

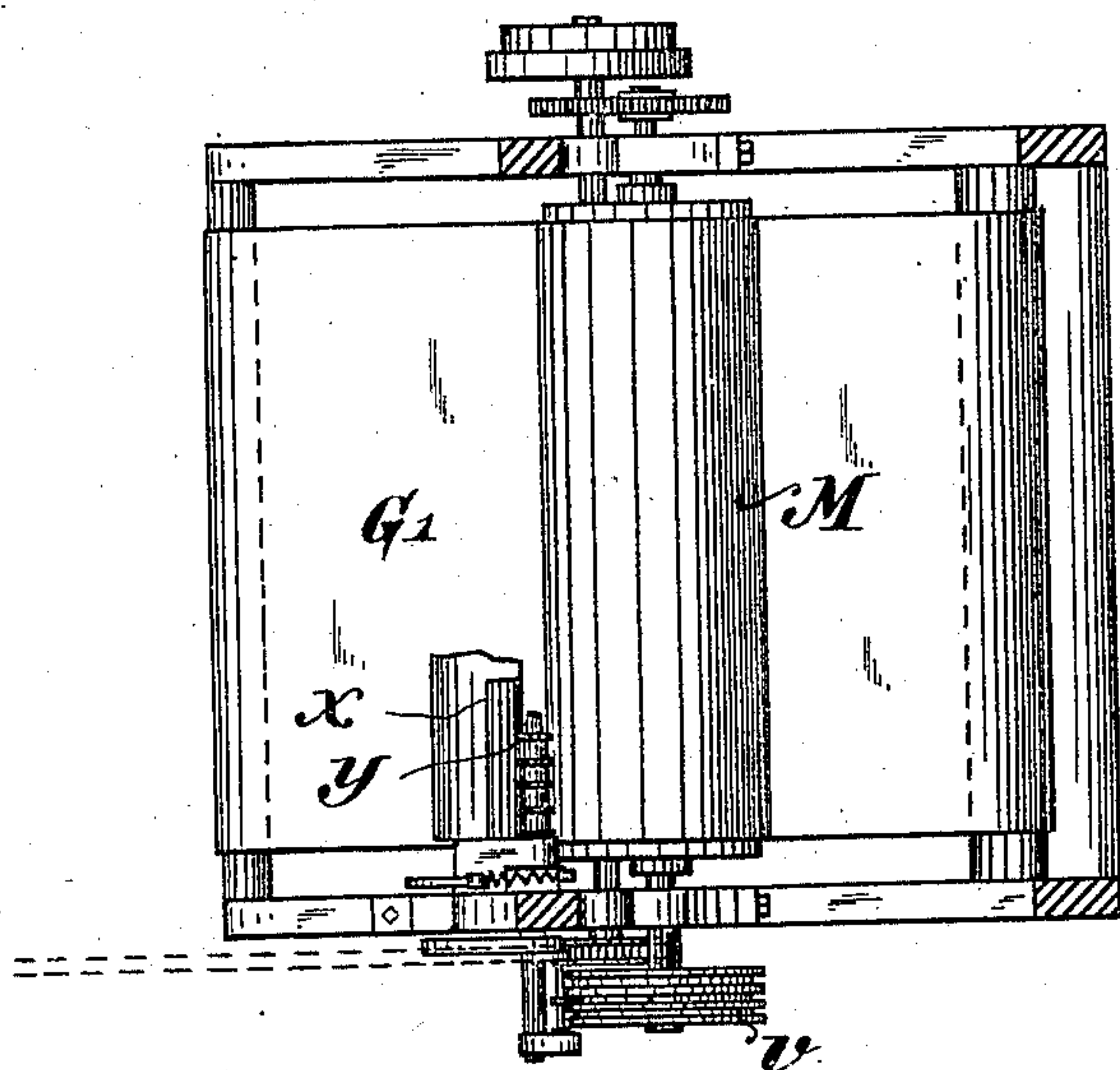
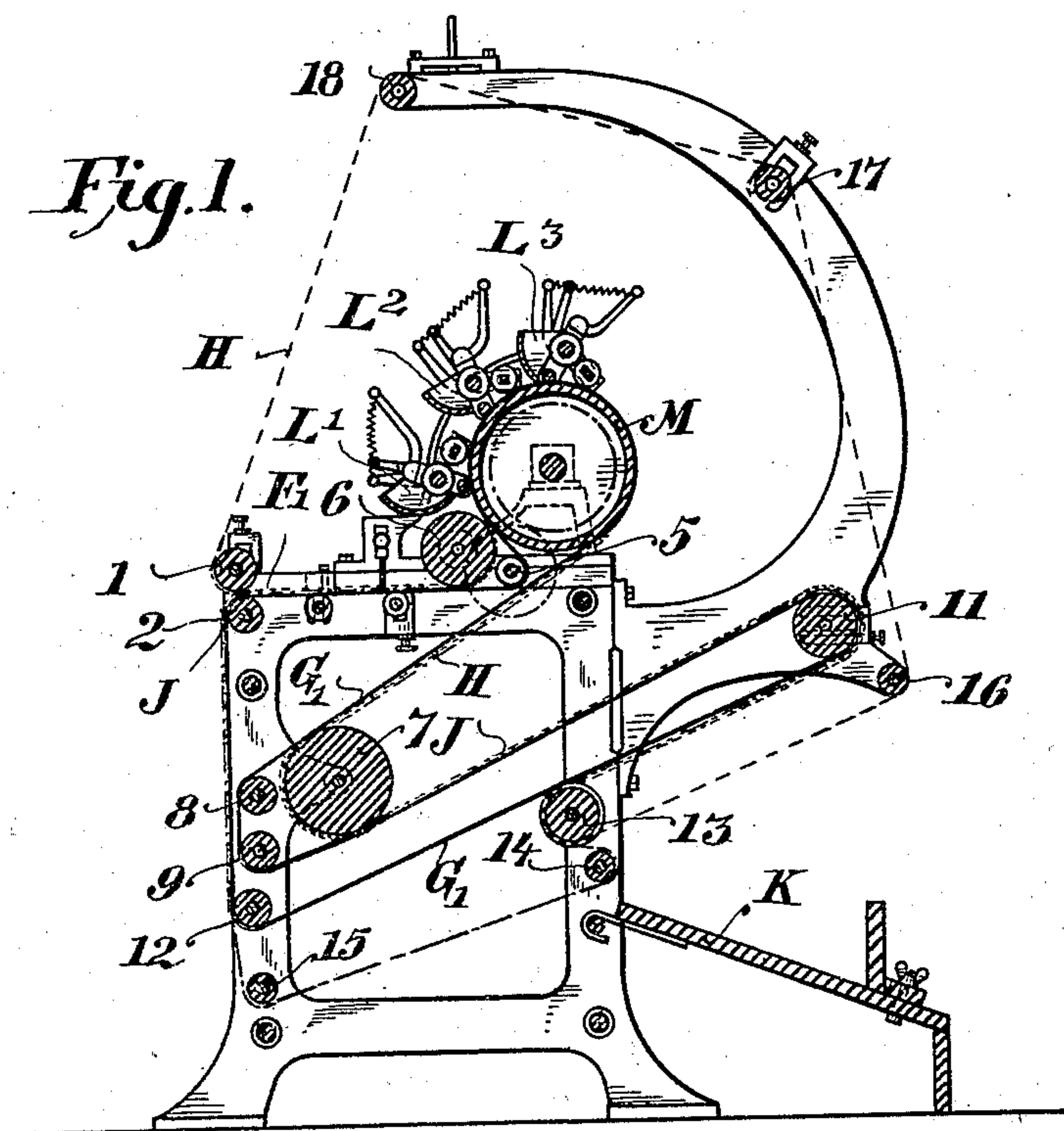
(No Model.)

3 Sheets—Sheet 1.

C. F. FÖRSTE.
RULING MACHINE.

No. 553,189.

Patented Jan. 14, 1896.



Witnesses:
Julius J. J. J. J.
Rudolph A. A.

Inventor:
Carl Friedrich Försde
by Eustace Hoppert
att'y.

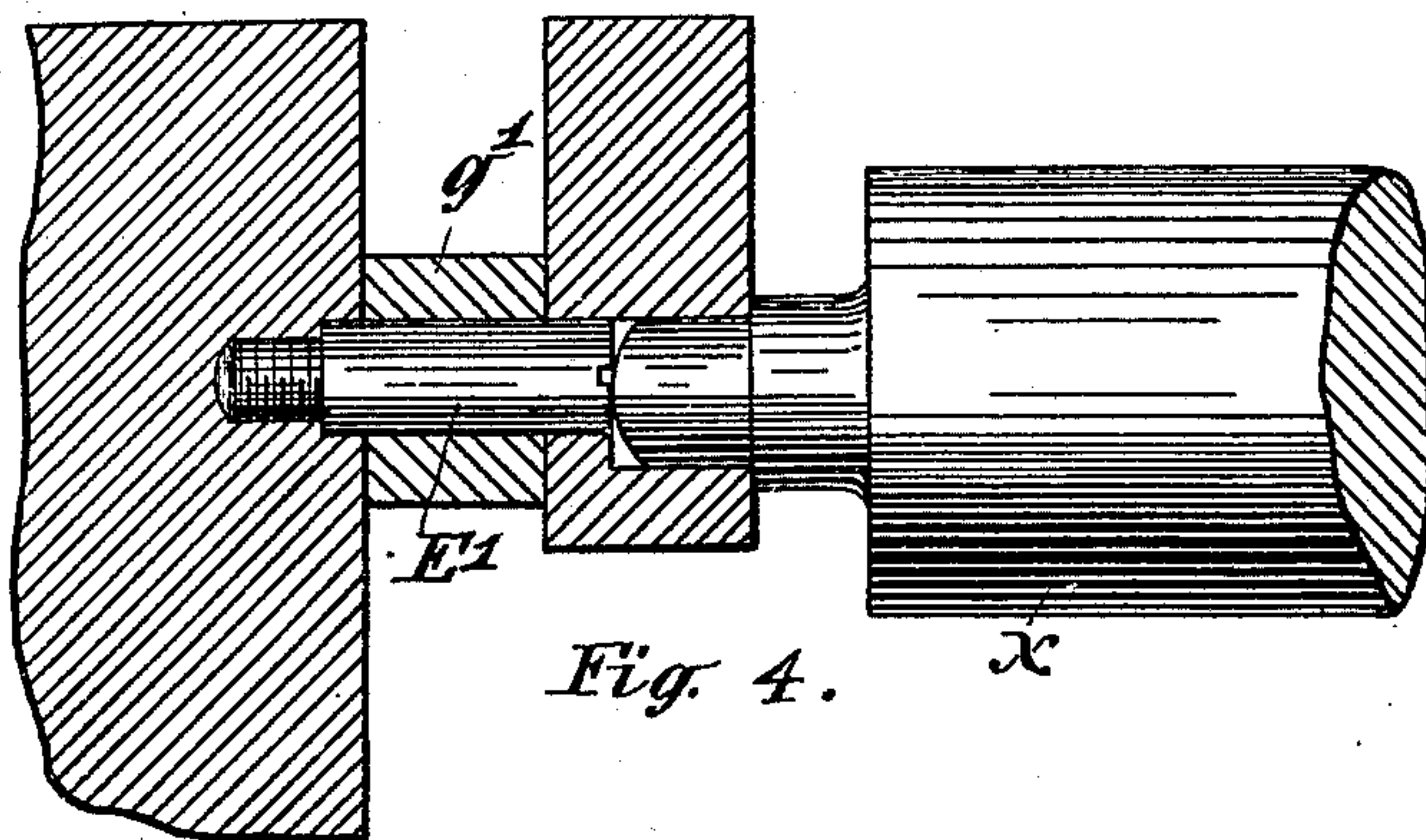
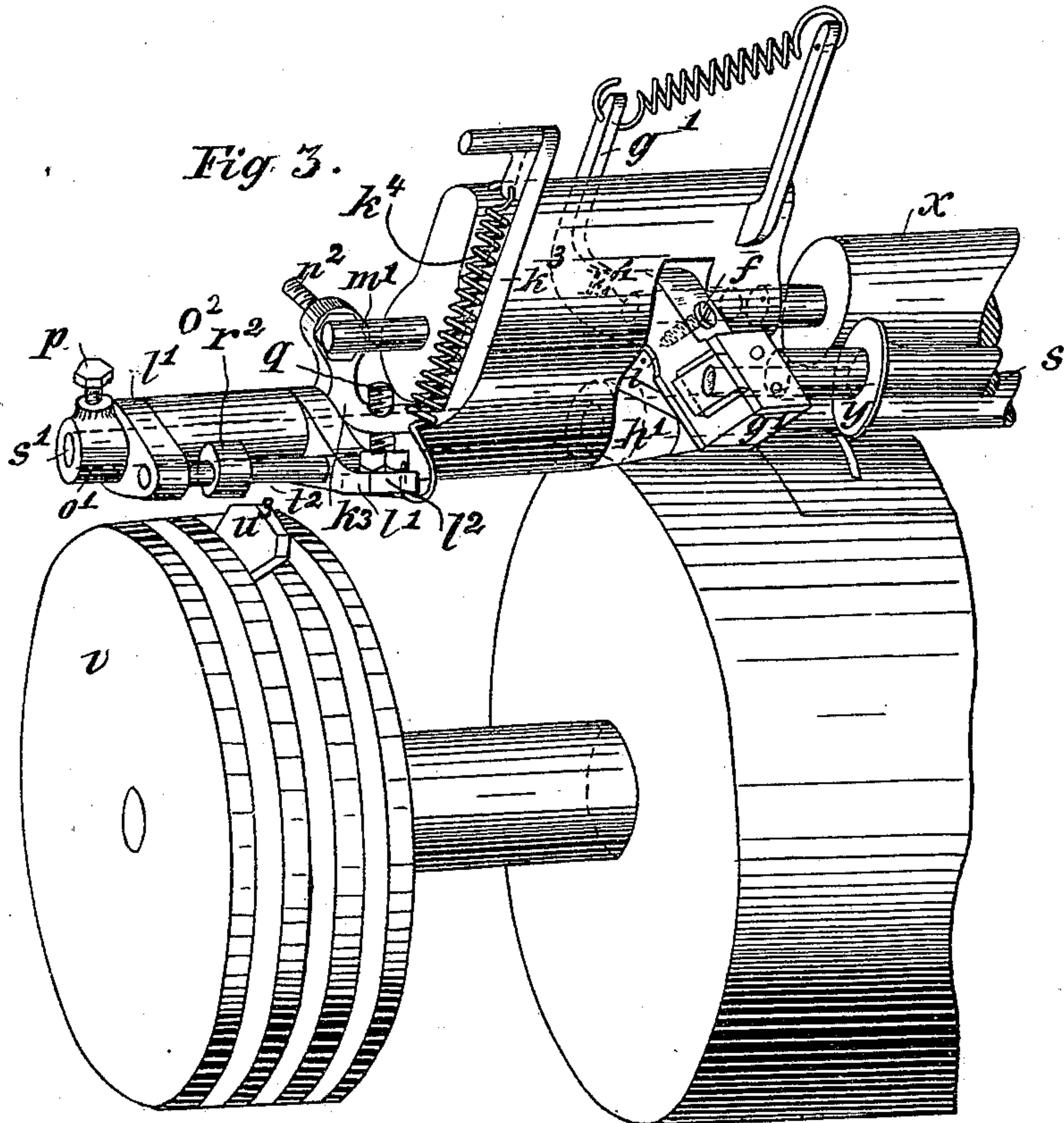
(No Model.)

3 Sheets—Sheet 2.

C. F. FÖRSTE.
RULING MACHINE.

No. 553,189.

Patented Jan. 14, 1896.



Witnesses
Paul Naake
Carl Mulow

Inventor
Carl Friedrich Förste
by Hopkinson
Attorneys

(No Model.)

3 Sheets—Sheet 3.

C. F. FÖRSTE.
RULING MACHINE.

No. 553,189.

Patented Jan. 14, 1896.

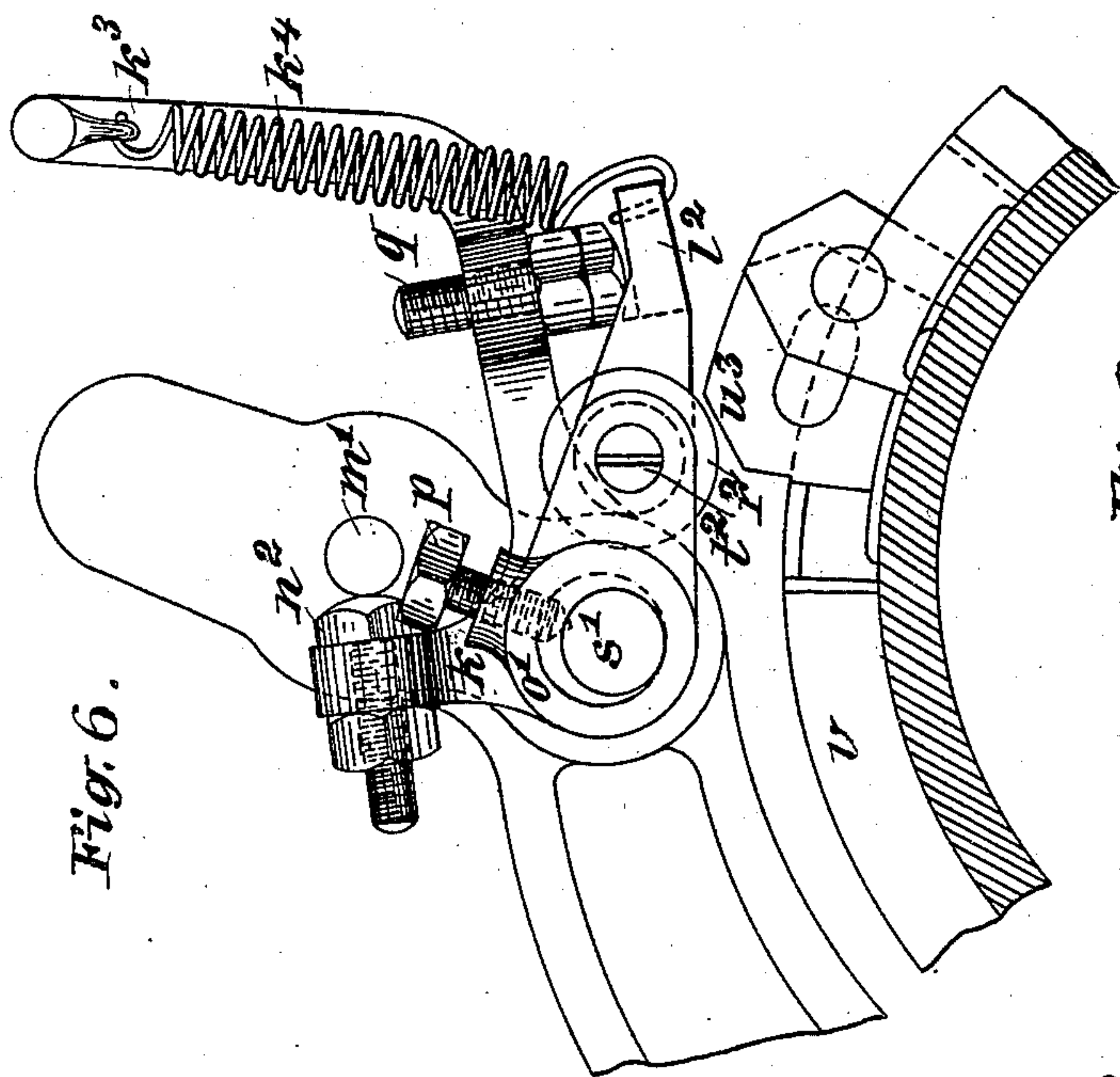


Fig. 6.

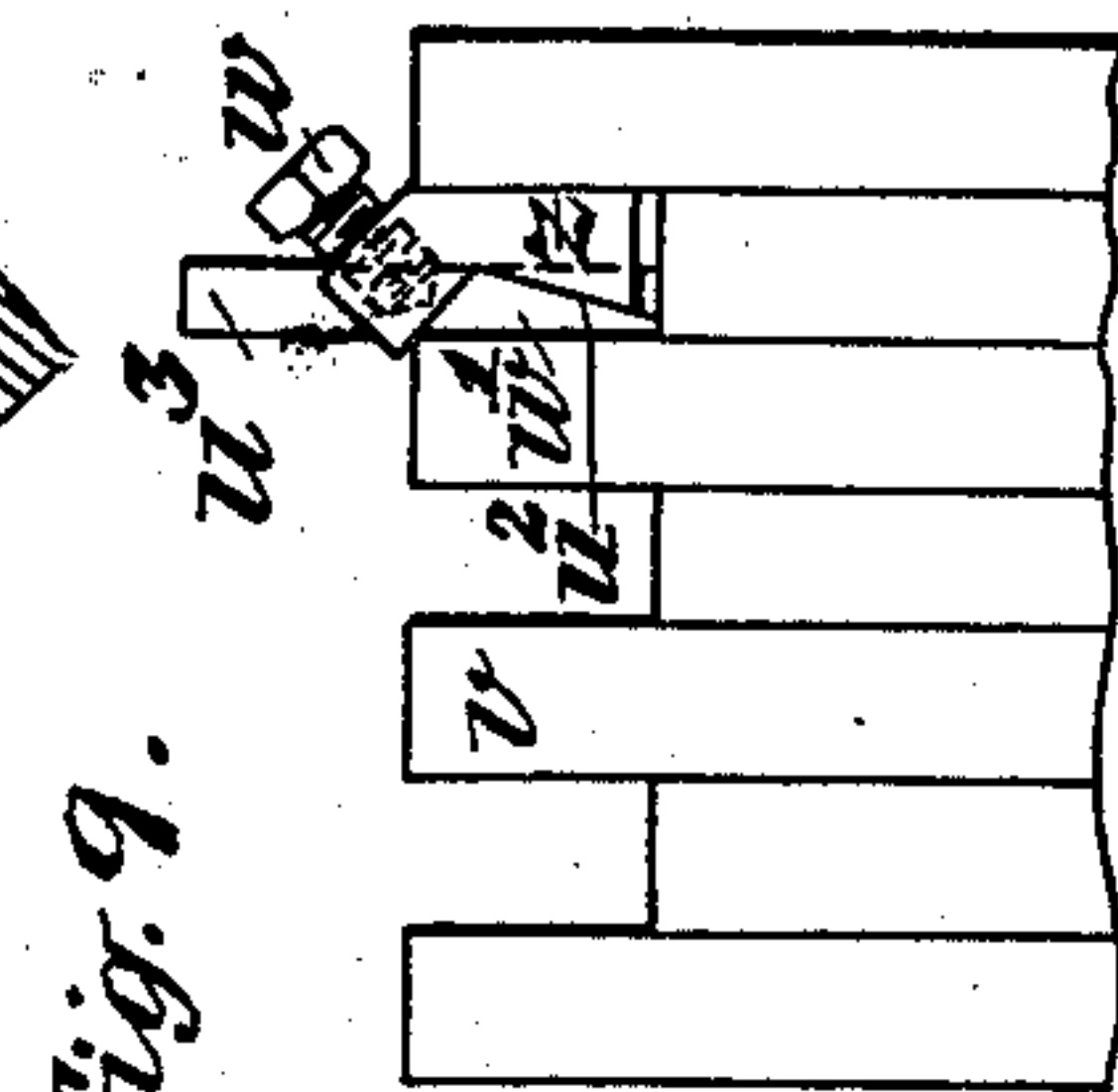


Fig. 9.

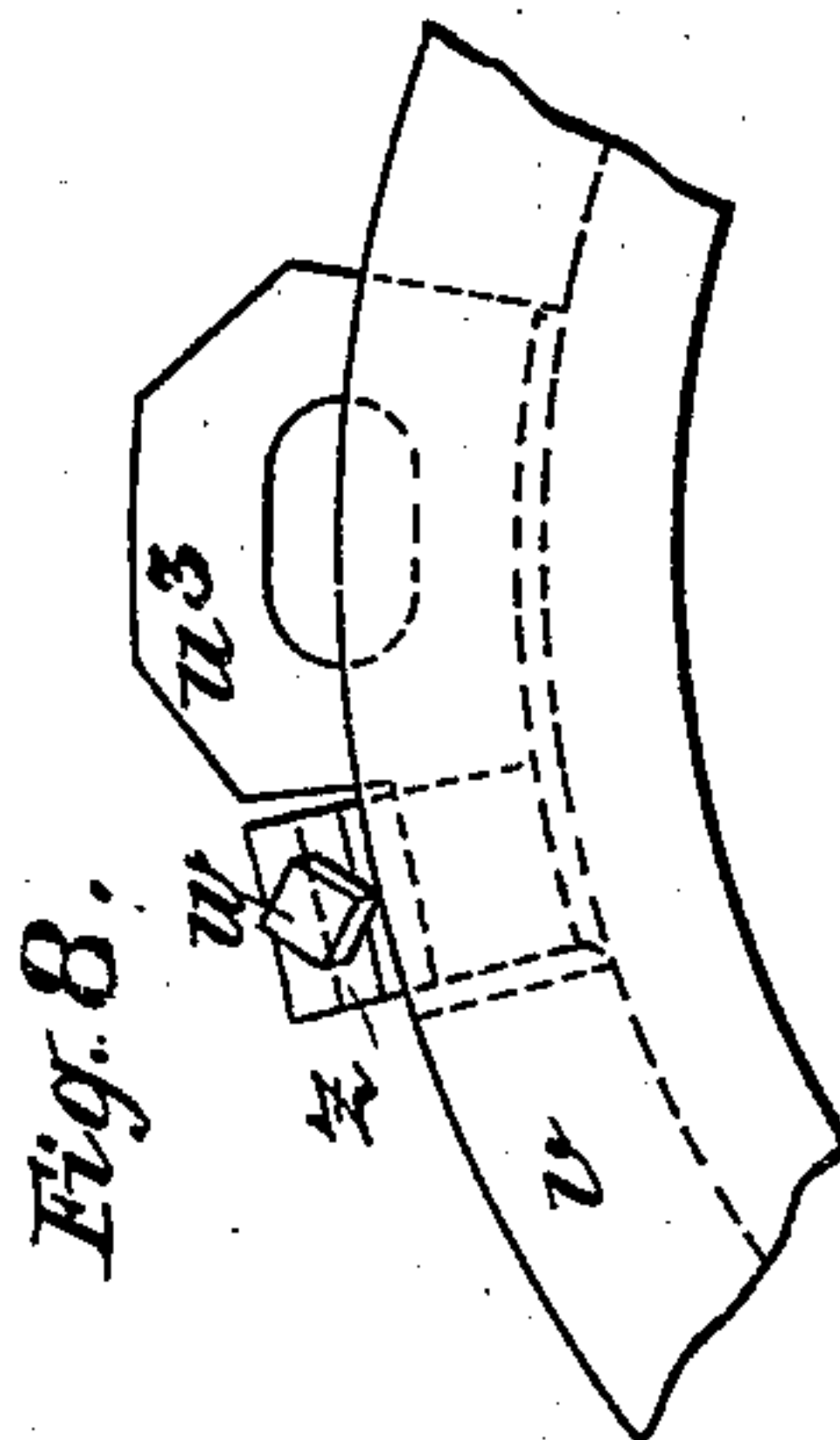


Fig. 8.

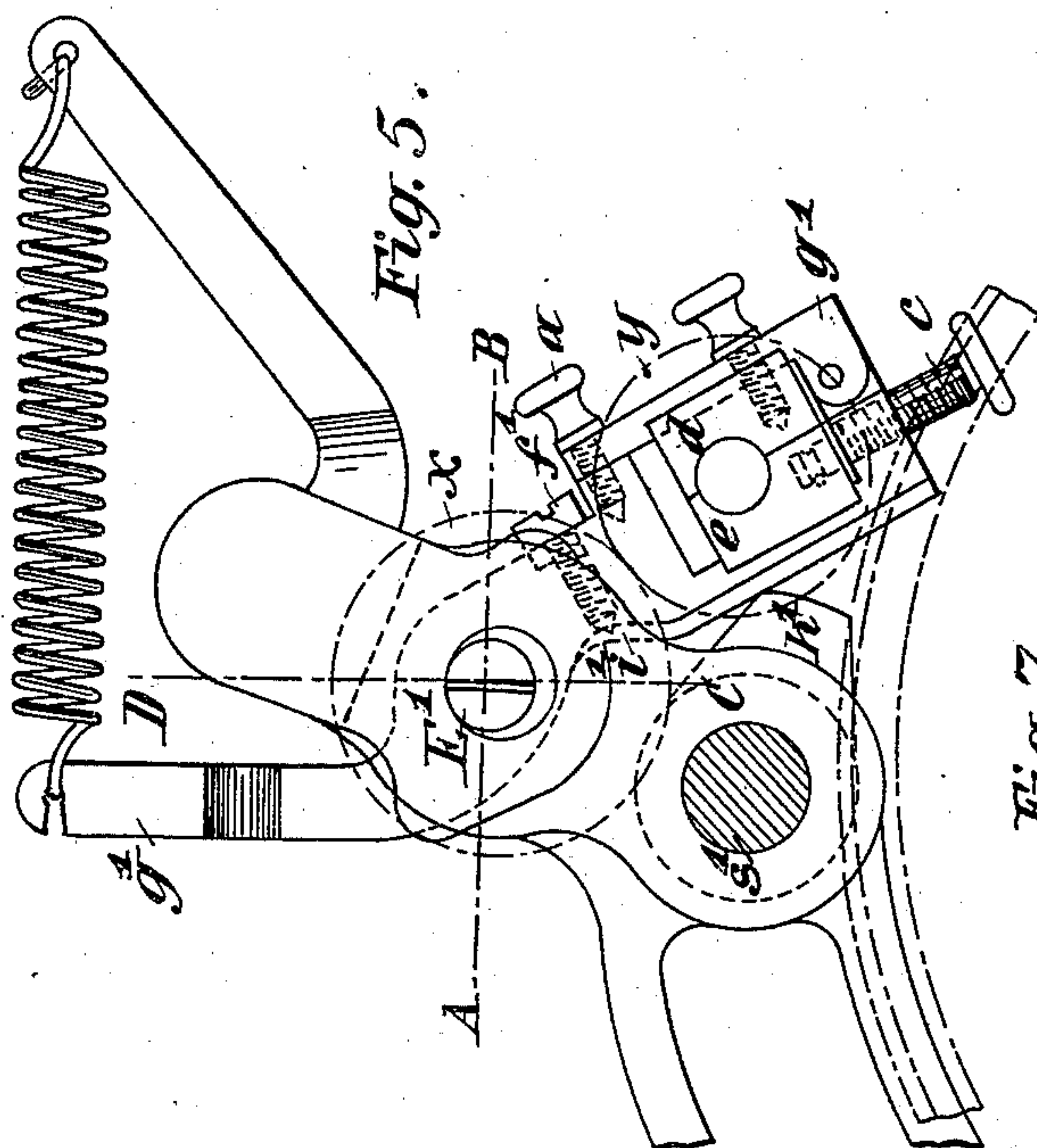
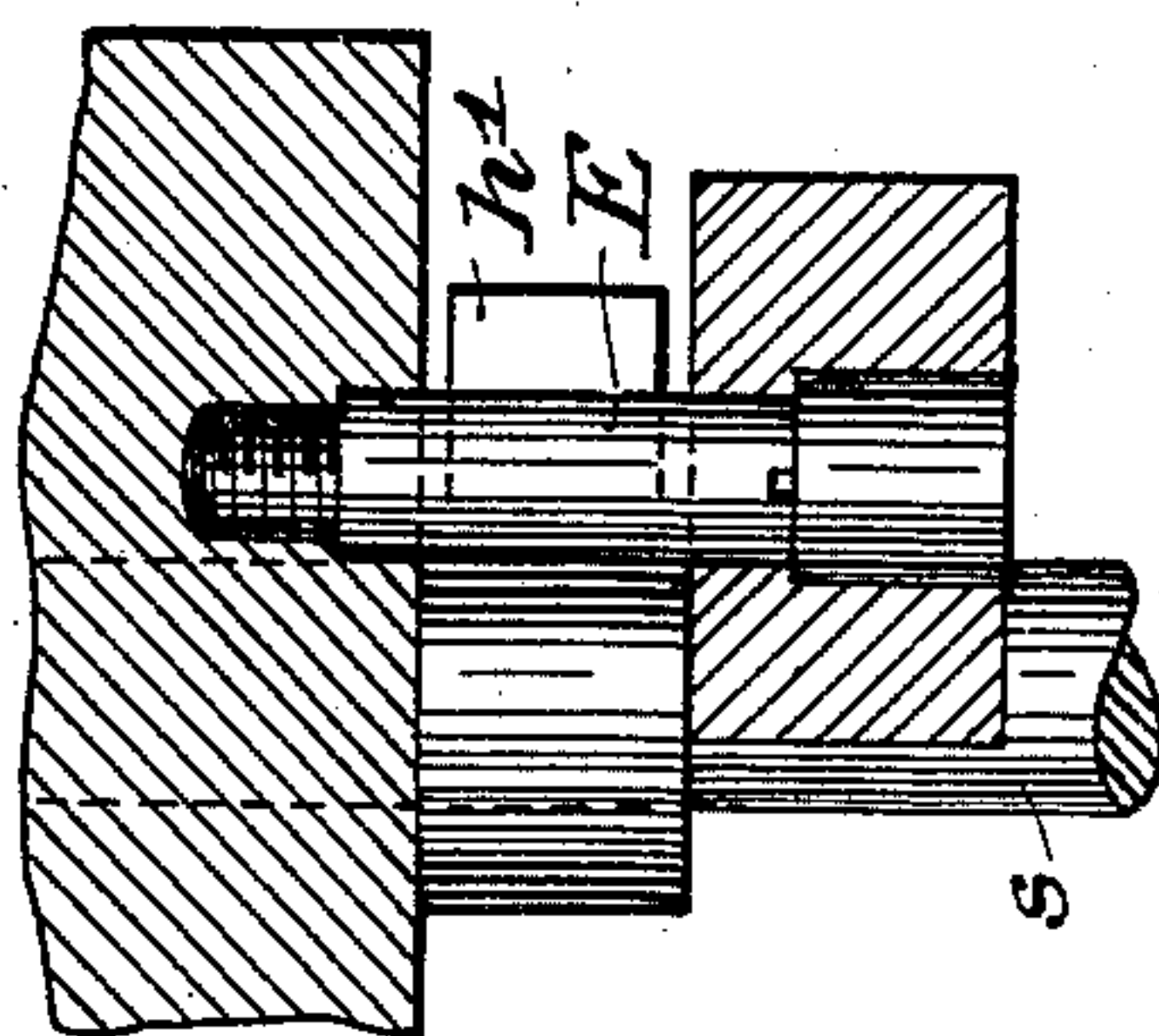


Fig. 5.

Fig. 7.



Witnesses
Paul Waake.
Carl Bülger.

Inventor
Carl Friedrich Förste
by Hopkins & Co.
Attorneys

UNITED STATES PATENT OFFICE.

CARL FRIEDRICH FÖRSTE, OF LEIPSIC, GERMANY, ASSIGNOR TO FÖRSTE
& TROMM, OF SAME PLACE.

RULING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 553,189, dated January 14, 1896.

Application filed August 15, 1894. Serial No. 520,384. (No model.) Patented in Germany August 8, 1890, No. 57,939, and in England October 3, 1891, No. 4,289.

To all whom it may concern:

Be it known that I, CARL FRIEDRICH FÖRSTE, a subject of the King of Saxony, and a resident of Leipsic, in the Kingdom of Saxony, German Empire, have invented a certain new and useful Improved Ruling-Machine, of which the following is a full, clear, and exact description, and for which I have obtained a patent in Germany, No. 57,939, dated August 8, 1890, and in England, No. 4,289, dated October 3, 1891.

The present invention consists of an improved ruling-machine; and the improvements comprise, first, the arrangement of the ruling-disks by which when the same are raised from the paper they are simultaneously brought out of contact with the coloring-roll; second, novel means for raising the ruling-disks to interrupt the lines at will; third, the arrangement of the conveyer-apron with regard to the threads, by means of which the tension of the said apron is regulated independently of the threads, whereby crumpling of the sheets is avoided.

In order to make the present specification more easily intelligible, reference is had to the accompanying drawings, in which similar letters and figures denote similar parts throughout the several views.

Figure 1 is a side elevation of the machine; Fig. 2, a plan, partly in section. Fig. 3 is a perspective view showing the device for raising the ruling-disks. Fig. 4 shows in detail the eccentric attachment for the shaft of the ruling-disks. Fig. 5 is a detail view of the roller-disk-shaft bearing and mechanism for lifting the same. Fig. 6 shows a detail view of the mechanism for actuating the lifting-shaft. Fig. 7 is a detail section of the eccentric trunnion whereon the bearings of the ruling-disk shaft are mounted; Fig. 8, a part side elevation of the dogs for actuating the lifting mechanism, and Fig. 9 an end elevation of Fig. 8.

In the machines commonly known it is necessary, in case the ruling-rollers do not start or stop correctly, to shift the dog or stud accordingly, thereby wasting much time. In our new machine this work is avoided by providing an eccentric sleeve or bushing for the

oscillating cam which serves to lift off the ruling-roller, the said sleeve being shifted to the right or to the left and thereby the beginning and the end of the interval or blank regulated with rapidity and precision.

Fig. 1 shows the general construction of the machine, but especially the arrangement of the inking devices around the cylinder and the course of the endless apron.

Figs. 4 to 9 represent details of construction on a large scale. As shown by Fig. 5, the ruler-axle is held in a pair of bearings g' , arranged on the right and left side of the machine, each bearing being adapted to oscillate on a stud E' . As shown by Fig. 4, the bearing of this stud is eccentric to the ink-roller x , so that on the bearing g' being lifted by means of the lever or cam h' mounted on shaft s' the ruling-disks y are placed out of contact with the ink-roller x . This eccentric position has the advantage that in the raised condition of the bearing g' , and if the machine continues to turn, as is necessary for the production of broken lines, closely-ruled lines (as used for the heading of papers) will not flow into each other.

For raising and lowering the ruler-axle, together with disks y , I employ a pair of cams or lifting-arms h' , placed underneath the bearings g' of the ruler-axle. These cams are rigidly attached to the shaft s' and begin to operate as soon as the said shaft s' is set in motion either by hand or by the mechanism of the machine.

For interrupting the lines at will, I employ the mechanism illustrated by Fig. 6, which is situated at the end of the shaft s' and only on one side of the machine. In front of the lever k^3 , which is rigidly connected with the shaft s' , there is mounted on the said shaft s' an adjustable eccentric sleeve o' . This sleeve carries another sleeve o^2 , adapted to turn thereon, and provided with two arms l' , which carry the fulcrum or axle l^2 of the lifting-roller r^2 . One of the said arms l' has a flattened extremity or a plate l^2 and is pressed against a set-screw q , fixed in the lever k^3 , by means of a helical spring k^4 . Another set-screw n^2 , likewise held in the lever k^3 , rests against a stud m' , fixed to the machine-frame,

and thereby limits the down motion of the levers l' and k^3 and of the friction-roller r^2 .

If it is desired to produce broken lines, I employ the grooved disk v , mounted on the prolonged cylinder-axle. The lifting-dogs u^3 , secured in the first, second, or third groove of the disk v , Figs. 3, 8, and 9, and arranged in pairs, (placed in the same groove,) come into contact with the lifting-roller r^2 , Fig. 6, during the revolution of the disk or drum v , and thereby lift the lever l^2 , which now turns the shaft s' . The lifting-roller r^2 can be shifted along the bolt t^2 , and thereby arranged to act on the dogs u^3 of the first, second, or third groove of the drum v . Consequently, the lifting-rollers r^2 of each inking apparatus may come into contact with all the lifting-dogs u^3 of a groove, or each roller r^2 may be set in motion independently of the other by the lifting-dogs u^3 of the first or the second or the third groove only. Now, as the said dogs u^3 are supplied in various lengths and may be used in pairs in each groove of the drum v and at any desired part of each groove, they may serve to produce a great variety of broken lines. After one of the said dogs u^3 has been placed at the desired part of the groove or circumference, it is secured in position by means of a wedge z , provided with a screw w , as shown by Fig. 9.

For adjusting minute differences or inequalities in the stopping or starting, I change the position of the eccentric sleeve o , Fig. 6, on the shaft s' , so that the dog u^3 will meet the lifting-roller r^2 sooner or later, as may be required, and the beginning and end of the blank or interruption is thereby regulated. The cam h' may be adjusted accurately with regard to the lever g' by means of a flat spring i' , attached at one end under the said lever g' and bearing against the said cam, said spring i' having its free end adjustable by means of a set-screw f in the lever g' .

Fig. 3 shows the relative position and arrangement of the parts described above on the cylinder. As already mentioned, the mechanism for producing the blanks, consisting of levers $k^3 l^2$, eccentric sleeve o' , lifting-roller r^2 , grooved drum v , and lifting-dogs u^3 , exist on one side only of the machine, while the ruler-axle bearing g' , together with its mechanism, as well as the lever h' , are arranged for each inking apparatus in duplicate—that is to say, on each side of the machine.

For every new piece of work requiring a different kind of ruling the necessary adjustments or operations, such as the regulation of the pressure of the ruling-disks on the paper, by changing the position of the screw n^2 in the lever k^3 , arranging the dogs u^3 in the drum v , regulating the travel of the lifting-roller r^2 by adjusting the screw q in the lever k^3 , may be effected from one side of the machine. Consequently the attendant need not leave his place.

As shown by Figs. 6, 8, and 9, the dog u^3 has inclined faces, and is held in the groove

by means of a wedge z which is pressed against an inclined extension u^2 of the dog u^3 by turning the screw w . If the screw is loosened, the dog u and key z may be lifted out of the groove together, being only held therein by friction.

In Fig. 1, G' designates the endless apron; H , the upper threads; J , the lower threads; L^1 , the first inking apparatus; L^2 the second, and L^3 the third inking apparatus; M the cylinder, and K the delivery-table. As will be seen from Fig. 1 of the drawings, the upper and lower threads are taken over different rolls quite independent of those employed to guide the endless apron. The threads H and J pass from between the rolls 1 and 2 around roll 6, cylinder M , rolls 7, 11, 13, and separate again at roll 14, the lower thread, J , passing rolls 14, 15, and 12 to roll 2, the upper thread being taken over rolls 16, 17, and 18 to roll 1. The apron passes around different rolls coming from roll 2 under 5, around the cylinder M , rolls 8 and 9, over 11, back under 12 and up to 2 again. The object of this arrangement is to keep the tension of the apron and threads equal with regard to each other. If apron and the threads are guided by the same set of rolls the apron gets creased, often creasing and crumpling the sheets of paper. This creasing or slackening of the apron is due to various causes, principally probably to the difference in the elasticity of the apron and threads and the friction exercised by both. I have found that the only way to obviate this disadvantage is to take the apron at times out of contact with the threads, as at 8 and 9, and again at 5, whereby both apron and threads run partially independent of each other.

I claim as my invention—

1. In a ruling machine the combination of levers g' , pivoted at the ends of the coloring cylinder but eccentrically as regards the same, and having downwardly extending arms, a ruling disk spindle mounted in said arms, and a spring to said levers adapted to hold same in a position to normally contact with the paper cylinder and the coloring cylinder but on being raised to leave the said coloring cylinder, and means for turning the said lever as specified.

2. The combination of levers $g' g'$ pivoted eccentrically with the coloring cylinder and carrying the ruling disk spindle, a spindle s mounted underneath the said levers g' in the machine frame, a cam h' fast on said spindle s , a sleeve fast on the outer end of said spindle carrying lever arms $l' l^2$, a laterally adjustable roll r^2 mounted between said lever arms, a disk v on the shaft of the paper cylinder and having thereon dogs to contact said roll and means to keep the cam h' in contact with the lever g' substantially as described.

3. The combination of levers $g' g'$ pivoted eccentrically with the coloring cylinder and carrying the ruling disk spindle, a cam h' and a spindle s mounted underneath the said levers g' to carry said cam, a sleeve fast on the

outer end of said spindle carrying lever arms $l' l^2$, a laterally adjustable roll r^2 mounted between said lever arms, a disk v on the shaft of the paper cylinder carrying adjustable dogs to contact with said roll, means to hold the cam h' in contact with the lever g' and means for adjusting the position of said cam against the end of the lever g' in the manner and for the purpose substantially as described.

4. The combination of levers $g' g'$ pivoted eccentrically with the coloring cylinder and carrying the ruling disk spindle; a spindle s mounted underneath said levers g' , in the machine frame, a cam h' fast on said spindle, a sleeve fast on the outer end of said spindle carrying lever arms $l' l^2$, a laterally adjustable roll r^2 mounted between said lever arms, a disk v on the shaft of the paper cylinder and having adjustable dogs to contact with the said roll, means to hold the cam h' in contact with the lever g' , an eccentric sleeve o inserted between spindle s' and the sleeve of the levers $l' l^2$ and means for adjusting the position of the cam h' against the end of the lever g' substantially as described and shown.

5. The combination of a ruling disk spindle, levers $g' g'$ mounted eccentrically to the coloring cylinder and carrying said spindle, means for actuating said levers g' through the medium of said laterally adjustable roll r^2 , consisting of a disk v mounted to rotate with the paper cylinder and having peripheral grooves, and dogs u adjustable in said grooves substantially as described and shown.

6. The combination of a ruling disk spindle, levers $g' g'$ mounted eccentrically to the coloring cylinder and carrying said spindle, means for actuating said levers g' through the medium of said laterally adjustable roll r^2 ,

consisting of a disk v , mounted to rotate with the paper cylinder and having peripheral grooves, and dogs u adjustable in said grooves by means of inclined surfaces u^2 and corresponding wedges z having adjusting screws substantially as described.

7. The combination of a ruling disk spindle, levers $g' g'$ mounted eccentrically to the coloring cylinder, and carrying said spindle, means for actuating said levers g' through the medium of a laterally adjustable roll r^2 , arms $l' l^2$ to support said roll, said arms being mounted on spindle s' , a lever k^3 fast on spindle s' , a spring connection between said lever k^3 and the arms $l' l^2$, an adjusting screw n in said lever adapted to contact with a stop on the machine frame and limit the downward motion of both levers k^3 and $l' l^2$ and means for intermittently operating said roll r^2 in the manner and for the purpose substantially as described.

8. The combination of a ruling disk spindle, levers $g' g'$ mounted eccentrically to the coloring disk cylinder and carrying said spindle, means for actuating said levers g' through the medium of a cam h' a spindle s to carry said cam and means for intermittently operating said spindle, an adjusting spring i' mounted on said lever g' and between it and the said cam h' and means to adjust said spring in the manner and for the purpose substantially as described and shown and for the purpose specified.

In witness whereof I have hereunto set my hand in presence of two witnesses.

CARL FRIEDRICH FÖRSTE.

Witnesses:

GUSTAV EDMUND REINHARDT,
JULIUS HUGO INDINGER.