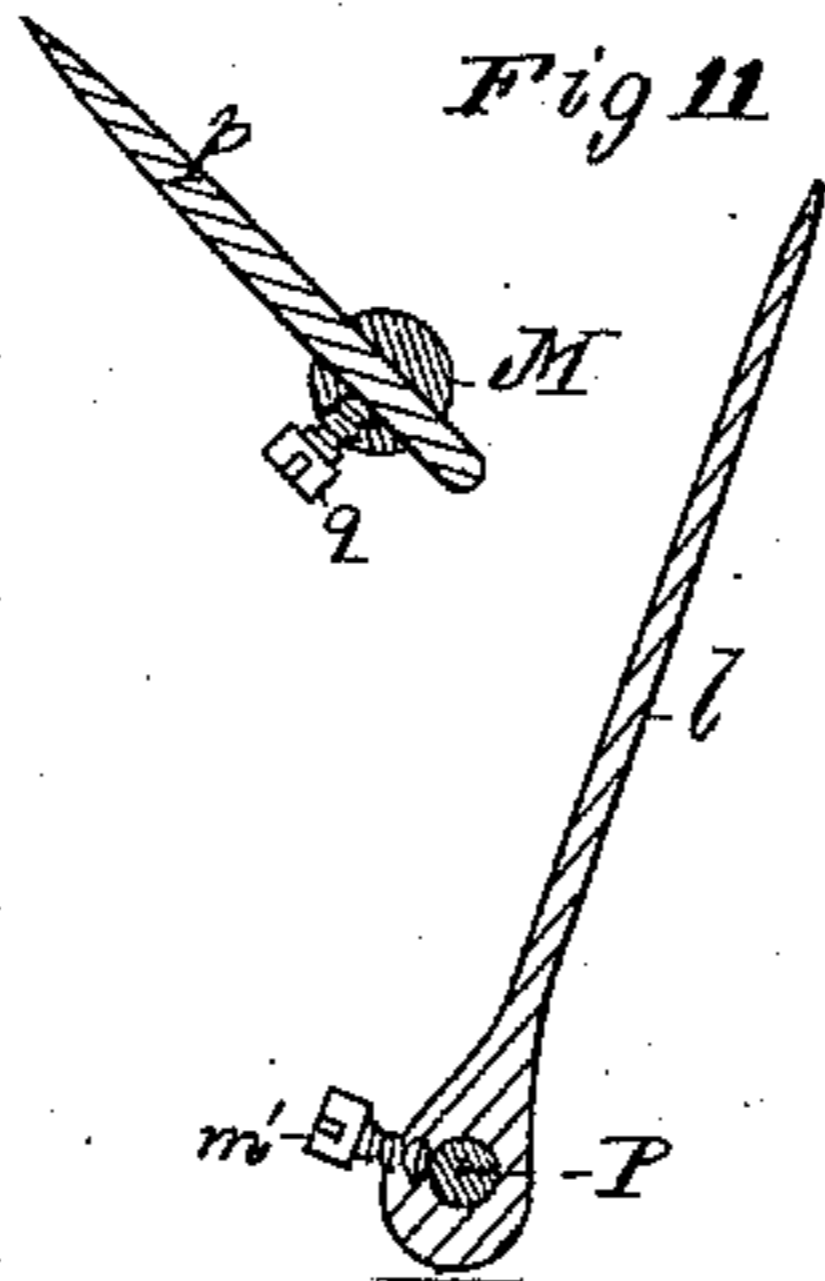
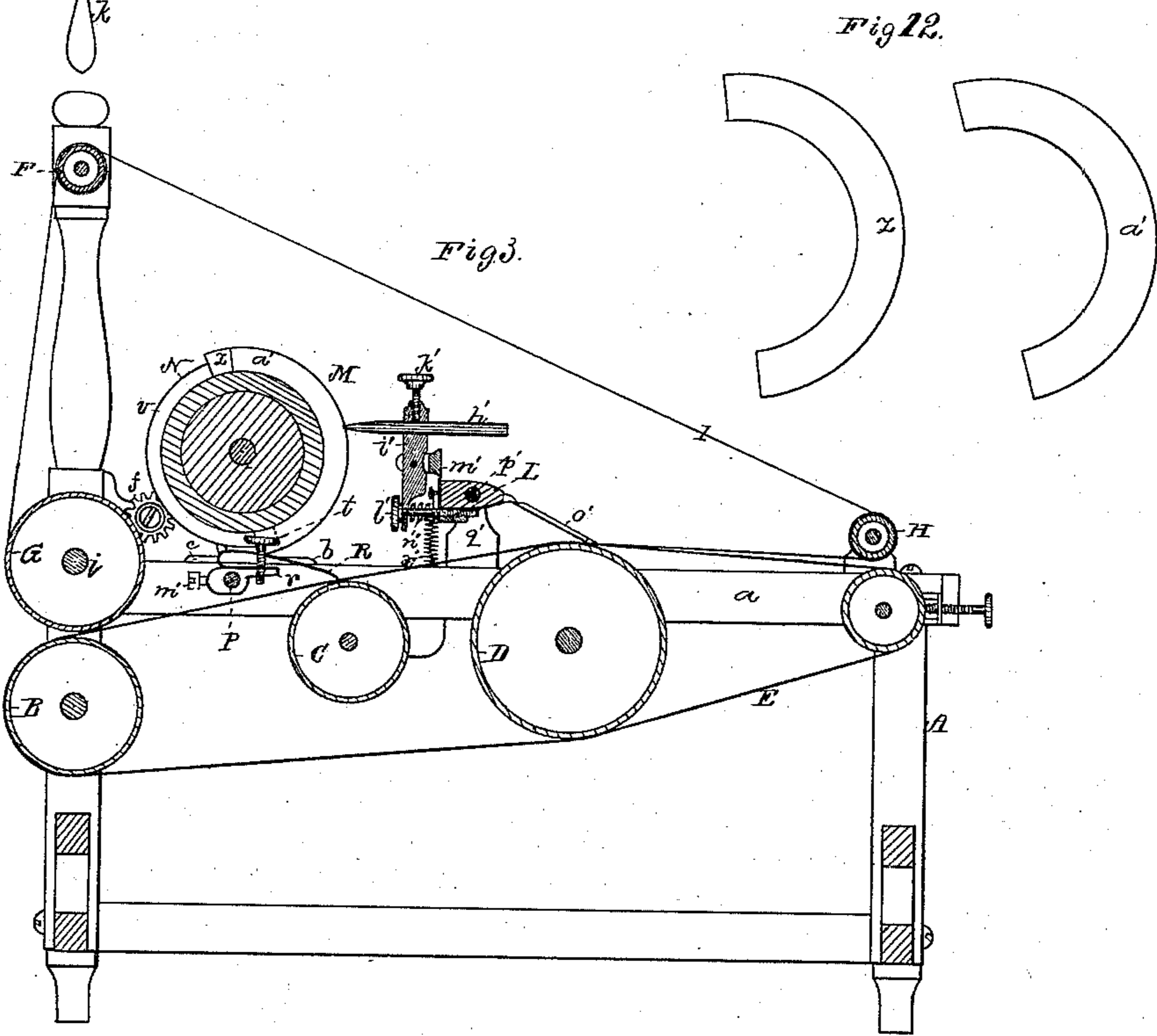
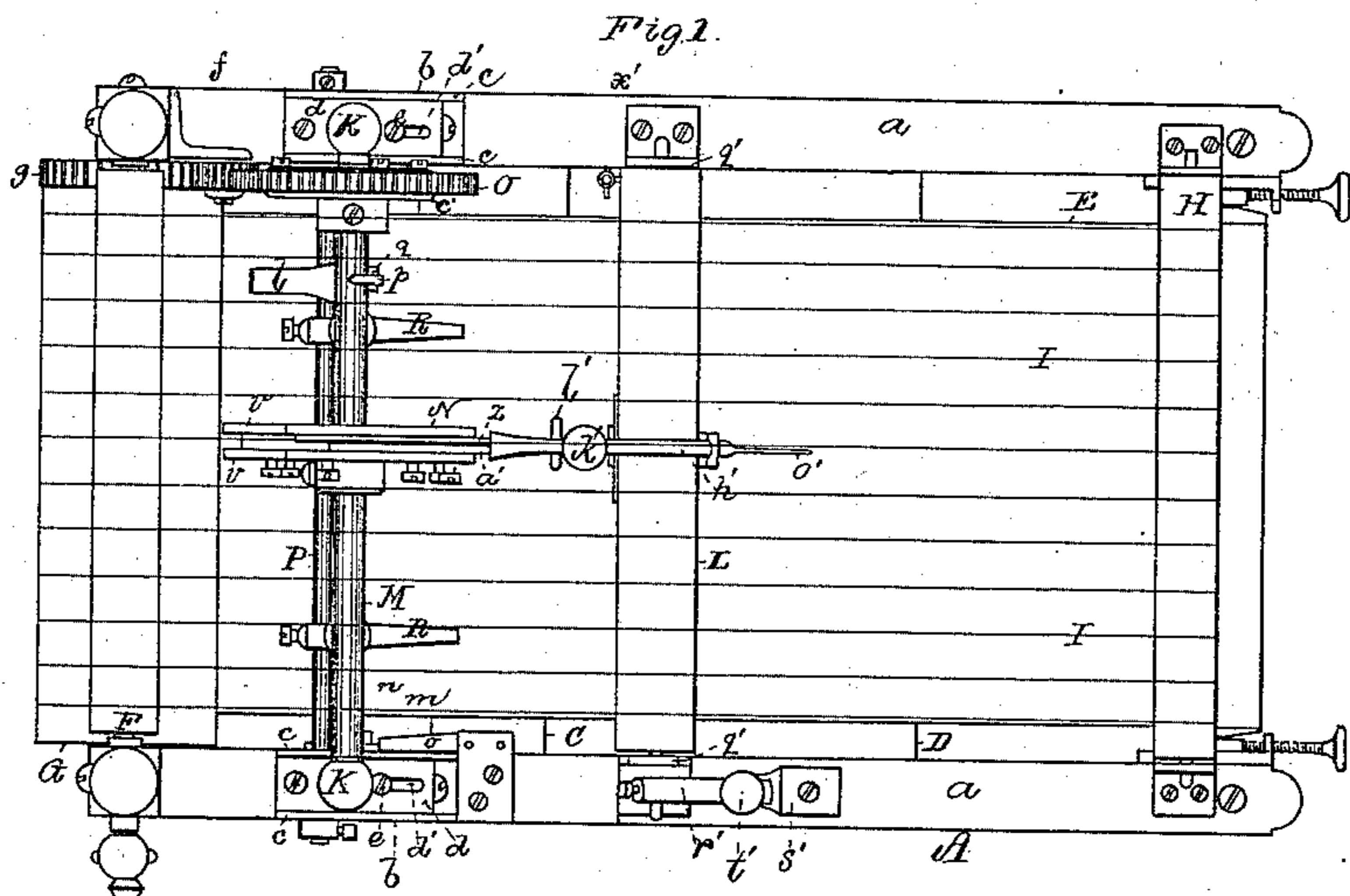


T. F. & F. H. COLLINS.
Paper-Ruling Machines.

No. 157,715.

Patented Dec. 15, 1874.



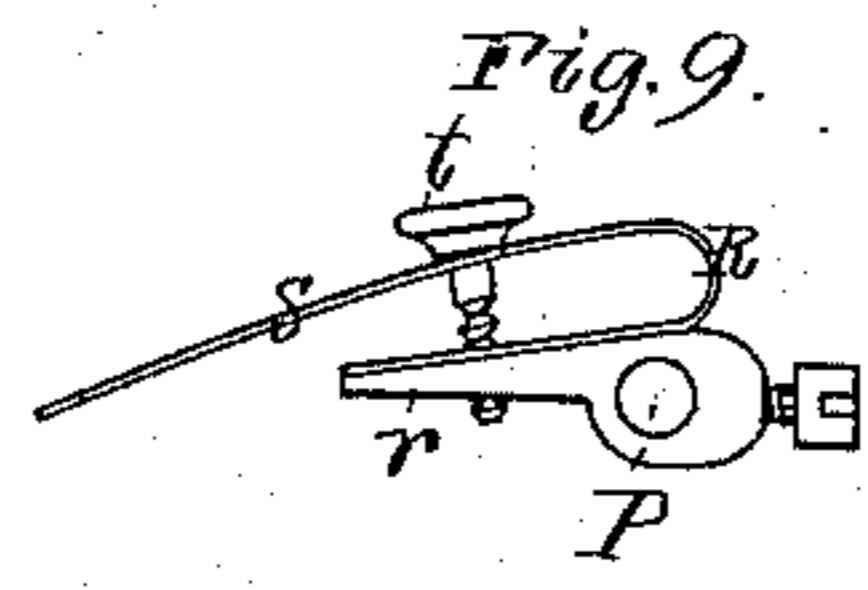
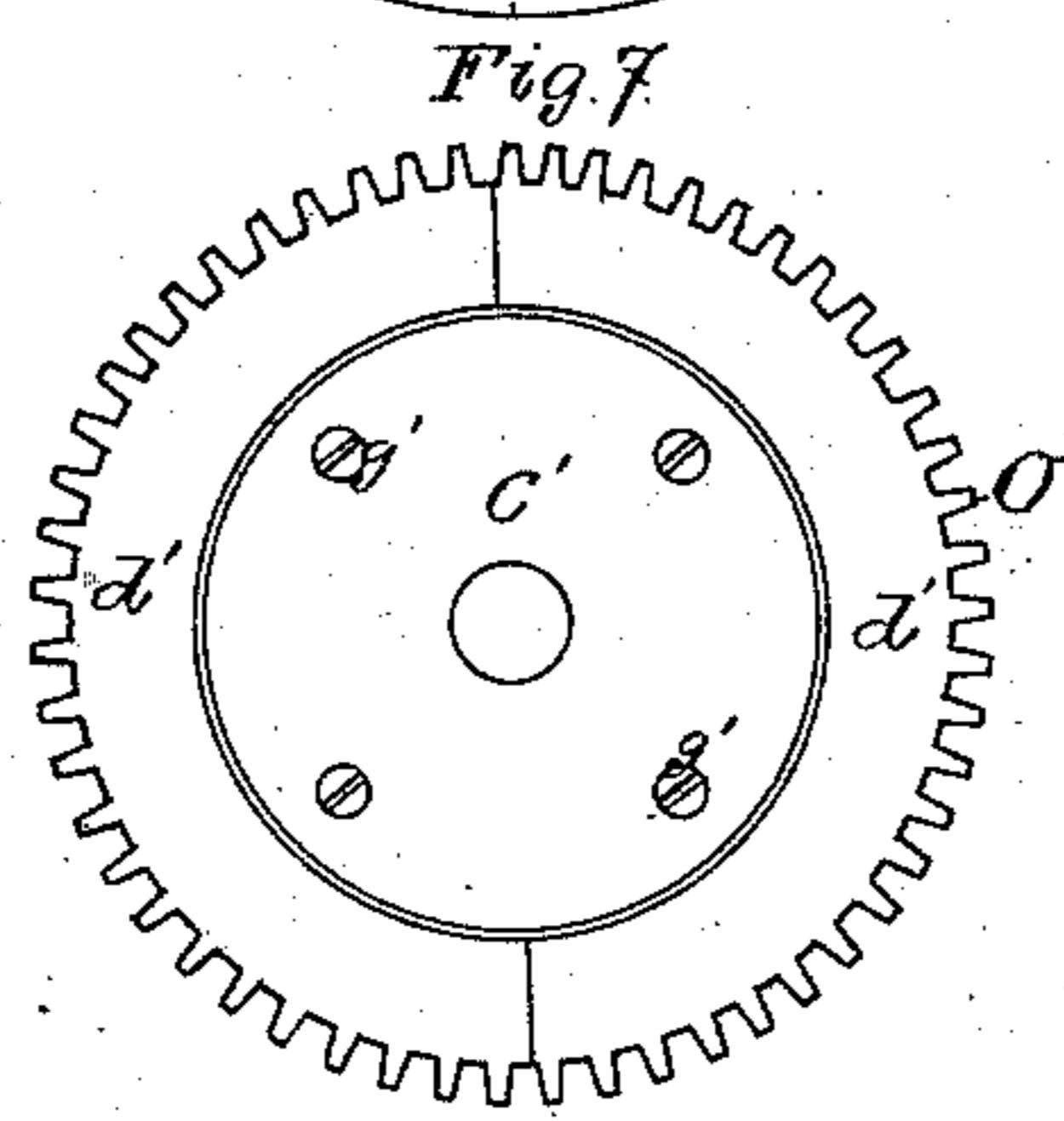
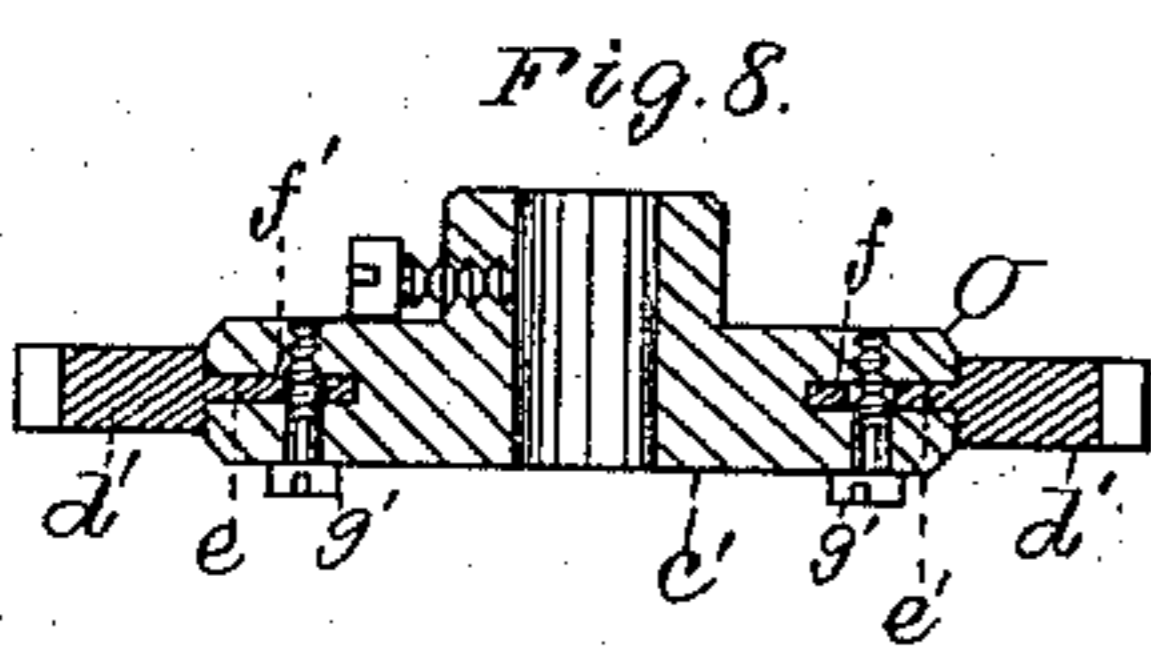
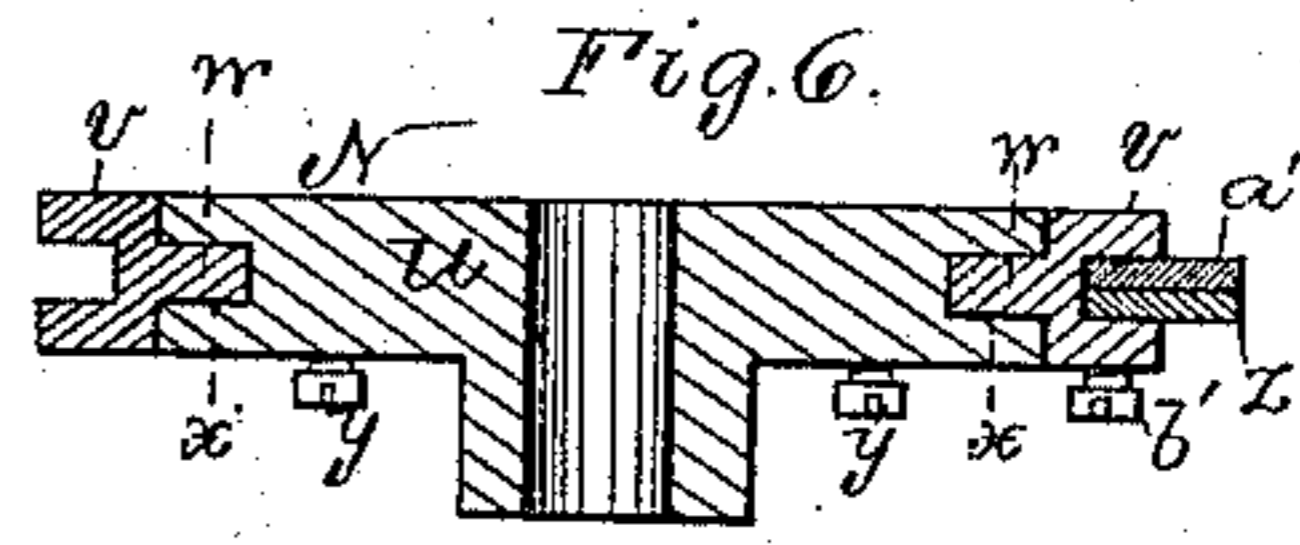
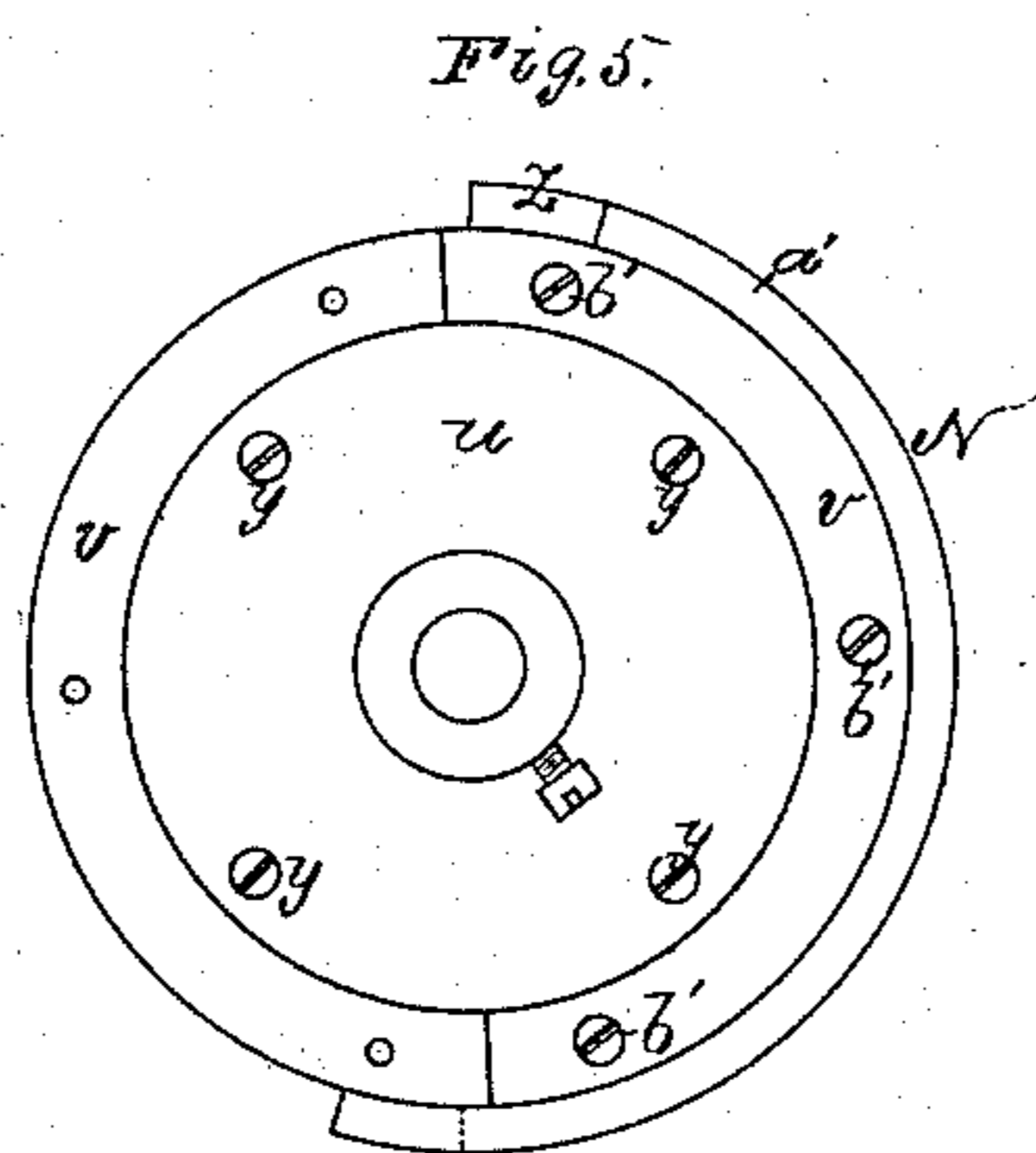
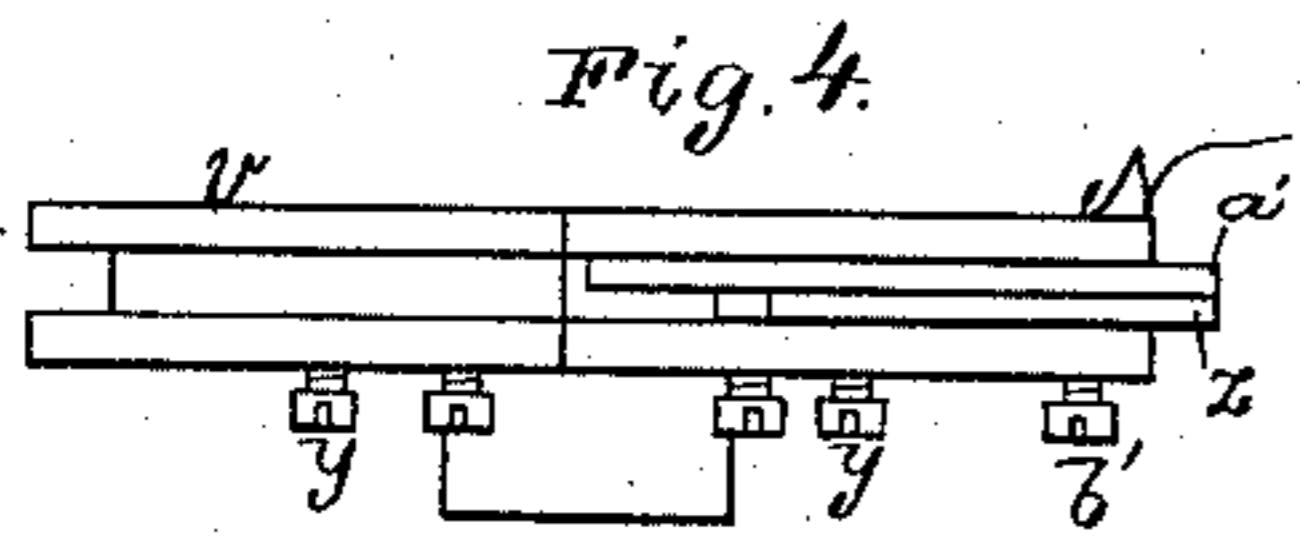
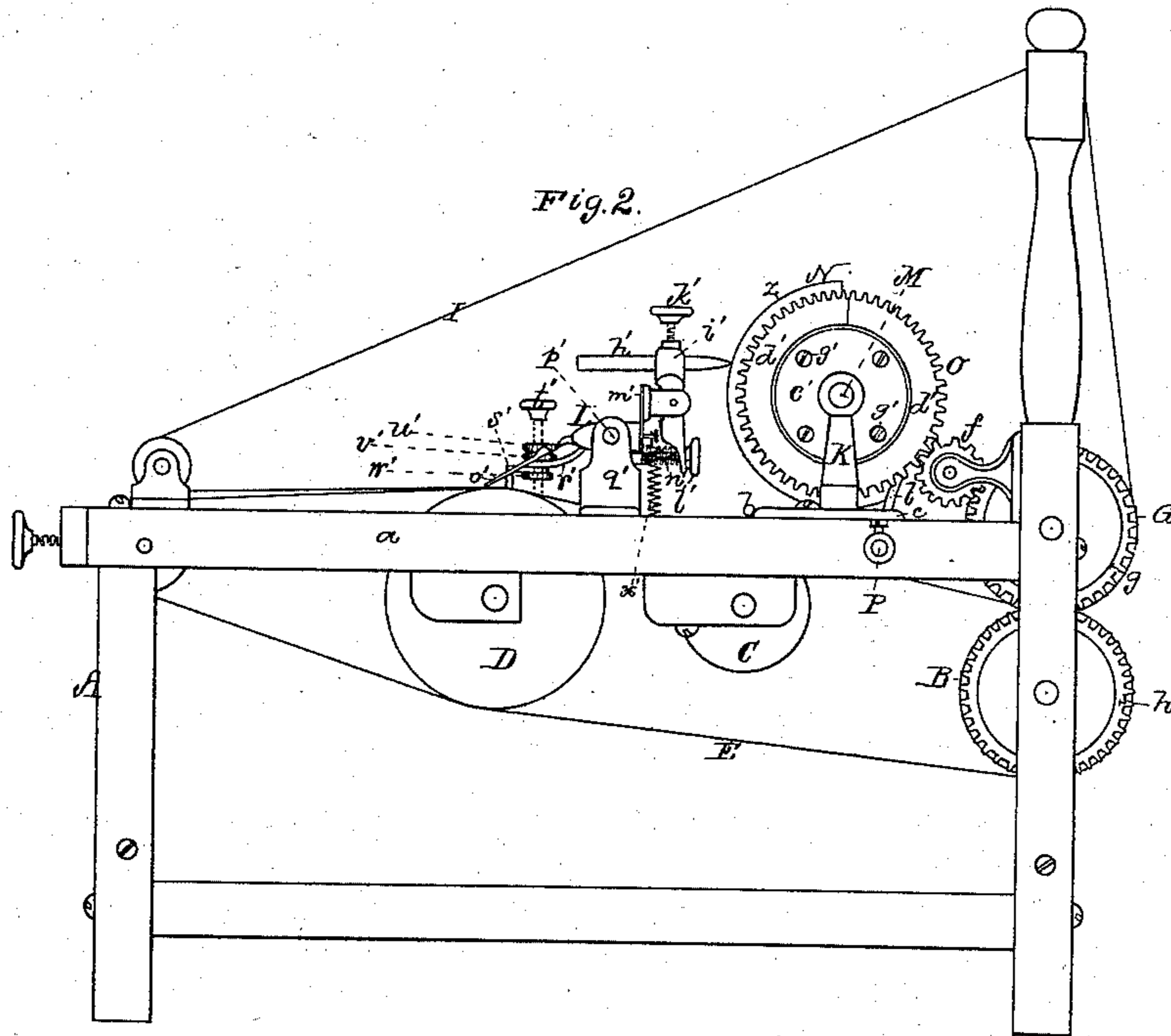
Witnesses
S. N. Piper.
L. N. Holden.

Tyrannus F. Collins.
Franklin H. Collins.
by their attorney
N. H. Selby

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S. W. Piper

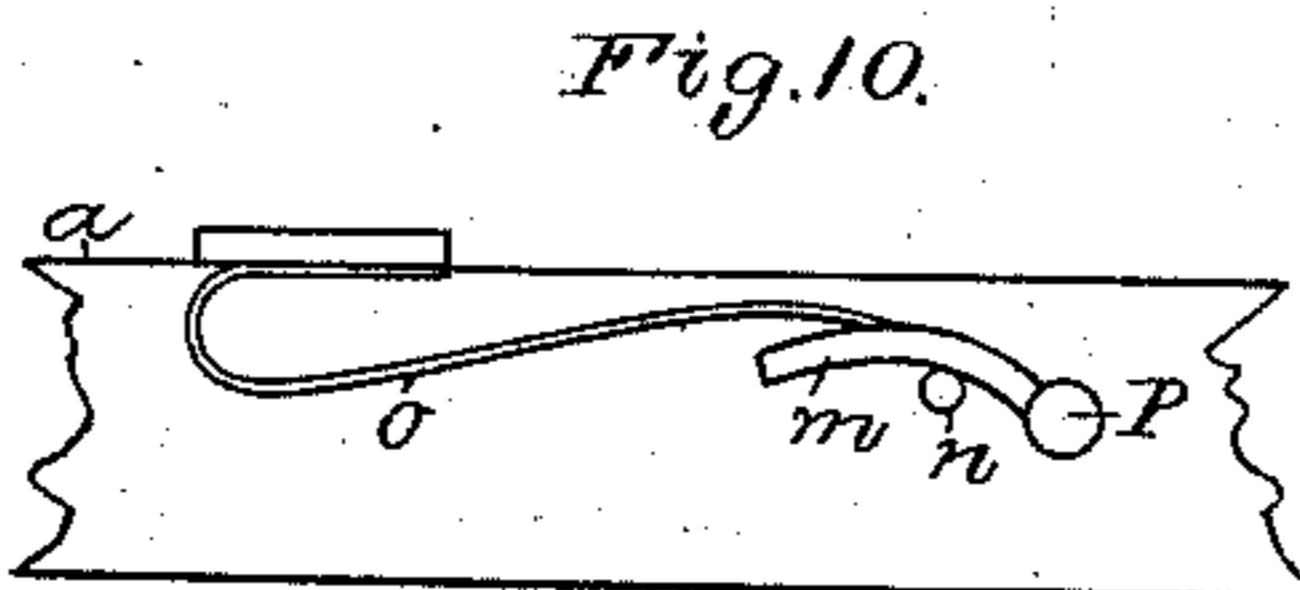
L. N. Holen

Tyrannus F. Collins.

Franklin H. Collins.

by their attorney.

R. H. Sedy



UNITED STATES PATENT OFFICE.

TYRANNUS F. COLLINS AND FRANKLIN H. COLLINS, OF BOSTON, MASS.

IMPROVEMENT IN PAPER-RULING MACHINES.

Specification forming part of Letters Patent No. **157,715**, dated December 15, 1874; application filed August 27, 1874.

To all whom it may concern:

Be it known that we, TYRANNUS F. COLLINS and FRANKLIN H. COLLINS, of Boston, of the county of Suffolk and State of Massachusetts, have invented new and useful Improvements in Paper-Ruling Machines; and do hereby declare the same to be fully described in the following specification and represented in the accompanying drawings, of which—

Figure 1 is a top view, Fig. 2 a side elevation, and Fig. 3 a longitudinal section, of a ruling-machine having our invention. Fig. 4 is a top view, Fig. 5 a side elevation, and Fig. 6 a transverse section, of the changeable cam-wheel. Fig. 7 is an outside elevation, and Fig. 8 a transverse section, of the changeable gear of the shaft of the cam-wheel. Fig. 9 is a side view of one of the elastic stop-fingers.

In the said drawings, A denotes the frame of the machine, it having arranged within it, in manner as shown, and as in other ruling-machines, three rolls or rotary cylinders, B C D, and an endless apron, E, going around them, all being as represented. The said frame also carries and supports three other rollers or rotary cylinders, F G H, one or more of which is, or may be, provided with a number of grooves extending entirely around it, and for the reception of a series of endless bands, I, all being disposed as shown. Each roller has its shaft-journals supported in suitable bearings in or applied to the frame. There are fastened on the top rails *a a* of the frame two plates, *b b*, each of which is provided with two parallel flanges, *c c*, extended upward from it. Between and against the flanges of each plate is the base *d* of one of two vertical posts, K K, such base being slotted, as shown at *d'*, and held down to the plate *b* by means of a clamp-screw, *e*, the whole being to enable the foot to be adjusted either nearer to or farther from the pen-bar L, as occasion may require. In bearings in the upper parts of the posts K K a shaft, M, is supported, such shaft having fixed upon it the changeable cam-wheel N and gear O, to be hereinafter described. The said gear engages with a spur-pinion, *f*, which in turn engages with the upper of the two gears *g h*, by which the rollers B and G are geared together, so as to revolve

at a like speed. The power to drive the machine is to be applied to the shaft *i* of the roller G by a crank, *k*, or by other suitable means. Below the shaft M, and extended across the frame, is the stop-finger shaft P. This shaft has an arm, *l*, projecting upward from it. It also has a shorter arm, *m*, projecting from it, over a stationary stud, *n*. A spring, *o*, fixed to the frame, bears downward upon the arm *m*.

Fig. 10 is an inner side view of the arm *m*, stud *n*, and spring *o*. Fig. 11 is a vertical section of the arm *l*, its shaft, and the adjustable wiper *p* and its shaft M, the arm *l* being applied to its shaft so as to be capable of being turned thereon, it being fixed to the shaft by a set-screw, *m'*. The wiper *p* slides through the shaft M, which is furnished with a set-screw, *q*, for fixing the wiper in position.

The shaft P supports the adjustable sustaining-arms *r* of a series of stop-fingers, R, each being composed in part of a spring, *s*, which is curved, as shown in Fig. 9, and is bent down at its front end, and has a gage-screw, *t*, which goes down through it and screws into the arm *r* beneath it, as shown, such arm *r*, screw *t*, and spring *s* constituting the adjustable stop-finger. The changeable cam-wheel N is composed in part of a wheel, *u*, (grooved around its circumference,) and two semicircular arcs, *v v*, each of which, on its main periphery, is provided with a tongue, *w*, to enter and fit to the groove *x* of the said wheel *u*. The two grooved and tongued arcs are held, in connection with the wheel *u*, by a series of set-screws, *y*, screwed into the wheel *u* and against the tongues of the arcs. The cam-wheel is further composed of two arcal cams, *z a'*, each being formed as shown in side view, Fig. 12. These two cams are placed side by side in the circumferential groove of the arcs *v v*, and are held in place by set-screws *b'*, screwed into either or both the arcs, each arc being provided with a series of tapped screw-holes to receive such screws.

By this arrangement of the arcal cams they may be moved, one on the other, within their sustaining-groove and adjusted and fixed in place therein, as circumstances may require, for determining the length of traverse of the ruling-pens.

The changeable gear O consists of a wheel, c' , grooved around its circumference, and two semicircular toothed arcs, $d' d'$. Each of said arcs has a tongue, e' , to enter the groove f' of the carrying-wheel c' , set-screws g' serving to hold the tongue in the groove.

In some cases it may be desirable to use a pair of toothed and tongued arcs having a radius greater or less than that of the pair shown, in order to produce the requisite rotary motion of the cam-shaft, particularly when the grooved arcs of the cam-wheel are removed from its carrying-wheel, and a pair of arcal cams of less radius are inserted in the carrying-wheel in the place of said grooved arcs, all of which may be done.

An adjustable chisel-shaped finger, h' , extending through a lever, i' , bears at its rear end against the periphery of the cam-wheel, such finger being fixed in the upper arm of the lever by a set-screw, k' . This lever, pivoted to the pen-bar L, has an adjusting-screw, l' , going through its lower arm, and being screwed into the pen-bar or the pivot-carrier m' fixed thereto, there being around the screw, and between the lever and the said carrier m' , a helical spring, n' .

From the pen-bar a series of ruling-pens is to be projected, in the usual manner, one of said pens being shown at o' .

From the shaft P' of the pen-bar, whose journals are supported in standards q' , an arm, r' , extends to and over a bracket, s' , arranged as shown. A screw, t' , arranged vertically, screws down through the bracket, and goes through the arm r' , there being arranged on said screw three nuts, $u' v' w'$. The lowest of these nuts serves as a check-nut to confine the screw to the bracket. The uppermost of said nuts answers as a check-nut to confine the middle nut at any desirable altitude on the screw, the middle nut serving as a stop to determine the upward movement of the pens.

With this machine a sheet of paper may be ruled between desirable distances from its opposite edges—that is to say, the machine may be adjusted so as to have the ruling commence at a given distance from one edge, and terminate at a given distance from the opposite edge—such being effected by so adjusting the arcal cams $z a'$ that the outer extremity of one shall be at the necessary arcal distance from that of the other.

After a sheet of paper may have been introduced into the machine for the purpose of being ruled, such sheet will be moved forward until its front edge may abut against the hooks of the stop-fingers, which will hold the sheet from advancing farther. The endless apron and band continuing to revolve, the sheet will not move forward until the fingers are raised by means of the action of the wiper p on the arm l .

At or about the time the fingers may be

raised to allow the sheet to advance, the chisel-shaped finger h' will drop off one terminus of the duplex cam of the cam-wheel, in order to enable the pens to be raised off the preceding sheet at the termination of ruling it.

The sheet to be ruled will next advance, until the other end of the duplex cam of the cam-wheel may be carried around into contact with the finger h' . The cam-wheel continuing to revolve, its duplex cam, by its action on the finger h' , will cause the pens to be depressed upon the paper at the proper distance from its front edge. As the paper may continue to advance it will be ruled until the finger h' may drop off the cam, when the pens will be thrown up by the retractive power of a spring, x' , fastened to the frame A, and the rear part of the pen-bar, the ruling ceasing at the proper distance from the rear edge of the sheet.

By means of the lever i' , adjusting-screw l' , and spring n' , combined with the pen-bar L, and the chisel-shaped finger h' , arranged with the cam-wheel as described, the pens can be adjusted so as to strike the paper, and depart from it at the proper times, whatever may be the speed of the cam-wheel.

By means of the adjustable wiper p and adjustable arm l , applied directly to the shafts M and P, as set forth, we overcome the objection incident to ruling-machines whose stop-gates are operated in part by a cam on the shaft of the needle or pen roller of the endless apron.

As such pen-roller is revolve by the friction of the apron, its proper surface speed cannot be depended on, it being liable to be more or less irregular, and thus to render the ruling so.

The wiper p and arm l , combined with the two shafts M and P, render positive the action of the stop-fingers and the pens, so that the pens are caused to commence and leave off the ruling at the precise positions desired.

We claim as our invention in the said ruling-machine as follows:

1. The combination of the levers i' , adjusting-screw l' , and spring n' with the chisel-shaped finger h' , and the pen-bar arranged with the cam-wheel, as set forth.

2. Each adjustable stop-finger R, as composed of the bent and hooked spring s , its support-arm r , and the adjusting-screw t , arranged and combined substantially as set forth.

3. The adjustable wiper p and arm l , combined with the cam-wheel and stop-finger shafts M and P, all substantially as and to operate as specified.

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FRANKLIN H. COLLINS.

Witnesses:

R. H. EDDY,
J. R. SNOW.