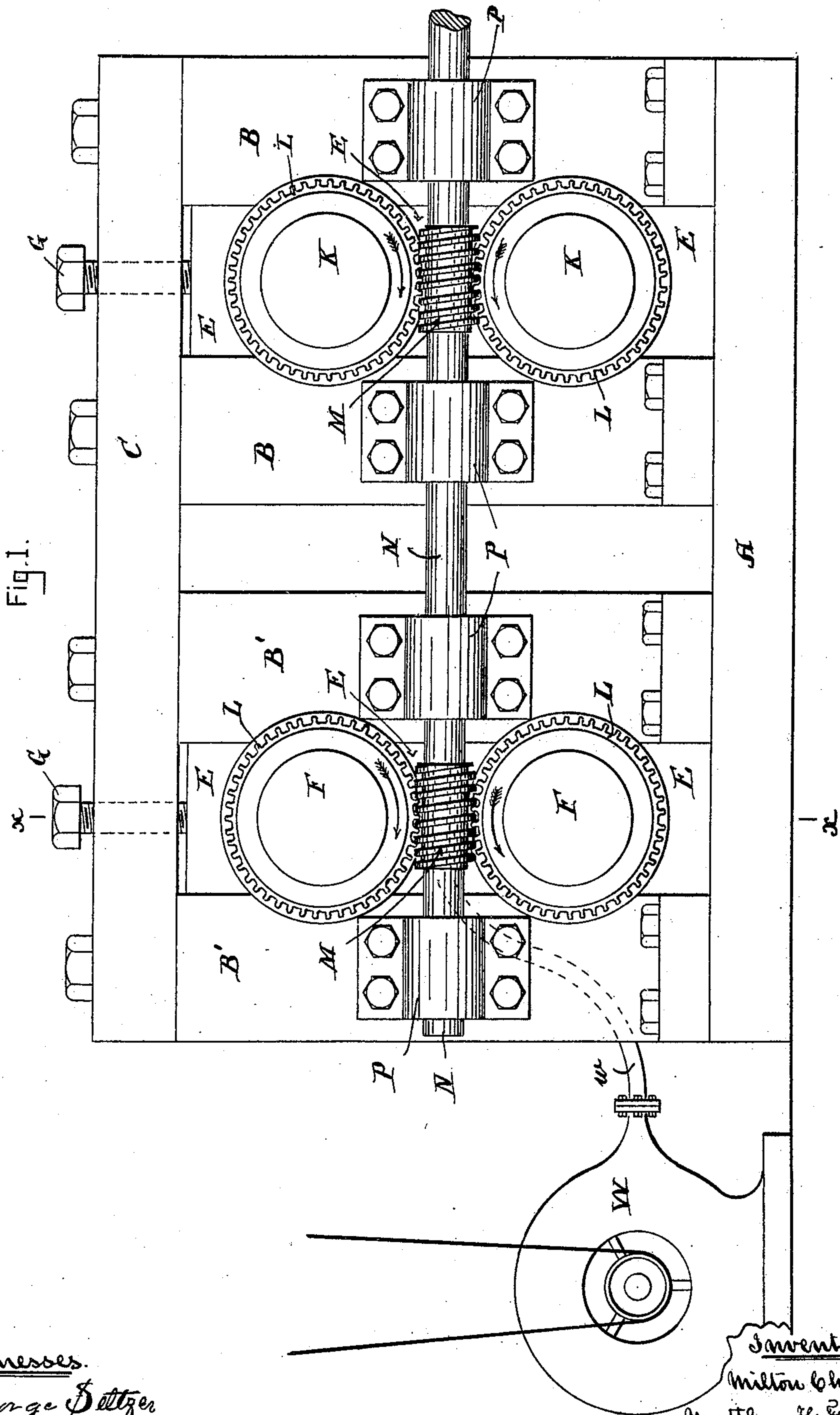
(No Model.)

5 Sheets—Sheet 1.

M. CHASE & M. H. FOSTER.
NAIL MACHINE.

No. 397,068.

Patented Jan. 29, 1889.



Witnesses.
J. George Seltzer
W. O. Rickert

Inventors.
Milton Chase
Matthew H. Foster
by C. Blanta
Attorney.

No. 397,068.

Patented Jan. 29, 1889.

Fig. 4.

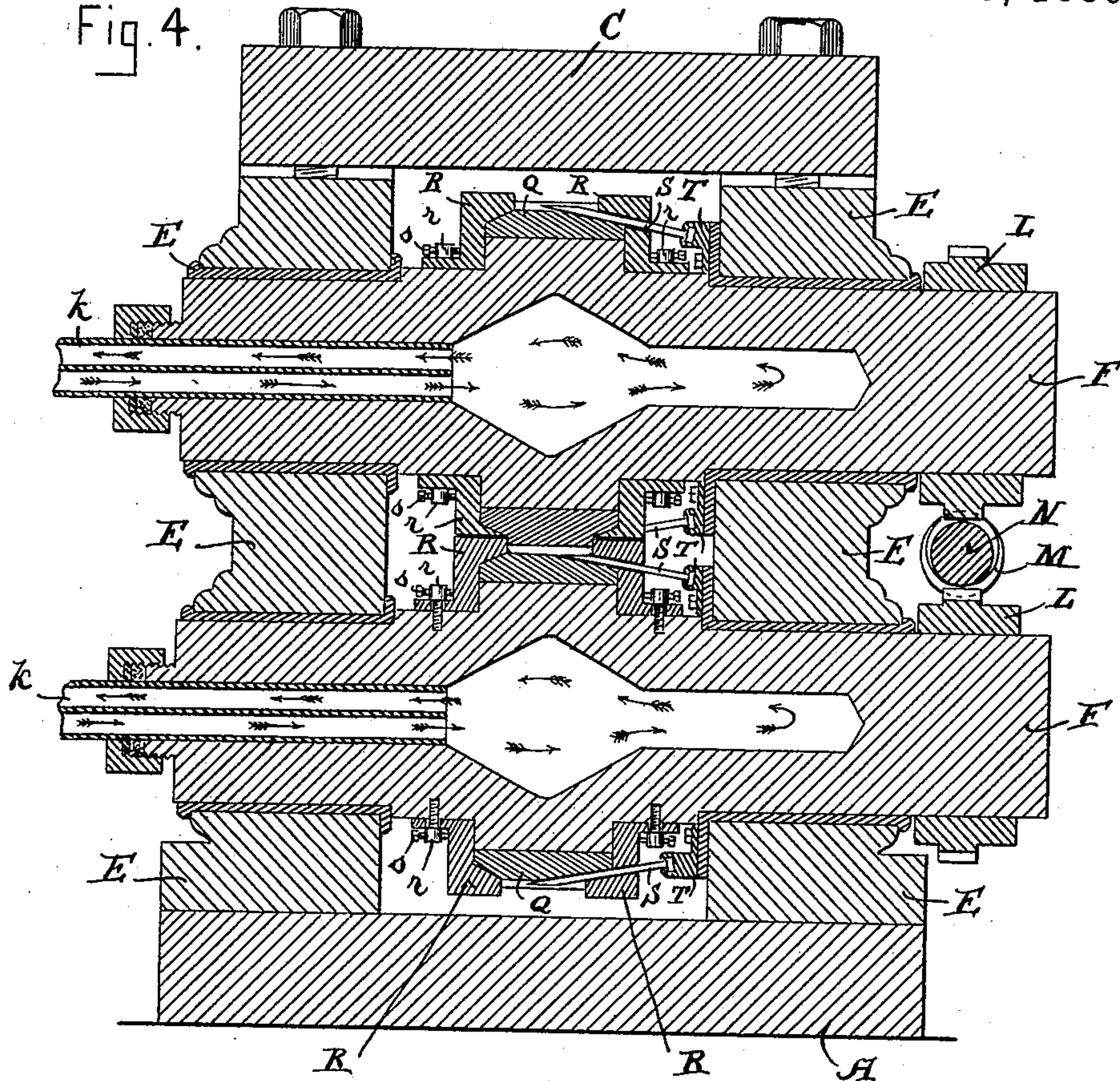
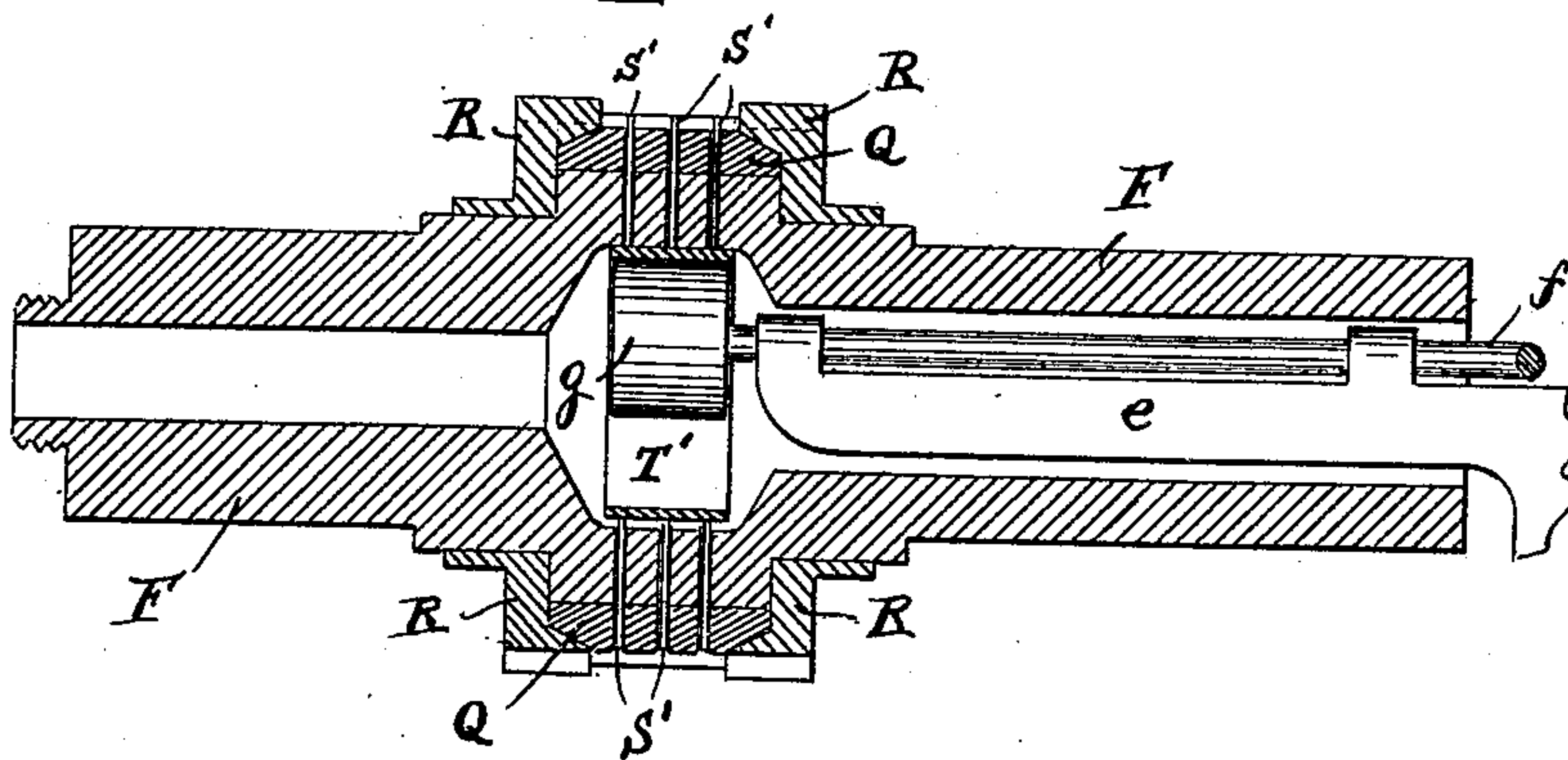


Fig. 6.



Witnesses.

J. George Seltzer
W. O. Rickert.

Inventors,

Milton Chase
Matthew H. Foster
by E. Blanta
attorney.

(No Model.)

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Fig. 7.

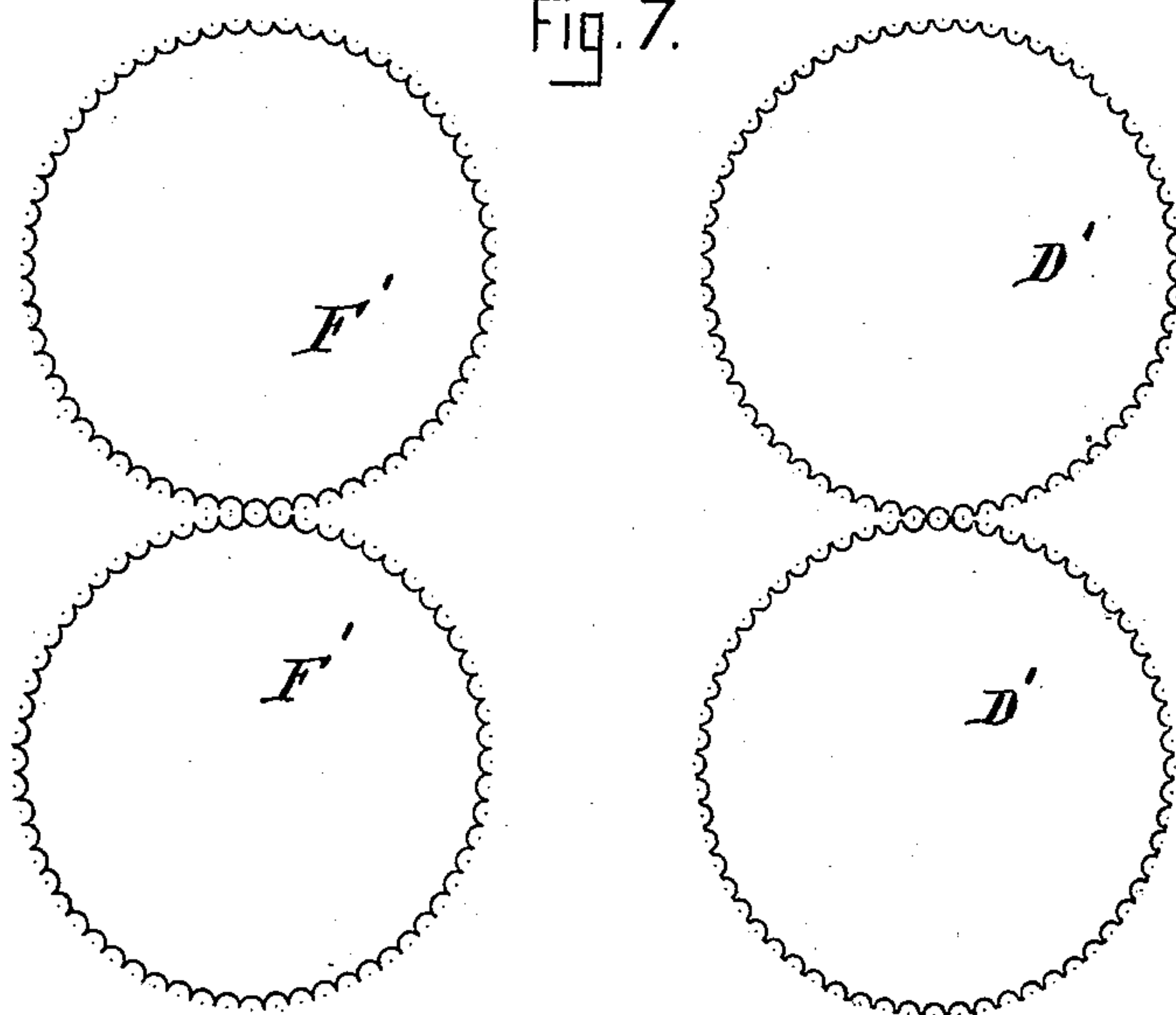
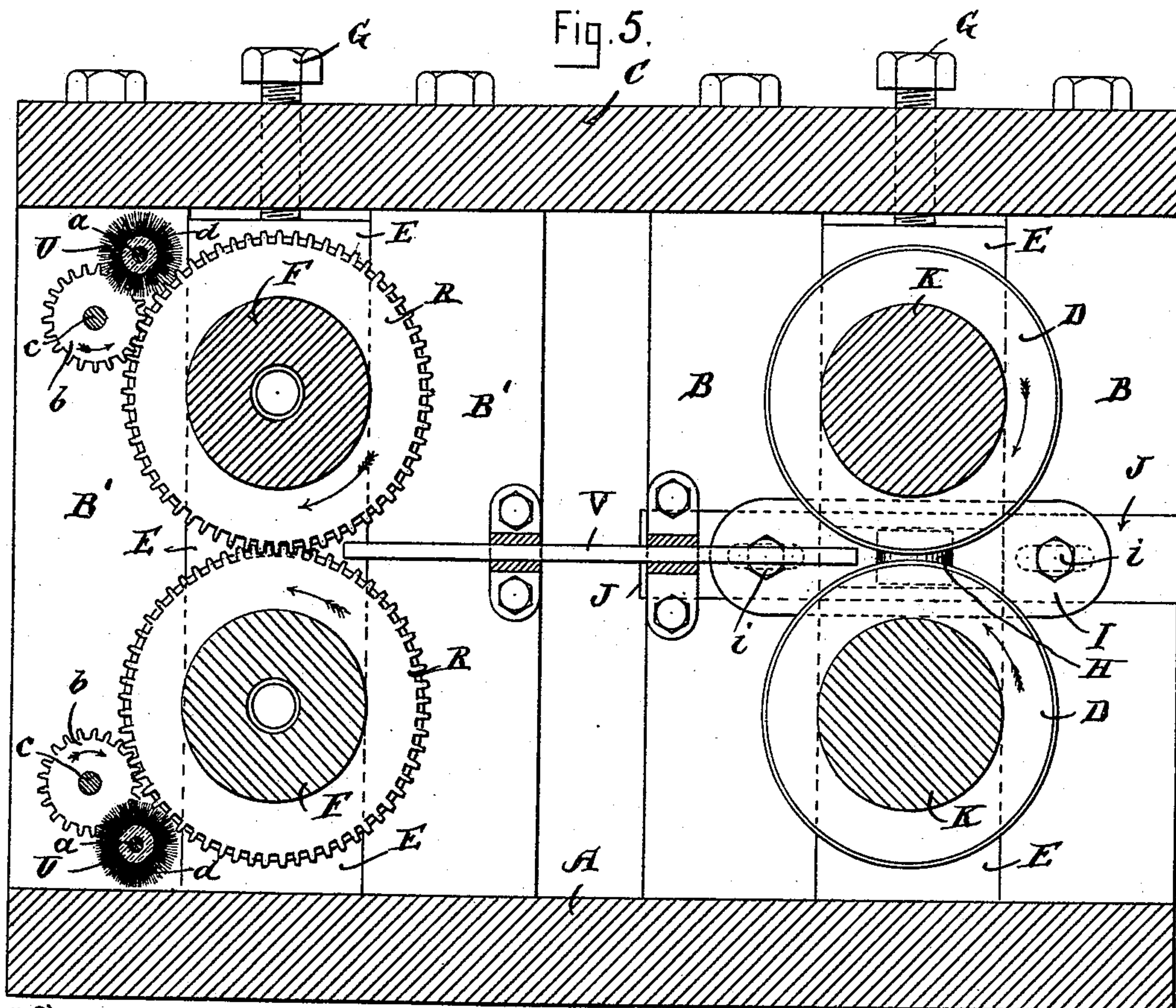


Fig. 5.



Witnesses.

George Betger
W. B. Ricker

Inventors.

Milton Chase
Matthew H. Foster
by C. Blanta
attorney

(No Model.)

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Fig. 8.

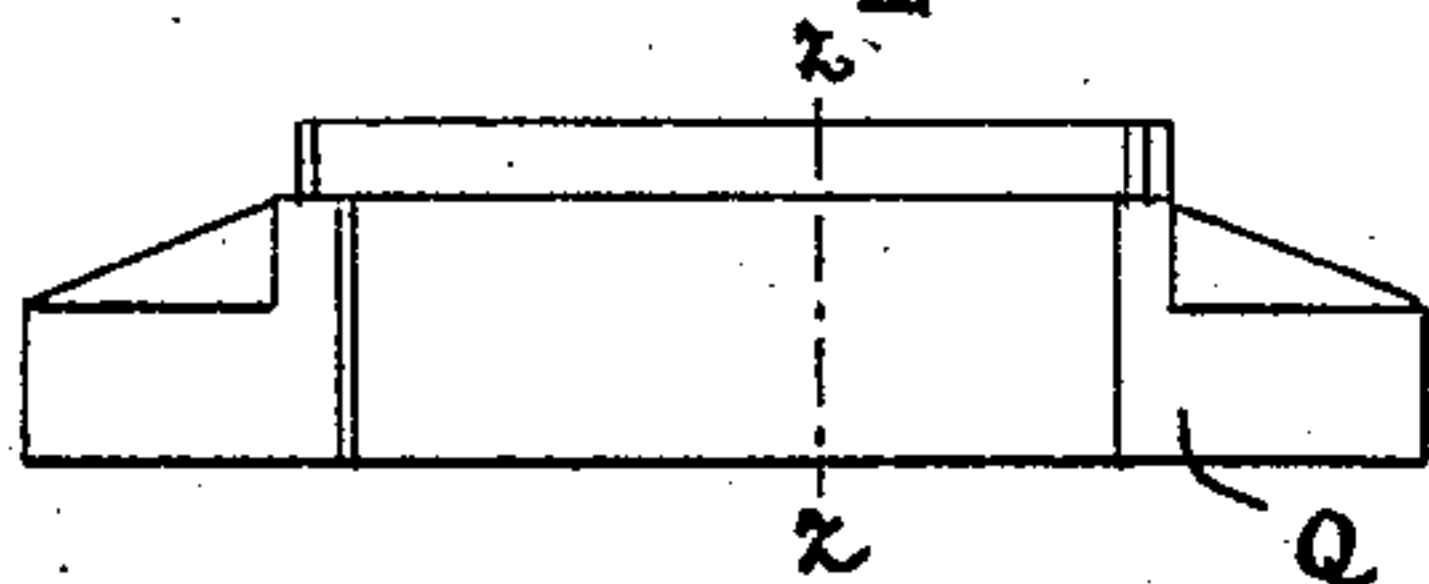


Fig. 9.



Fig. 10.

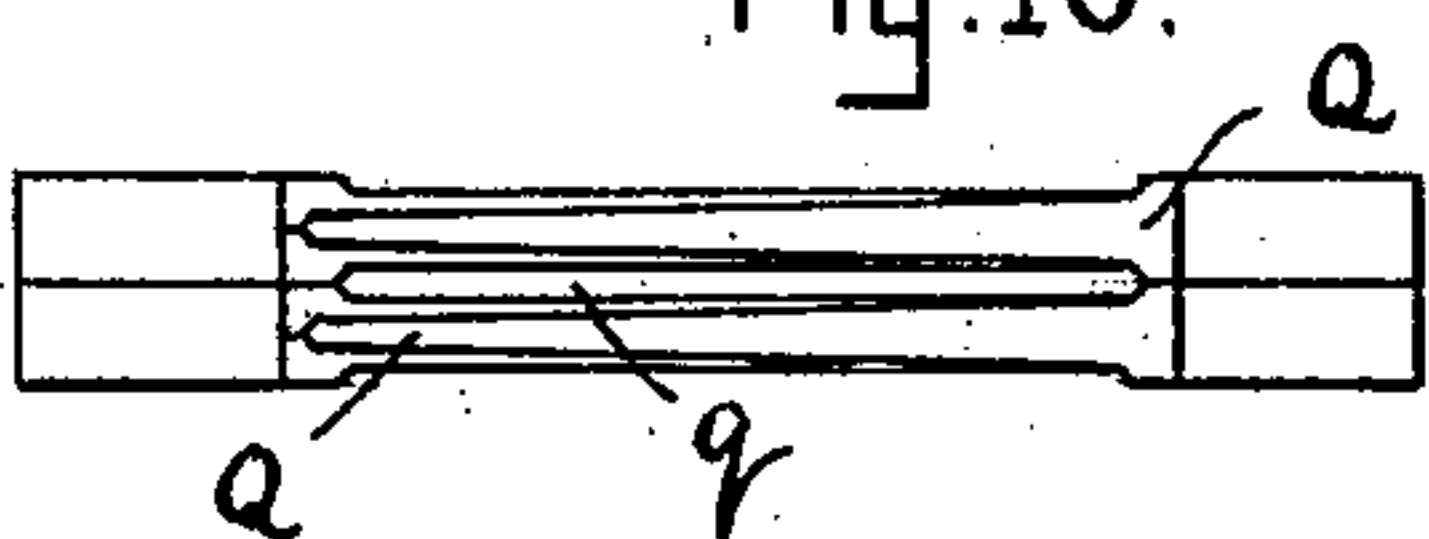


Fig. 11.

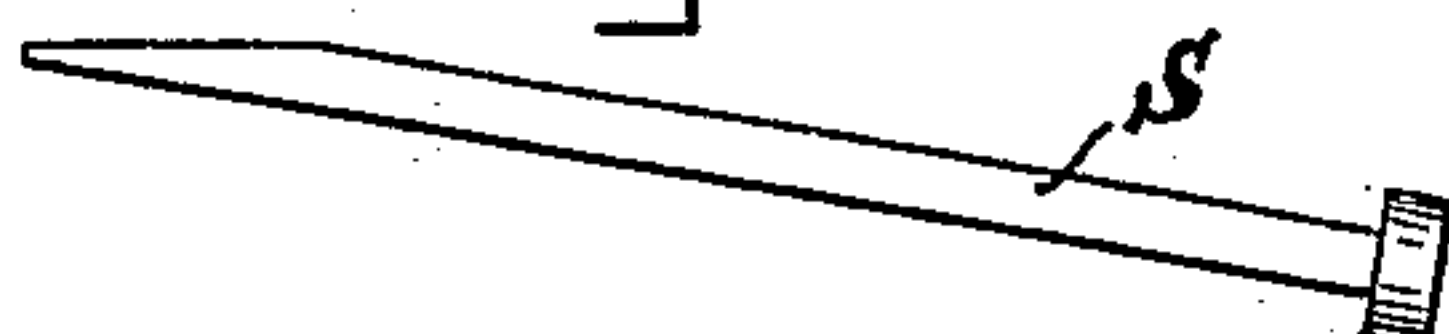


Fig. 12.

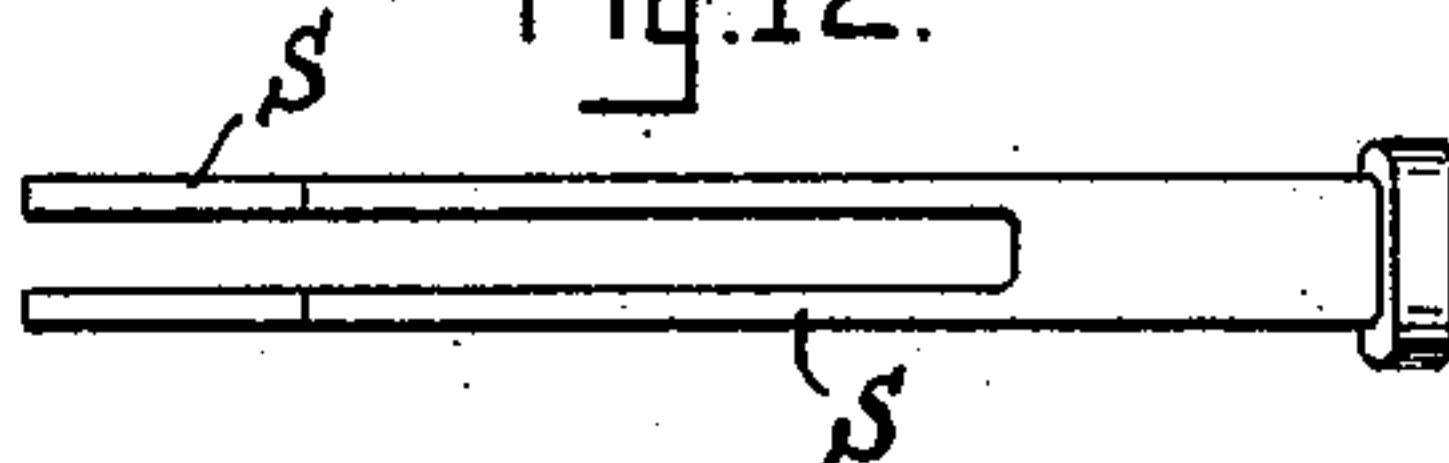


Fig. 13.

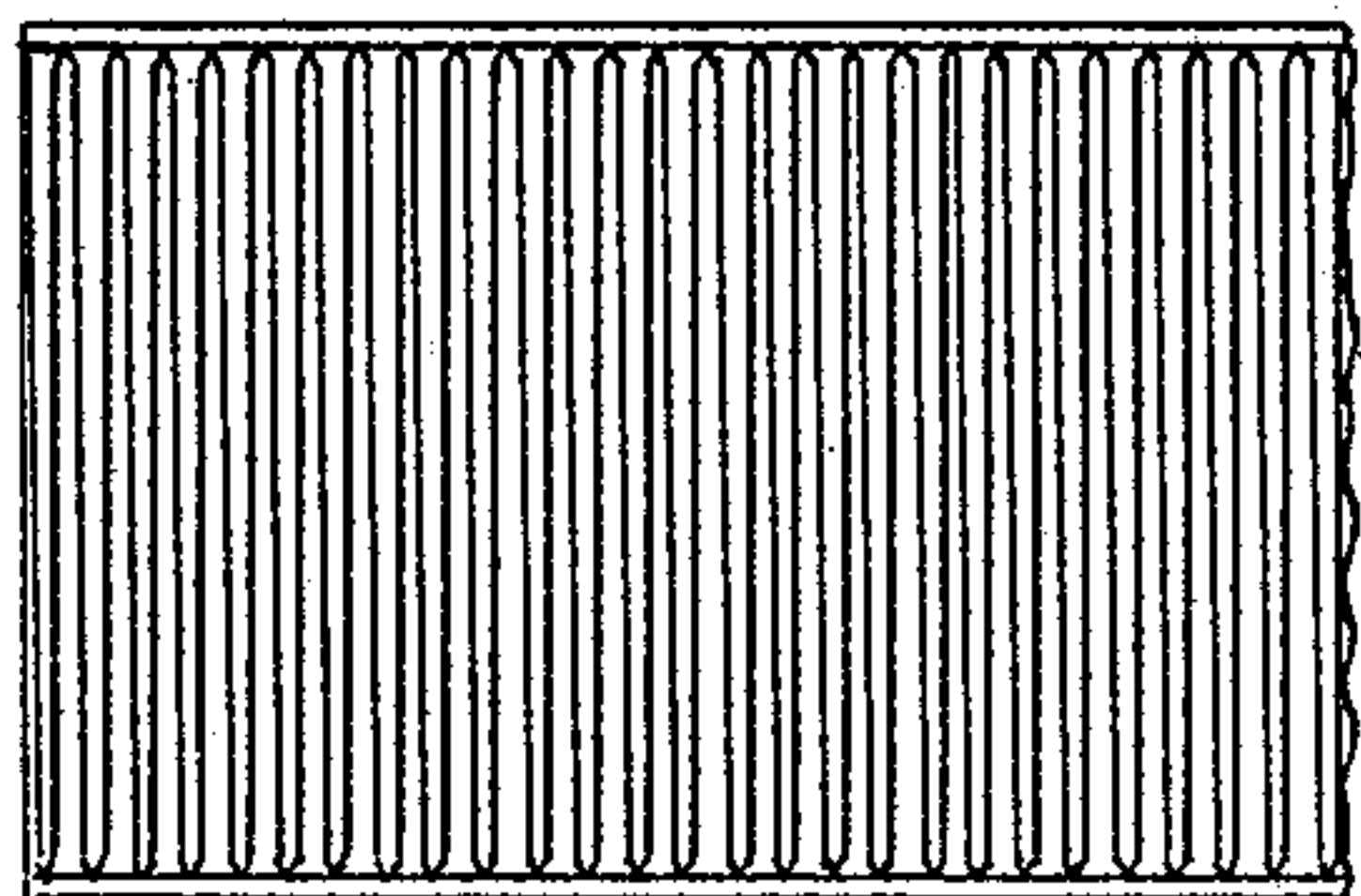
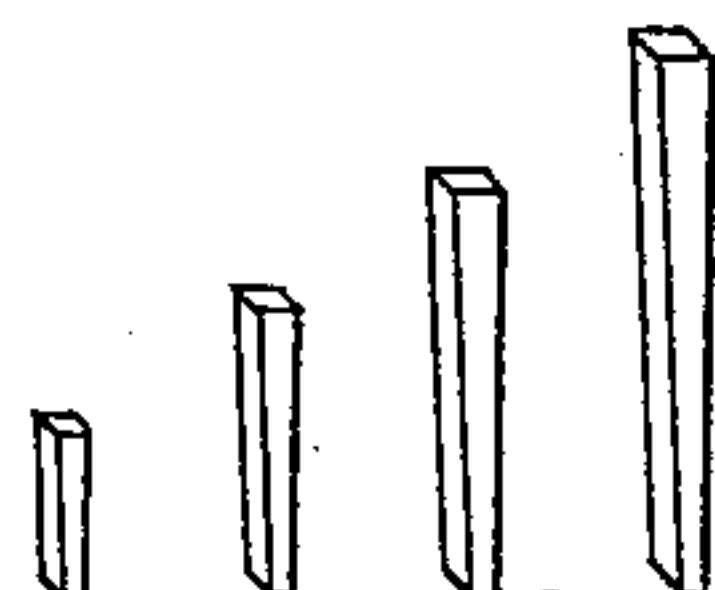
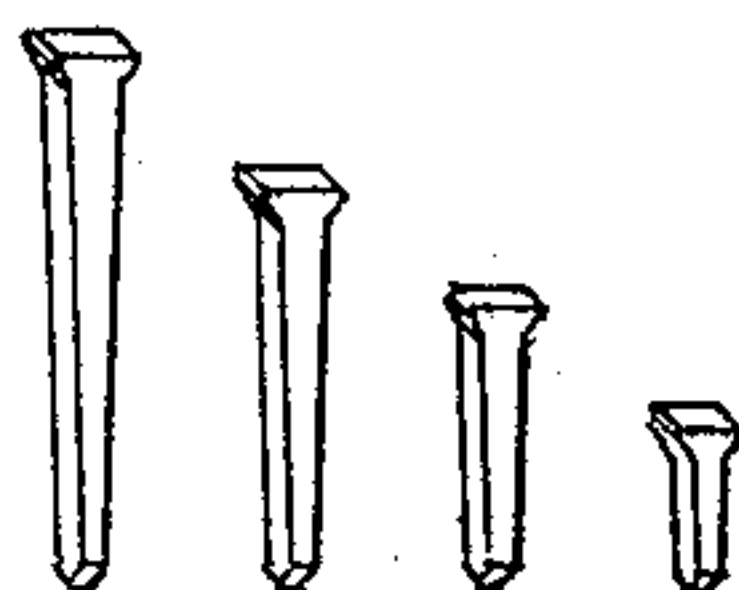
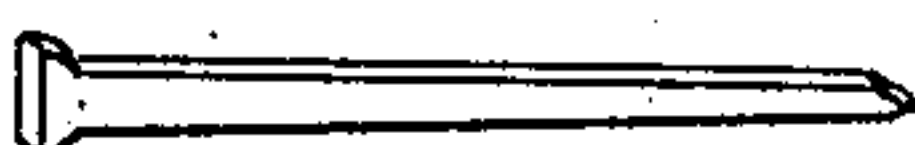
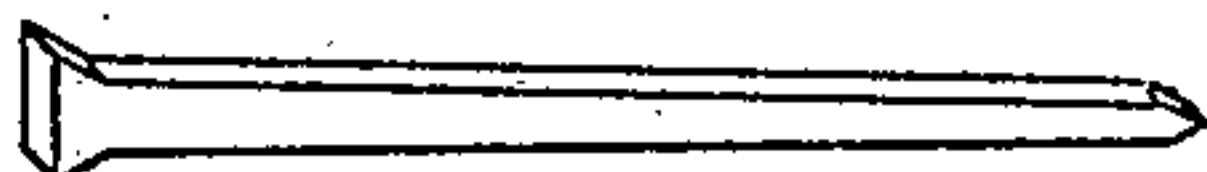
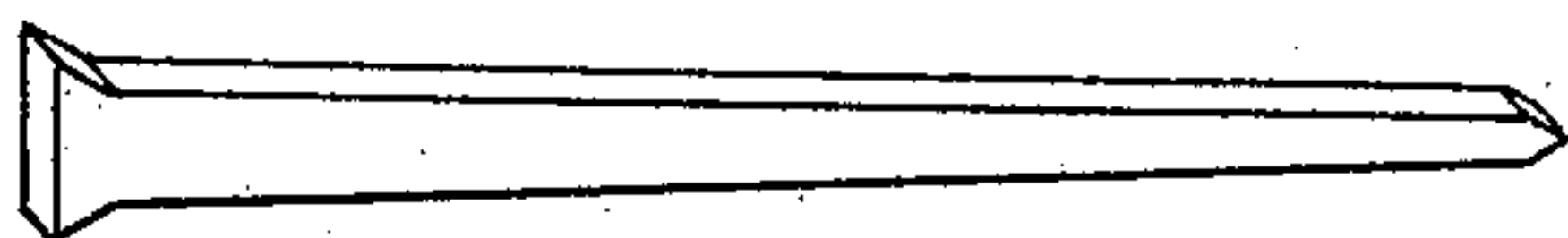
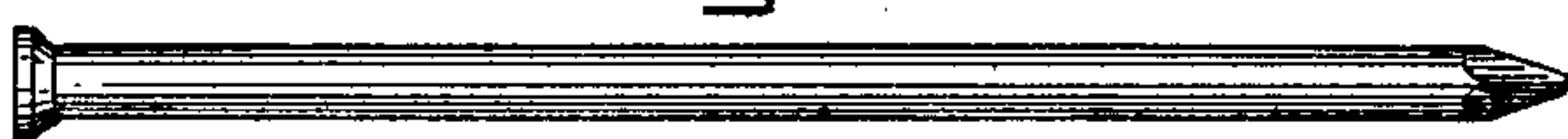


Fig. 14.



Fig. 15.



Witnesses.

J. George Seltzer
W. O. Ricker

Inventors.

Milton Chase
Matthew H. Foster
by E. Blanta
attorney.

UNITED STATES PATENT OFFICE.

MILTON CHASE AND MATTHEW H. FOSTER, OF HAVERHILL, MASSACHUSETTS,
ASSIGNORS TO THE COMBINATION NAIL MACHINE COMPANY, OF SAME
PLACE.

NAIL-MACHINE.

SPECIFICATION forming part of Letters Patent No. 397,068, dated January 29, 1889.

Application filed March 23, 1888. Serial No. 268,203. (No model.)

To all whom it may concern:

Be it known that we, MILTON CHASE and MATTHEW H. FOSTER, citizens of the United States, both residing at Haverhill, in the county of Essex and State of Massachusetts, have invented certain new and useful Improvements in Nail-Machines, of which the following is a specification.

The object of our invention is to produce a machine for making nails without waste of material, and much quicker, consequently cheaper, than with machines as now constructed.

The invention consists of two feed-rollers, whereby a plate of metal passing through them will be upset or compressed to partly form the nail, and of two rolls, each provided with a series of cutters or dies on its perimeter, arranged so that the dies on one cylinder or roll will fit into the space between those of the other cylinder or roll, so that the strip of metal fed between them will be cut up into perfect nails; and the invention further consists in certain details of construction, hereinafter fully described, and set forth in the claims.

Referring to the accompanying drawings, Figure 1 represents a side view of a nail-machine embodying our invention. Fig. 2 is a view of one end, showing the feed-rollers. Fig. 3 is a view of the other end, showing the dies or cutter-rolls. Fig. 4 is a transverse vertical section taken on line *x x* of Fig. 1. Fig. 5 is a longitudinal vertical section taken on line *y y* of Fig. 2. Fig. 6 shows in horizontal longitudinal section a modified form of clearers and operating mechanism. Fig. 7 shows the conformation of the feed-roller and dies for making wire nails from plates of metal. Fig. 8 is a side view of one of the dies or cutters. Fig. 9 is a section of same taken on line *z z* of Fig. 8. Fig. 10 is a plan or top view of two adjacent cutters. Fig. 11 is a side view of one of the clearers. Fig. 12 is a plan or top view of same. Fig. 13 shows a sheet of metal for wire nails after it has passed through the first set of feed-rolls. Fig. 14 is an end view of same. Fig. 15 shows some of the various kinds of nails that can be cut from a sheet of metal by our machine.

We will first describe the machine, as shown

in Figs. 1 to 6, as constructed to make nails similar to the ordinary cut nails.

The frame of the machine we prefer to construct as shown—viz., of a bed-plate, A, to which are secured on each side four standards, B B'. These are firmly held in place at the top by a plate or cap, C, bolted thereto.

The shafts K of the feed or heading rollers D D are mounted in suitable bearings, E E, (see Figs. 1 and 5,) secured between the standards B B, and the die or cutting rolls F F are mounted in similar bearings E E, secured between the standards B' B'. These bearings and rolls are placed in position before the plate or cap C is bolted on the lower bearings, resting upon the bed-plate A, and the upper bearings, being forced down by the bolts G, retain all the bearings and rolls in place.

The feed or heading rolls are slightly narrower than the strip of metal from which the nails are to be formed, and they are beveled on each edge, as shown in Figs. 2 and 5, so that the plate passing between them is upset or compressed to partly form the heads of the nails by the small rollers H H, mounted in suitable frames, I, secured to the inside of the standards B B, just opposite the point where the two feed-rollers D come nearest together. Each of these rollers H is adjustable nearer to or farther from the feed-rolls D by means of a wedge, J, fitting in a slot in the standards B B behind the frame I. The face of the wedge that is next to the frame I is straight, the slope forming the wedge being on the rear side of the opening in the standards B and formed on the same angle, so that when the wedge is pressed in it will force the frame I and roller H nearer to the feed-rollers B, but when drawn back the frame I and roller H will be farther from the feed-rollers. After the wedge has been adjusted so as to bring the roller H in the proper position, the bolts *i* are tightened up and securely hold them in place.

The feed or heading rolls may be made in one with or secured upon the shafts K, which at one end project beyond the bearings E and are each fitted with a worm-wheel, L. The die or cutting-rolls F are also provided with worm-wheels L. These worm-wheels are driven in the direction shown by the arrows (see Fig.

1) by worms M, upon a shaft, N, mounted in bearings P, secured to the sides of the standards B B', motion being imparted to the shaft N from any convenient source.

5 Upon the die or cutting rolls are mounted a series of cutters, Q, which are held in place by rings or collars R, secured to the rolls F on each side of the cutters Q by bolts *r*, that pass through oval holes formed in the flange
10 of the collars R, and through the heads of each of the bolts *r* is passed a small bolt, *s*, so that by tightening up the bolts *s* the collars R are forced into close contact with the cutters Q.

15 The cutters Q are arranged around the periphery of the rolls E so that a space is left between each the exact shape and size of the die, only in the reverse direction, (see Figs. 8 and 10, in which Q is the die and *q* the space,) 20 the dies on one roll fitting into the corresponding opening in the other roll, whereby a strip of metal that has been passed between the heading-rolls D D—being passed between them—is forced into a space between the cutters on one roll and then into a space between the cutters on the other roll, and so on, each
25 piece of metal so cut off forming a perfect nail.

To insure the rolls F running in perfect
30 unison with each other, we provide all the rings or collars B with teeth, thus forming cog-gears, which cause the rolls to run perfectly true, thereby preventing any tendency to twist or strain, as would be the case if the
35 gears were only on one side; and they also form guides for the strip of metal so that it cannot move sidewise, but must pass between the cutters in a perfectly straight direction.

40 To force the cut nails out of the dies we employ clearers S. (See Figs. 1, 4, 11, and 12.) These clearers are each provided with a head that works in a cam, T, secured to the bearings E, and the clearers pass through slots
45 cut in the side of the rings or collars R, so that they travel round with the rolls F and are drawn in by the cam T as they approach the center—that is, the part where the cutters come into contact with each other—so that they
50 will be below the lower edge of the nail after it is cut; but as the rolls revolve the clearers will be forced inward by the cam T and push the nail out from between the dies. These clearers are particularly applicable for short nails,
55 and we prefer to make two or more of them together with one head, as shown in Fig. 12.

For long slim nails we arrange the clearers as shown in Fig. 6, in which F is the roll, Q the dies, and R the collars. As before described, the roll is hollow, and into one end
60 an arm, *e*, projects. This arm is secured to one of the standards B, or other fixed part of the machine, and is provided with suitable bearings in which is mounted a shaft, *f*, the end of which is provided with a drum or disk, *g*. T' is a cam or ring of metal, which, may, if desired, be made flexible and in more

than one section. To the outer surface of this ring is secured a number of pins or clearers, S', that pass through holes formed in the roll
70 F and lower part of the dies Q, so that as the roll F revolves the pins or clearers S' will be drawn in on the side where the nails are being cut and forced out on the opposite side so as to push the nails clear of the dies,
75 the pulley *g* and shaft *f* being free to rotate with the cam or ring T', thereby preventing undue friction.

In case any nail should stick and not drop off readily, we provide circular brushes U, 80 preferably of wire, to brush off any adhering nails. These brushes are mounted upon shafts *a a*, journaled in the standards B', and are driven from the gears on the collars R, through gears *b b*, mounted upon shafts *c c*, 85 also journaled in the standards B', and gears *d d* on the shafts *a a*, as shown in Figs. 2 and 5.

To guide the plate as it passes from the heading-rolls D to the rolls F, and also to
90 prevent sagging or bending of the plate, we secure a tubular guide, V, between the rolls, as shown in Fig. 5.

To keep the die or cutting rolls F from heating, they are formed hollow, as shown in Fig. 95 4, and a tube, *k*, is inserted in one end. This tube remains stationary while the rolls revolve. This tube is provided with a central position so that cold water or air can be forced through the lower portion into the roll and
100 then escape out of the upper portion, as indicated by the arrows; or, if desired, the roll may be formed hollow its entire length, as in Fig. 6, in which case the cold air or water would be admitted on one side and escape on
105 the other.

To keep the face of the dies cool as they cut the nails, we force air onto the dies by means of a fan, W, (or it might be an air-pump, in which case the air would be colder,
110 being supplied under pressure,) a pipe, *w*, conducting the air to the surface of the dies.

When it is desired to form nails resembling the ordinary wire nails, we employ rolls with their surfaces formed as shown in Fig. 7, in
115 which the feed-rolls D' are recessed around their perimeters, as shown, so as to compress the strip of metal into nearly a round form as well as heading it, as before described, and then the strip of metal passing through the
120 die-rolls F' is cut off to form complete nails. In this case the clearers would not be required, the brushes U being sufficient to insure the finished nails leaving the dies.

Of course the feed-rolls and the dies would
125 have to be arranged according to the sort of nail required to be made, and instead of having the feed-rolls made to partly form the head the plates could be rolled at the mill into the required form, in which case only the
130 die-roller and their accessories would have to be employed.

What we claim as our invention is—

1. The feed-rolls D D, provided with bev-

eled edges, in combination with the rollers H, mounted in frames I, wedges J, and bolts i, substantially as and for the purposes set forth.

5 2. The rolls F, in combination with the dies Q and rings or collars R, for securing them in position, substantially as shown and described.

10 3. The clearers S and cams T, in combination with rolls provided with dies for cutting nails, substantially as shown and described.

15 4. In a nail-machine, a pair of feed-rolls and side rollers arranged to partly form the head of the nails jointly with the pair of rolls provided on their perimeter with dies arranged alternately with each other, so that the dies on one roll will fit into the spaces between the dies on the other roll, substantially as shown and described.

20 5. The feed-rolls D D and die-rolls F F, in combination with the worm-wheels L, worms M, and shaft N, whereby the feed and the die rolls are driven at the same speed, substantially as shown and described.

6. The brushes U and gears *d b*, in combination with the die-rolls F, dies Q, and collars R, substantially as and for the purposes set forth.

7. In combination with the die-rolls F and dies Q, a pump or fan, W, and pipe *w* for delivering a blast of cold air to the dies, substantially as shown and described.

8. In a nail-machine, a pair of feed-rolls the periphery of which is formed to partly shape nails on a strip of metal passed between them jointly with the pair of rolls provided with dies to cut and form complete nails from said strip of metal, substantially as set forth.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

MILTON CHASE.

MATTHEW H. FOSTER.

Witnesses:

FRANCIS H. PEARL,
JOSEPH H. PEARL.