

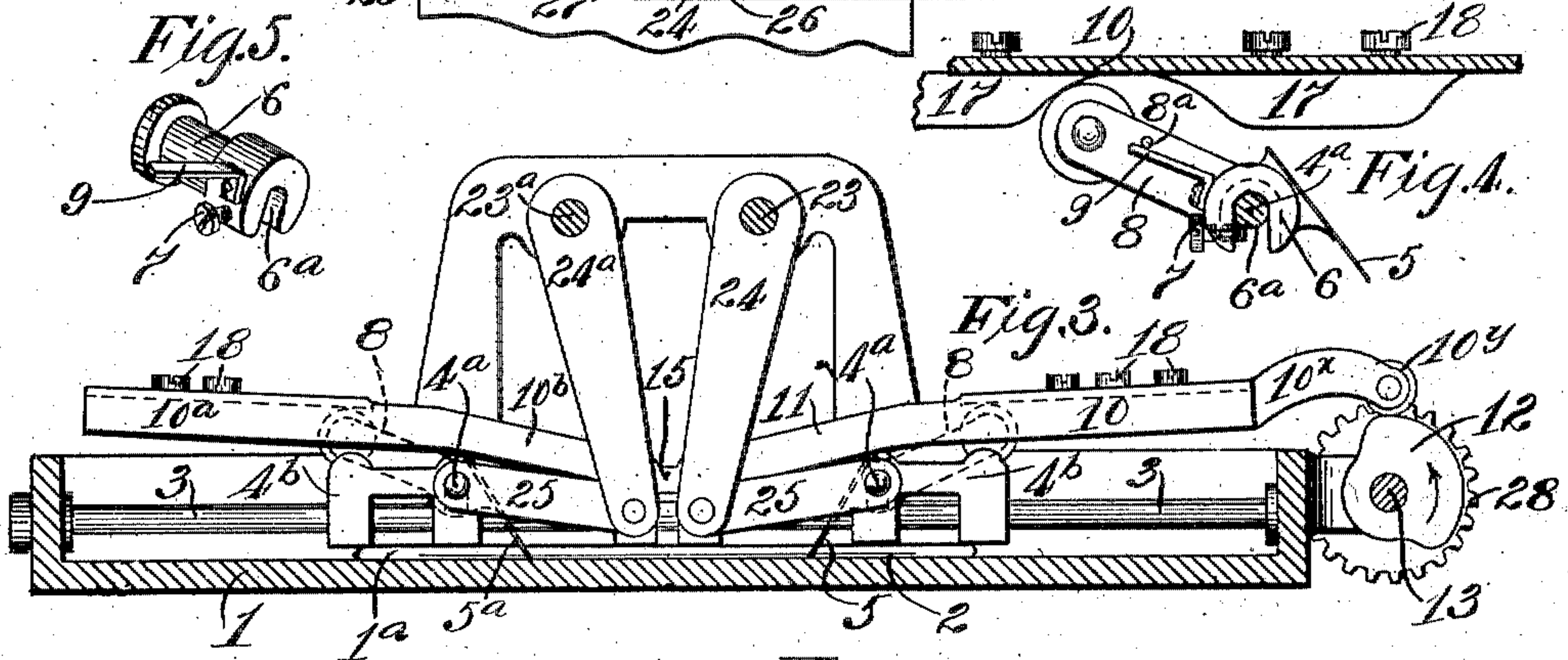
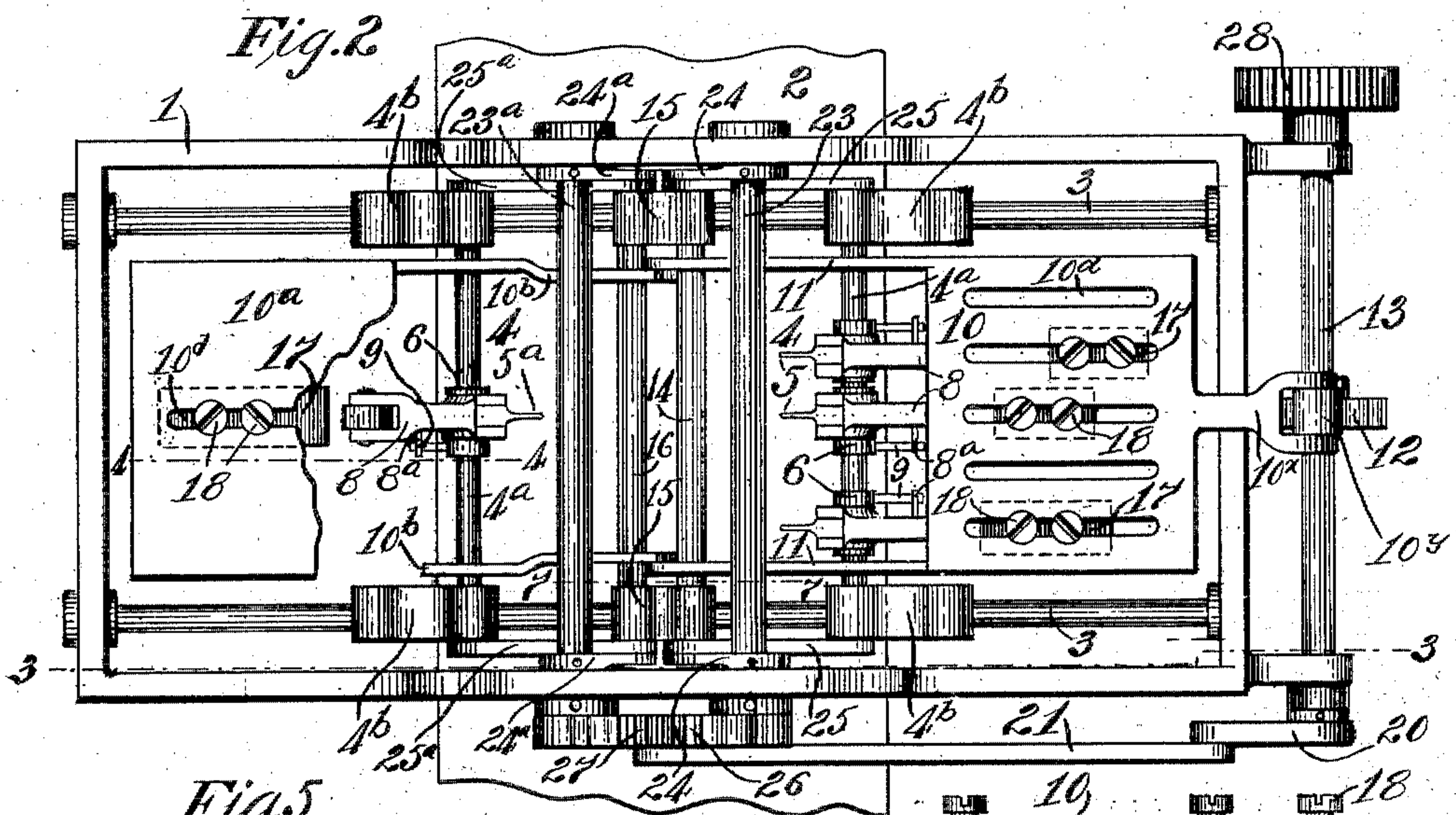
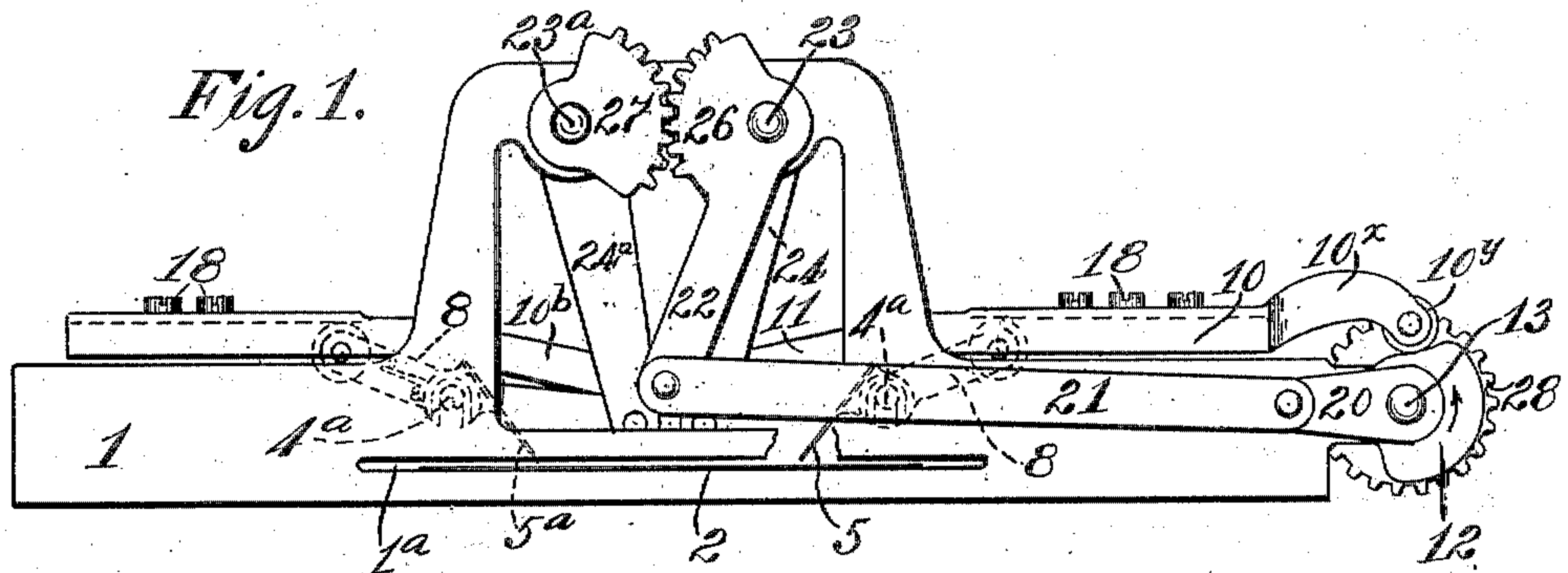
No. 760,017.

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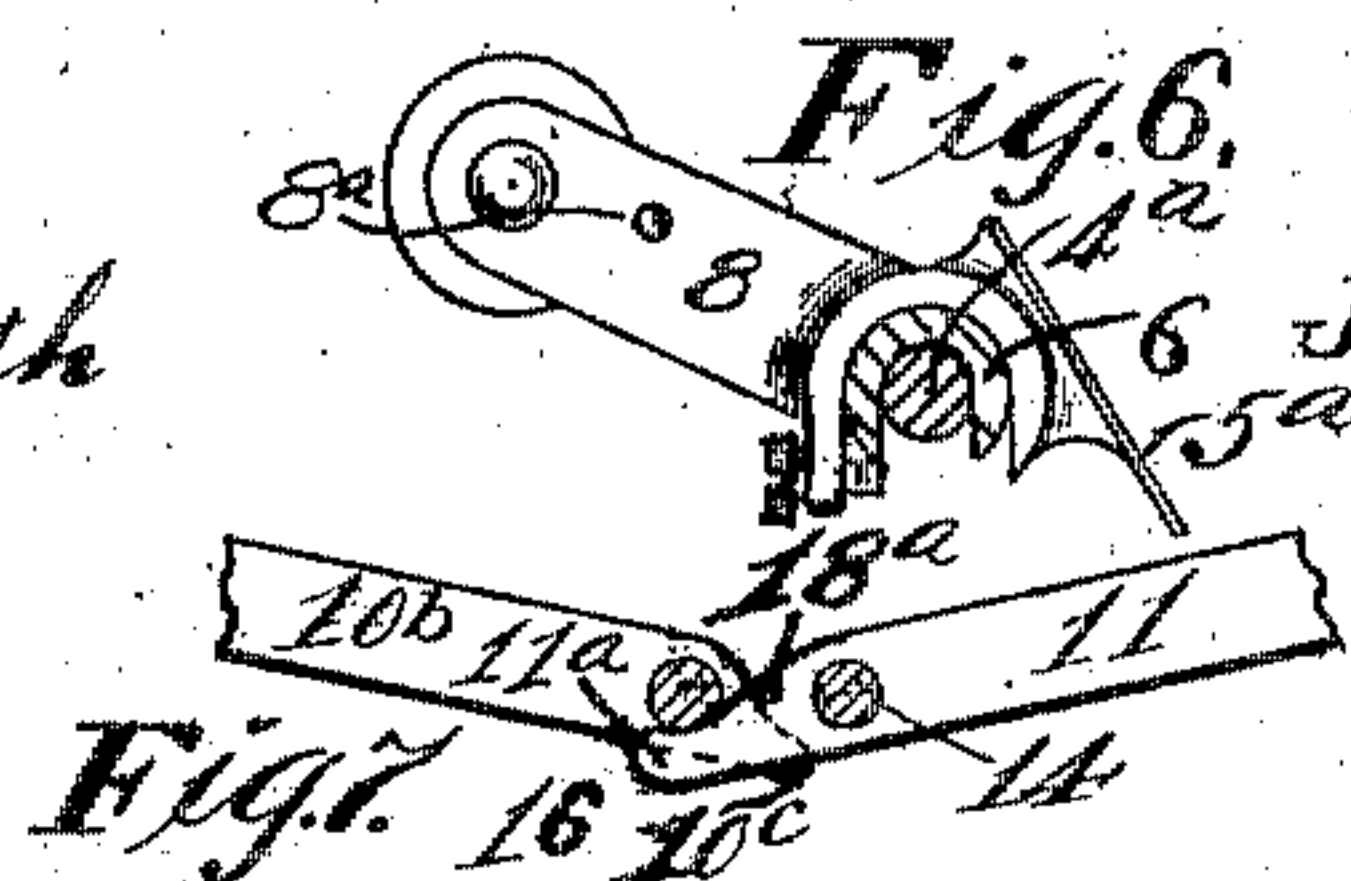
J. H. REINHARDT.  
RULING MACHINE.

APPLICATION FILED MAR. 16, 1903.

NO MODEL.



WITNESSES:  
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# UNITED STATES PATENT OFFICE.

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## RULING-MACHINE.

**SPECIFICATION** forming part of Letters Patent No. 760,017, dated May 17, 1904.

Application filed March 18, 1903. Serial No. 147,941. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES H. REINHARDT, a citizen of the United States, and a resident of East Orange, Essex county, New Jersey, have invented certain new and useful Improvements in Ruling-Machines, of which the following is a specification.

My invention relates to improvements in machines for ruling paper and the like, and is particularly applicable to ruling "down" lines on bill-heads, or the lines running perpendicularly to the cross or "faint" lines. Heretofore, so far as I am aware, it has been customary to rule down lines on bill-heads independently of the press upon which the bill-heads are printed; and it is the object of my invention to provide a machine which may be used and operated in conjunction with a printing machine or press in such manner that while bill-heads are being printed the down lines may be simultaneously ruled, whereby to afford a saving in the cost of producing bill-heads.

In carrying out my invention I provide a suitable frame with means for supporting and operating one or more ruling-pens and means for causing the latter to engage and rule the paper while moving in one direction and to be lifted free from the paper while moving in the reverse direction, the arrangement being such that the machine may be connected with and operated by a suitable part of a printing press or machine—such, for instance, as shown in Patent No. 721,236, granted to me on February 24, 1903—and in such relation to such machine that the paper either before or after being printed will pass through or across my improvements, so as to be ruled simultaneously with the printing operation.

My invention also comprises the novel details of improvement and arrangements of parts that will be more fully hereinafter set forth and then pointed out in the claims.

Reference is to be had to the accompanying drawings, forming part hereof, wherein—

Figure 1 is a side view, partly broken, of a machine embodying my improvements. Fig. 2 is a plan view thereof, part being broken

away. Fig. 3 is a sectional view substantially on the line 3 3 in Fig. 2. Fig. 4 is a detail sectional view substantially on the line 4 4 in Fig. 2. Fig. 5 is a perspective view of part of the means for supporting the pen. Fig. 6 is a sectional detail view of the pen-supporting means, and Fig. 7 is a detail view taken on the line 7 7 in Fig. 2.

Similar numerals of reference indicate corresponding parts in the several views.

The numeral 1 in the drawings indicates generally a frame which may be of suitable construction and which is provided on opposite sides with slots or passage-ways 1<sup>a</sup> to permit the passage across frame 1 of sheets or strips of paper or the like 2 to be ruled. Said frame is preferably of such construction to enable it to be readily attached to or used in connection with a printing press or machine of suitable construction and of the type having an intermittent motion for producing printing impressions. The frame 1 is provided with guides 3, upon which are mounted one or more frames 4, adapted to reciprocate to carry one or more ruling-pens 5 5<sup>a</sup>. The frames 4 I have shown comprise a transverse rod 4<sup>a</sup> and heads or blocks 4<sup>b</sup>, mounted to slide upon the guides 3. The pens 5, which may be of any suitable or well-known construction for ruling purposes, are carried by the frames 4 in such manner as to descend and act upon the paper 2 during one stroke and to pass freely over the same on the return stroke, and for this purpose I have shown an arrangement as follows: To the rods 4<sup>a</sup> of the frames 4 are adjustably and removably secured sleeves 6, which are shown provided with slots 6<sup>a</sup> to permit their ready adjustment to said rods, and screws 7 hold them in place upon said rods, whereby said sleeves may be adjusted to suitable distances apart along said rods. Upon the sleeves 6 are pivotally mounted arms or levers 8, to which the pens 5 5<sup>a</sup> are secured by any suitable means, and the arms 8 are held by a spring or weight in such position that the pens may engage the paper 2. For this purpose I have shown springs 9, carried by the sleeves 6, bearing against pins 8<sup>a</sup> on



the arms 8 and tending normally to raise the arms and depress the pens. Means are provided to coact with the arms 8 to control the action of the pens upon the paper 2, and to this end I have shown a plate 10, lying above the arms 8 and adapted when depressed or in the downward position to engage said arms and cause them to rock to lift the pens from the paper and whereby when the plate is raised the arms will be free to rise to permit the pens to engage the paper. The plate 10 is shown supported by arms 11, pivotally carried within frame 1, and at 12 is indicated a cam adapted to actuate the plate 10 at the proper time. An extension 10<sup>x</sup> from plate 10, having a roller 10<sup>y</sup>, coacts with cam 12. The cam is shown carried by a shaft 13, supported in suitable bearings in frame 1, and the arrangement is such that during one part of the rotation of cam 12 the plate 10 will be lifted to permit the pens 5 to engage the paper 2, and during another part of the rotation of said cam the plate 10 will descend and cause the pens to be lifted from the paper, and such actions take place during the reciprocations of the pens. The arms 11 are shown pivotally supported upon a rod 14, carried by fixed supports 15 on guides 3.

In the example of my invention illustrated I have shown means for simultaneously operating two sets of pens, as 5 5<sup>a</sup>, for the purpose of ruling simultaneously down lines on opposite sides of the strip or paper 2, whereby the paper 2 after being ruled can be slit or cut into separate bill-heads. The means of supporting the pen or pens 5<sup>a</sup> are substantially the same as that described with respect to the pens 5, and a plate 10<sup>a</sup>, corresponding to the plate 10, is pivotally supported above the arm 8 of pen 5<sup>a</sup> by means of arms 10<sup>b</sup>, pivoted upon a rod 16, carried by the supports 15. To operate both plates 10 10<sup>a</sup> simultaneously by cam 12 and to support said plates in their normal inoperative positions, the inner ends 11<sup>a</sup> 10<sup>c</sup> of said arms pass under the opposite rods 16 14, respectively, (see Fig. 7,) and a pin 18<sup>a</sup>, carried by one arm, as 11<sup>a</sup>, and connecting with the opposite arm, as 10<sup>a</sup>, and above the same, as shown in Fig. 7, provides an arrangement whereby as cam 12 raises plate 10 the arms 11, rocking on their pivotal rod 14, will cause the arms 10<sup>b</sup> to correspondingly raise plate 10<sup>a</sup>, (such operation of both plates being substantially simultaneous,) and when the cam releases plate 10 both plates will simultaneously descend. The operation of arm 8 of pen 5<sup>a</sup> with respect to plate 10<sup>a</sup> is similar to that before described with respect to arms 8 of the pens 5 in connection with plate 10.

In Fig. 2 I have shown a plurality of pens 5 and a single pen 5<sup>a</sup>, although such relation may be reversed, and this is for the purpose of showing that a single pen or a plurality of

pens may be used simultaneously on either side. It will also be understood that a pen or pens on either side of the machine may be used while the pen or pens on the opposite side are not used when it is desired to rule but one side or portion of a strip or paper 2.

In some cases it will be found desirable to cause a pen or pens to start or stop ruling at a different point relatively to another pen or pens to produce correspondingly long and short lines and also interrupted or broken lines, according to the character of the special ruling to be made. To produce such results, I provide means for independently controlling the action of the pens, and to this end I have shown cams or projections 17, carried by the plates 10 10<sup>a</sup> in line with the arm or arms 8. These cams or projections 17 may be of suitable length and have suitable shape to cause the corresponding arms 8 to rock to the desired extent and at the desired time. The cams or projections 17 are also preferably made adjustable in the direction of the stroke of the pens, and to this end I have shown the plates 10 10<sup>a</sup> slotted at 10<sup>d</sup> to receive screws 18, that connect with the cams or projections 17 and pass through said slots. The cam or projection 17 will be placed in line with the desired pen or pens, and adjusted to the desired position with respect to the stroke of the pen, so that when the plate or plates 10 10<sup>a</sup> are raised to permit the pens to act on the paper the appropriate cam will engage the corresponding arm 8 at a certain time of the stroke to raise the pen from the paper. The cam may be such that the pen can drop upon the paper at any desired point or points of its stroke, making interrupted or broken lines, or the pen can be held above the paper for a period after the beginning of its stroke and then dropped, or raised after part of its stroke, or in any suitable manner to produce the desired line or lines.

While any suitable means may be provided for reciprocating the pens, the arrangements I have shown provide for reciprocating the pens simultaneously in opposite directions, or, in other words, the pens 5 5<sup>a</sup> are arranged to simultaneously move away from each other toward the opposite edges of the strip or paper 2 and next return toward the center thereof simultaneously, and so on alternately. To this end I provide shaft 13 with a crank 20, that is connected by a link 21 with a rocker-arm 22, secured to a shaft 23, pivotally carried by and extending across frame 1, and to said shaft 23 on opposite sides are secured arms 24, that connect by links 25 with the adjacent heads or blocks 4<sup>b</sup>. By such arrangement as crank 20 rotates in the direction of the arrow in Fig. 1 the pen-support 4 for pens 5 will be reciprocated across the paper or strip 2. To simultaneously reciprocate the support 4 for the pen or pens 5<sup>a</sup>, I



provide a shaft 23<sup>a</sup>, supported similarly to shaft 23, and which is provided with arms 24<sup>a</sup>, connected by links 25<sup>a</sup> with the blocks 4<sup>b</sup> of the support for pen 5<sup>a</sup>, such parts being similar to those described with respect to pens 5.

The shafts 23 23<sup>a</sup> are connected to rock in unison in opposite directions, and for this purpose I have shown them provided, respectively, with intermeshing segmental gears 26 27. The foregoing arrangements are such that the pens 5 5<sup>a</sup> will be reciprocated simultaneously toward and away from each other.

While the ruling-machine above described may be operated by suitable means independently of a printing-press, the arrangements are such that the ruling operation may take place during the printing of the paper or strip. I have shown the shaft 13 as provided with a gear 28, adapted to be operated by suitable means, and particularly to be operated by any suitable driving part of a printing-press provided with a reciprocative type chase or platen, as shown, for instance, in my patent above named. In such case the arrangement will be such that while the paper 2 is held in the press for the printing impression to be made the shaft 13 will be so rotated that the pens 5 or 5<sup>a</sup>, or both, will be moved across the paper to produce the desired down lines thereon, cam 12 having raised plates 10 10<sup>a</sup>, (the paper 2 having been fed to position beneath the pens from or toward the printing-press by the paper-feeding devices of the press,) and on the return stroke of the press, during which time the paper 2 will be fed beneath the pens, the crank 20 will cause the pens to approach each other, the cam 12 acting to permit the plates 10 10<sup>a</sup> to drop upon the arms 8 to raise the pens from the paper 2, and so on alternately; but shaft 13 may be operated by any suitable means irrespective of a printing-press, the paper 2 being fed by any suitable means where ruling is to be done separately from the printing-press, and so on continuously.

From the foregoing it will be understood that by means of my improvements the printed matter for two bill-heads may be impressed upon the paper 2 by a printing-press in reversed positions toward the center of the paper, and the pens 5 5<sup>a</sup> can simultaneously rule the down lines toward opposite edges of said paper for the two bill-heads, and then the paper 2 can be cut to produce the bill-heads for use. Of course, if desired, a single bill-head can be ruled at one time or a plurality of bill-heads alined. The advantages of my improvements, whereby a plurality of bill-heads may be printed and ruled simultaneously by a single operation of a printing-press and ruling-machine, will be obvious, as thereby considerable expense in producing bill-heads is saved, and a further advantage of my improvements resides in the fact that spe-

cial ruling can be produced by a mere adjustment of the pens to the desired positions and the application of the cams 17 to produce lines of varying length or other form. Of course ruling can be done by the machine for matter other than bill-heads.

I do not limit my invention to the particular details of construction and relative arrangements of the parts shown and described, as they may be variously changed and modified without departing from the spirit thereof.

Having now described my invention, what I claim is—

1. A ruling-machine comprising a plurality of pens, independent supports for each pen whereby each pen may be operated independently of the others, means for reciprocating said pen-supports, and means for causing the pens to engage paper while moving in one direction, and to be moved out of engagement with the paper when moving in the opposite direction, substantially as described.

2. A ruling-machine comprising a plurality of pen-supports, means for supporting said pen-supports so that each pen may be operated independently of the others, means for simultaneously reciprocating said pen-supports toward and from each other, and means for causing the pens to engage paper when moving in one direction and to be free from the paper when moving in the opposite direction, substantially as described.

3. A ruling-machine comprising a reciprocative frame having a cross-rod, means to support and guide the frame, arms independently pivotally carried by said rod adapted to actuate pens, means to cause said arms to rock independently of each other to permit the pens to engage and disengage paper to be ruled, and cams to coact with said arms to vary the operating strokes of the pens, substantially as described.

4. A ruling-machine comprising a plurality of pens, independent supports for each pen whereby the pens may operate independently of each other, means to support and reciprocate the supports, means to adjust said supports laterally independently of each other, a plate adapted to coact with said pen-supports, and means to operate said plate to cause the pens to engage paper when moving in one direction and to disengage the paper when moving in the opposite direction, substantially as described.

5. A ruling-machine comprising a pen-support, means to support and reciprocate the same, a plate adapted to coact with said pen-support, means to operate the plate to cause the pen to engage and disengage the paper, and a cam connected with said plate to control the operating stroke of the pen, substantially as described.

6. A ruling-machine comprising a pen-support, means for supporting and reciprocating the same, a plate along which the pen-support



slides to coact with said pen-support, a cam to rock said plate, and means for operating said cam, substantially as described.

7. In a ruling-machine the combination of  
5 a plurality of pen-supports, a pair of frames for said supports, means for guiding and reciprocating said frames, a pair of plates carried independently of the pen-supports for coacting with said pen-supports, and means for simultaneously operating said plates to simultaneously control the action of the pens carried by said frames, substantially as described.

8. In a ruling-machine the combination of  
15 a plurality of pen-supports, a pair of frames for said supports, means for guiding and reciprocating said frames, a pair of plates for coacting with said pen-supports, said plates being movably connected together, and means for rocking one of said plates whereby both  
20 plates will be simultaneously operated, substantially as described.

9. In a ruling-machine the combination of a pair of frames, guides therefor, pen-supports carried by said frames, said supports  
25 comprising arms pivotally supported, means for reciprocating said frames toward and from each other, plates adapted to coact with said arms to raise and lower the pens carried thereby, and means for operating said plates, substantially as described.

10. In a ruling-machine the combination of a pen-support, a frame therefor, having a rod upon which the support is pivotally mounted, means for guiding and reciprocating said  
35 frame, means for adjusting said pen-support laterally along said rod with respect to said frame, and means for causing the pen-support to raise and lower the pen with relation to the paper to be ruled, substantially as described.

11. In a ruling-machine the combination of a pair of frames, means for guiding the same, pen-supports carried by said frames, rocking arms connected with said frames, and means for causing said arms to rock toward and from  
45 each other, substantially as described.

12. In a ruling-machine the combination of a pair of frames, means for guiding the same, pen-supports carried by said frames, rocking arms connected with said frames, gears connected with said arms to operate them in unison, and means for rocking said gears, substantially as described.

13. In a ruling-machine the combination of a frame, guides therefor, a pen-support carried by said frame, rocking arms connected with said frame, a crank, connections between said crank and said rocking arm for operating the latter, a plate to coact with the pen-support, and a cam to operate said plate, substantially as described.

14. In a ruling-machine the combination of a frame having a cross-rod, means to guide and operate the frame, pen-supports independently pivotally carried by said rod, so that  
65 each may be operated independently of the others and means to operate said supports to raise and lower the pens with respect to paper to be ruled, substantially as described.

15. In a ruling-machine the combination of  
70 a frame having a cross-rod, means to guide and operate the frame, sleeves carried by said rod, pen-supports pivotally carried upon said sleeves, and means to operate said supports to raise and lower the pens with respect to paper  
75 to be ruled, substantially as described.

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Witnesses:

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