

(No Model.)

5 Sheets—Sheet 1.

G. L. GEISLER.
MACHINE FOR RULING PAPER.

No. 545,886.

Patented Sept. 10, 1895.

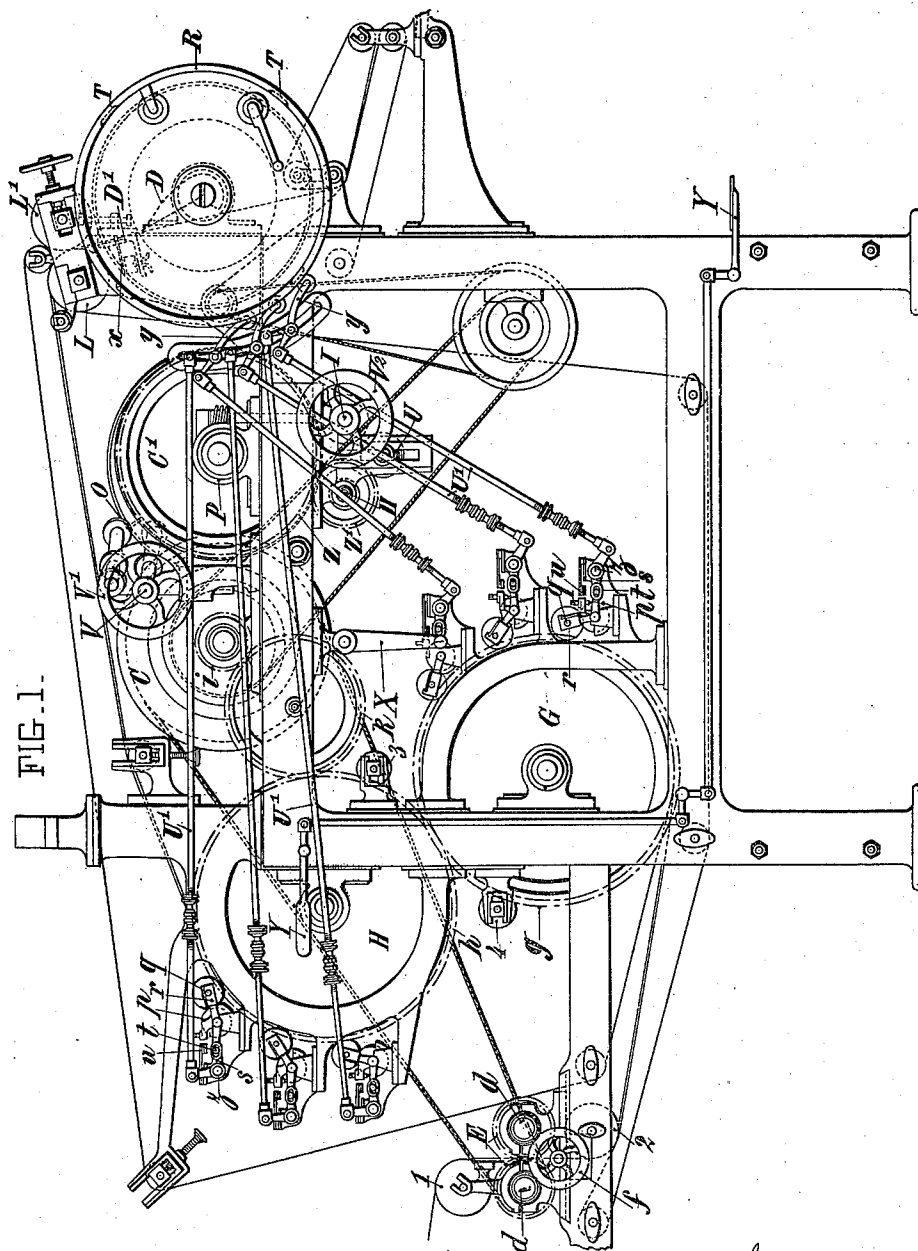


FIG. 1.

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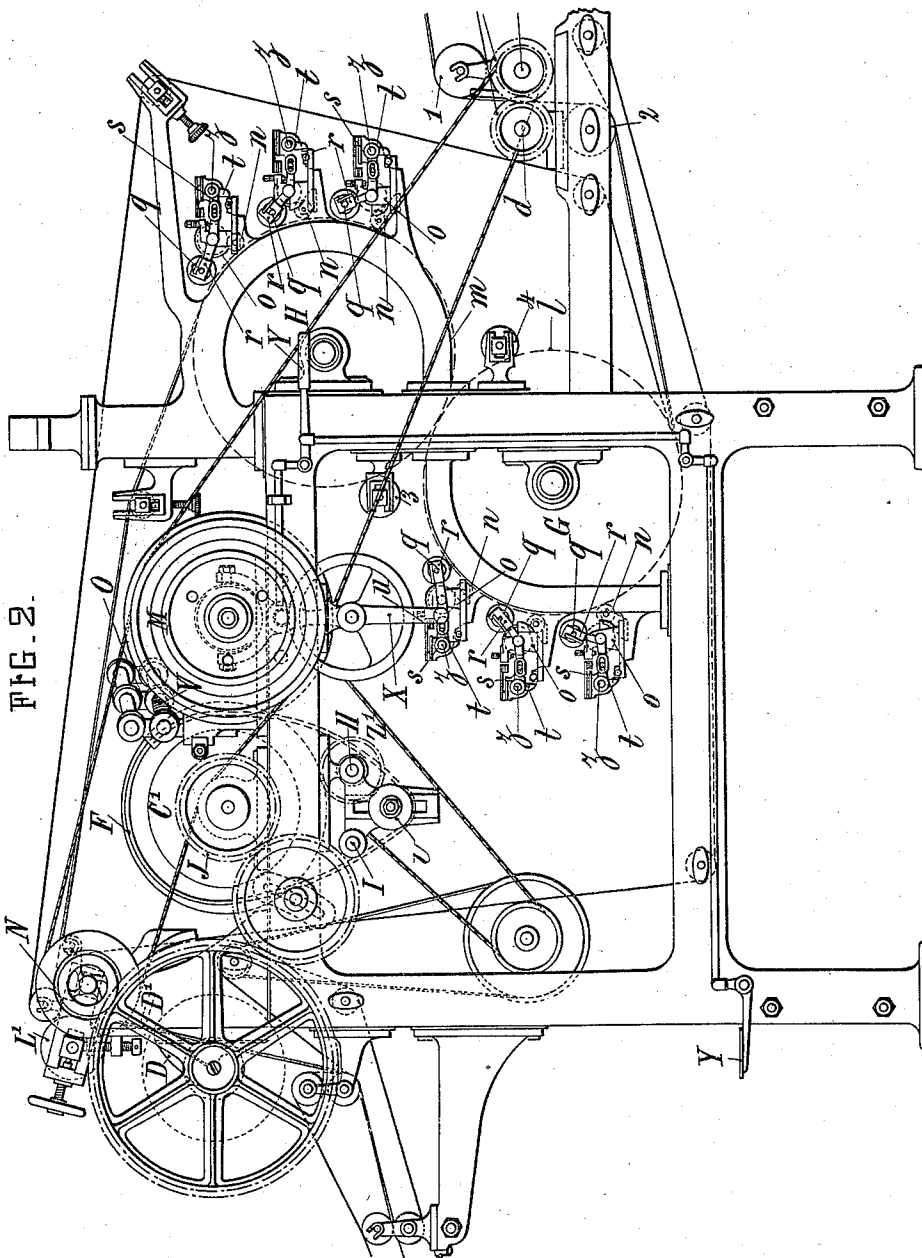
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G. L. GEISLER.
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No. 545,886.

Patented Sept. 10, 1895.



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(No Model.)

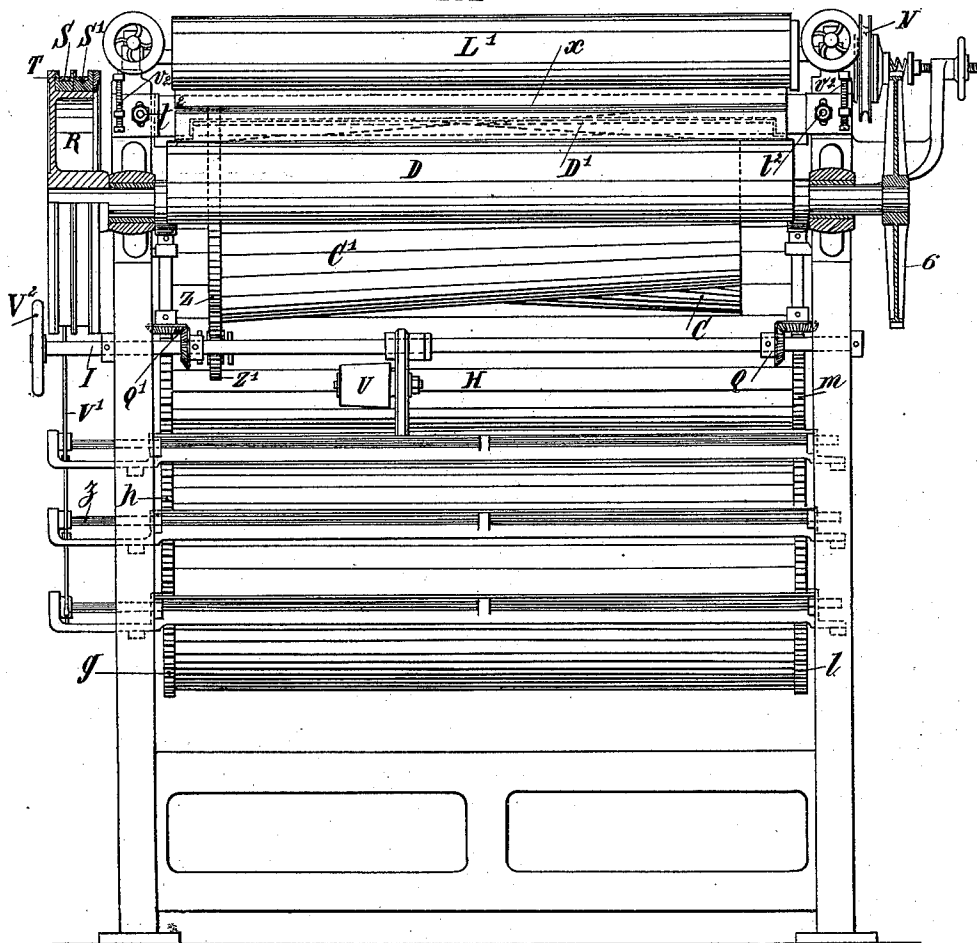
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G. L. GEISLER.
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Patented Sept. 10, 1895.

FIG. 3.



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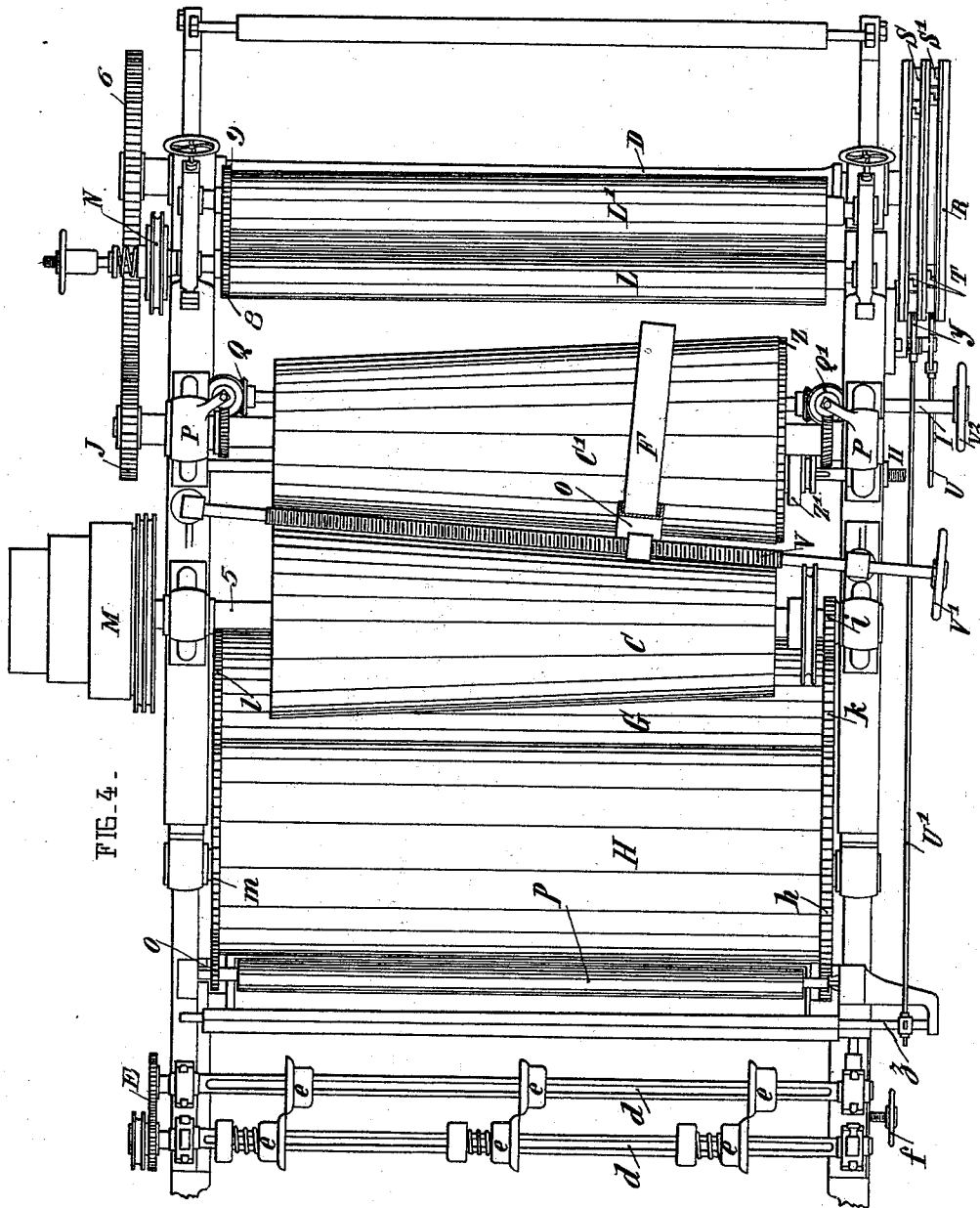
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5 Sheets—Sheet 4.

G. L. GEISLER.
MACHINE FOR RULING PAPER.

No. 545,886.

Patented Sept. 10, 1895.



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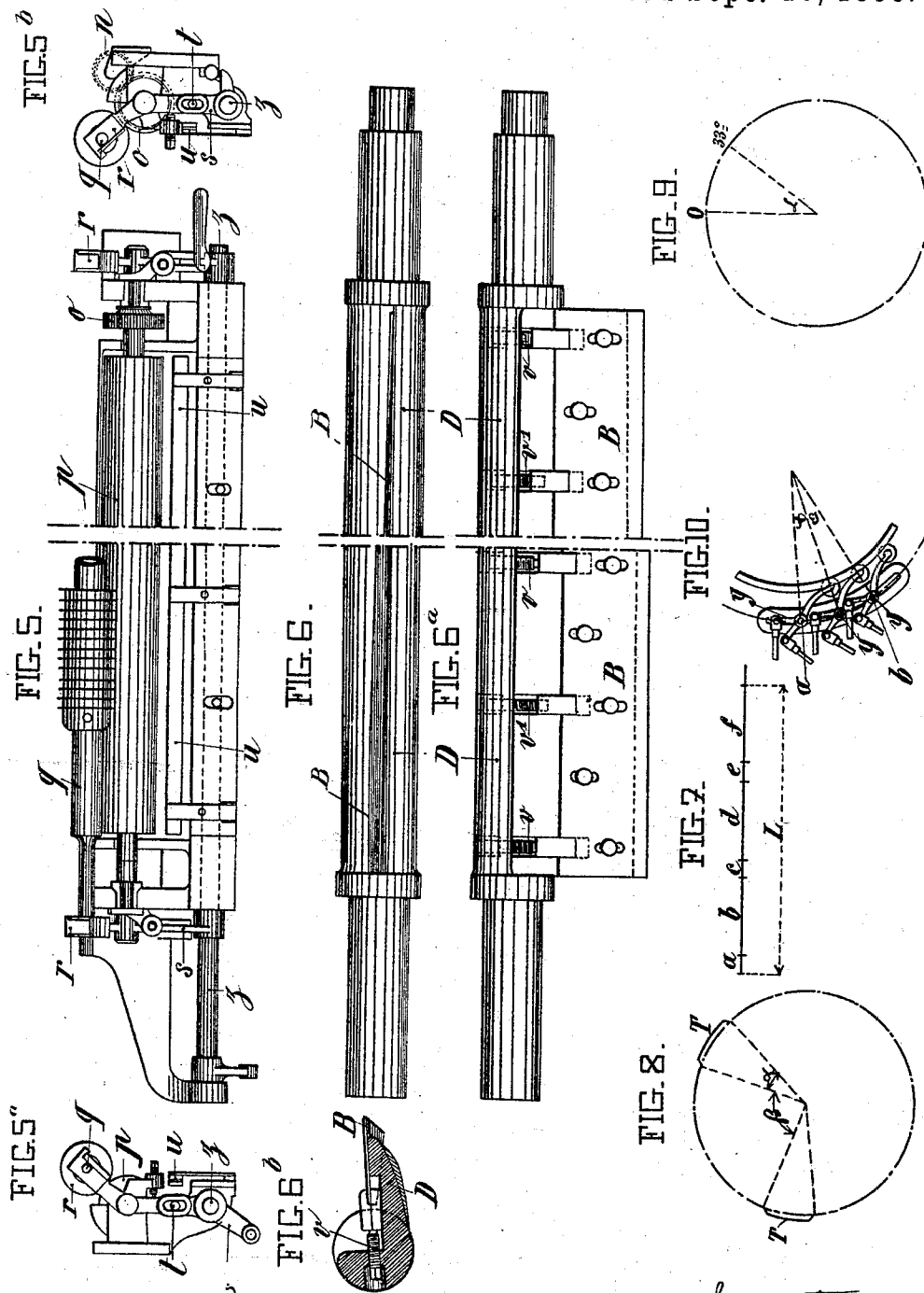
(No Model.)

5 Sheets—Sheet 5.

G. L. GEISLER.
MACHINE FOR RULING PAPER.

No. 545,886.

Patented Sept. 10, 1895.



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UNITED STATES PATENT OFFICE.

GABRIEL LOUIS GEISLER, OF PARIS, FRANCE.

MACHINE FOR RULING PAPER.

SPECIFICATION forming part of Letters Patent No. 545,886, dated September 10, 1895.

Application filed January 10, 1894. Serial No. 496,378. (No model.)

To all whom it may concern:

Be it known that I, GABRIEL LOUIS GEISLER, of the city of Paris, France, have invented certain new and useful Improvements in Machines for Ruling Paper, of which the following is a specification.

Machine-ruling is usually done on paper previously cut to the required size, although attempts have been made to rule paper in the roll, but this necessitated very regular winding of the roll, as upon this depended the regularity of the head-lines and margins. Moreover, the paper required to be cut after ruling. No advantage is thus derived from ruling the paper in the roll instead of in sheets; but, on the contrary, it involves the supplementary operation of passing the paper through a special reeling-machine before ruling.

The ruling-machine which forms the subject of the present invention takes the paper roughly rolled on a reel, trims, rules, and cuts it up, and by means of mechanism fixed on the cutter-shaft or operated thereby renders it capable at its ordinary speed of ruling on both sides of the paper and all kinds of ruling necessitating the employment of special tools which are slow in operation and of limited output. It will be readily conceived that when ruling paper in the roll doubles are avoided, and by dispensing with one operation waste is prevented. Lastly, sorting before ruling is also rendered unnecessary.

To these ends my invention consists in the novel arrangement and combination of parts hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming part of this specification, wherein—

Figure 1 represents a side elevation of the machine, showing the stop-ruling mechanism. Fig. 2 is an elevation of the opposite side, showing the driving-gear. Fig. 3 is a sectional end elevation, showing the transverse cutter. Fig. 4 is a plan of the machine. Fig. 5 is a detail plan view of the apparatus for inking the ruling-disks. Fig. 5^a is an end view of the same. Fig. 5^b is a like view of same, looking from the other end. Fig. 6 shows a plan view of the revolving transverse cutter. Fig. 6^a is a like view of the same, taken at right angles to that illustrated in Fig. 6. Fig. 6^b is a transverse sectional view of the

revolving transverse cutter; and Figs. 7, 8, 9, and 10 are diagrams hereinafter referred to.

My improved machine is characterized by the combination and particular arrangement of the following elements: First, a letting-off spindle; second, sets of circular cutters for cutting the paper longitudinally; third, ruling apparatus, each comprising an ink-fountain, inking-roller, and ruling-disks; fourth, a revolving knife for cutting the paper transversely; fifth, a device connected with the revolving transverse cutting-knife to throw the ruling apparatus out of action.

The letting-off spindle, on which is fixed the reel of paper to be ruled, is supported in two bearings adjustable the one in the direction of and the other at right angles to the axis, the first for adjusting the reel laterally and the other for equalizing the tension at the two sides of the paper, these two adjustments being effected by means of hand-screws.

The mechanism for cutting the paper longitudinally comprises a pair of shafts *d*, Figs. 1 and 4, carrying several pairs of circular cutters *e* and driven by a belt connected with the main driving-pulley *M* through a pair of gear-wheels *E*. The bearings of shafts *d* are adjustable in a transverse direction by screws *f* to bring the cutters into proper position with relation to the inking-disks and regulate the width of the margins and headings. Guide-rollers 1 2 serve to conduct the paper between the circular cutters *e*. The paper is then conducted around the two cylinders *G H*, which form part of the ruling apparatus. These cylinders *G H* receive motion from gears *g h*, fixed thereon at one end, and which engage with and are driven by pinion *i* on the main shaft 5 through an intermediate wheel *K*. The other ends of said cylinders carry gears *l* and *m*, which transmit rotary motion through the intermediate wheels *n* and gear-wheels *o* to the rubber rollers *p*, which turn in the ink-fountains and serve to ink the ruling-disks, three sets of such ruling apparatus being arranged in front of each of the cylinders *G H*. Each set of ruling-disks are loosely carried by a hollow steel shaft *q* and rest slightly upon the inking-roller *p*, which imparts rotary motion to the disks and at same time supplies them with ink. The position of the ruling-shaft and consequently the ruling-disks

with relation to the paper are controlled by means of a pair of bell-crank levers r , pivoted on the shaft of the inking-roller p . One arm of each of the bell-crank levers is provided with suitable adjustable bearings (not shown) in which are journaled the ruling-disk shaft, the other arms being provided with a pin t , which enters a slot in each of the bell-crank levers s , which are pivoted on the shaft z , and by which the ruling-disks are thrown into and out of contact with the paper, as will be hereinafter explained.

u is a clip to hold a felt or other strip, which may be caused to press more or less upon the inking-roller p by means of thumb-screws for the purpose of increasing or diminishing the strength of the lines produced by the ruling-disks according to the pressure exerted on the inking-roller.

3 4 are blotting-rollers which are pressed by means of springs against the felt-coverings of the drums G H for the purpose of taking up any ink which may be deposited thereon by the ruling-disks. This part of the machine is chiefly characterized by the construction, whereby the inking apparatus is adapted to be thrown into and out of contact with the paper, as hereinafter described.

The paper after having been ruled is then cut transversely to the desired size by the long spiral knife, Fig. 6, of the ordinary kind. The steel blade B , which is attached to the knife-holder D , may be readily adjusted by means of set-screws v , which press forward the knife and give it the desired inclination. Between the set-screws v are interposed retaining-screws v' which screw into the stock of the blade B and serve to hold it against the ends of the screws v . The knife-holder D is operated by means of a pair of Evan's friction-cones C , C' , one of which is driven from the main shaft 5 and communicates motion through the other cone to the pinion J and gear k . The main shaft 5 also drives the drums of the ruling apparatus, as has been before stated, by a constant motion, while the knife can be revolved more or less rapidly first, by shifting the belt F from one end to the other of the cones, and, second, by changing the gear-wheel J which drives the knife. The first operation is effected by means of the screw V , controlled by hand-wheel V' , which traverses the belt-guide O from one end to the other of the cones. The necessary tightening or loosening the belt is effected by means of the eccentric bearings P of cone C' , adjusted by worm-gear and two pairs of small bevel-pinions Q Q' , operated by a hand-wheel V^2 on shaft I . It will thus be seen that the size of the sheet may be varied at will.

The transverse cutter comprises a pair of rollers L L' , which conduct the paper to the bed-cutter D' , which may be placed at any required inclination. The two rollers L L' are connected by gears 8 9, and are driven by a belt from the main driving-pulley M through the medium of the friction-pulley N in order

to maintain the paper in tension and prevent irregularities in the cuts and ruling. The driving-pulley M has a friction-clutch (not shown) and is thrown into gear by means of the crank-handles X , connected with suitable intermediate mechanism m' , Fig. 1, while the instant stoppage of the machine is effected by levers Y , disposed at the four corners of the machine. The bed-cutter D' is fixed in position by means of two screws v^2 , Fig. 3, placed one at each end, and is secured when adjusted by two screw-studs and nuts t^2 .

It will be seen that as the paper continues to travel it would not be cut square were the cutting-edges of the knife and bed-cutter parallel to the axis. Moreover, the inclination of the bed-cutter and of the knife should also be capable of variation to suit the size of the sheet.

Tables prepared for each machine serve to indicate to the operator the inclination to be given to the knife for each size of sheet. The bed-cutter, further, has a bar x , Figs. 1 and 3, let into it, which is capable of being projected more or less therefrom. When the bar is drawn back within the bed-cutter, the paper is free to slide upon the latter, and when it is made to project therefrom the paper is caused to deviate from its course, which retards the corresponding side and thus corrects the defect which may exist in the squareness of the cut of the paper due to the circular distance between the two ends of the helical blade. By this means the slightest differences can be corrected by simply projecting one end of the bar more or less, so as to retard the paper at one or other side and so correct any deviations from the desired squareness of cut. As the rotary cutter makes one revolution for each size of sheet, it will be evident that by keying upon the axis of said cutter a wheel provided with mechanism for raising the ruling-disks stops in the ruling operation may be obtained which will always correspond to the same parts of the sheet. Therefore, upon the knife-carrier D there is keyed a wheel R , Figs. 1 and 3, having a grooved rim, in which are placed two circularly-grooved rims S S' , provided with tappets T in varying numbers and lengths movable around the wheel, so as to be capable of easy adjustment for the purpose of controlling the ruling on the sheet. These tappets raise the ruling-disks off the paper, through the small bell-crank levers γ and coupling-rods U' , acting through the levers r and s , before referred to. The tappet-wheel may be mounted upon an intermediate shaft, the essential feature being the application of a series of adjustable tappets upon a wheel driven by and having the same angular velocity as the cutter. The same result might be obtained by making two, three, four, or more revolutions exactly, or one-half, one-third, one-fourth, one-twelfth revolution to one revolution of the cutter, but this would be much less convenient, besides which, in

the case of a larger number of revolutions, it would not be possible to provide for their equal division in every case.

The knife having been regulated to cut the length of sheet desired by means of the cones and intermediate gear, the regulation of the mechanism to throw the ruling-disks out of contact with the paper is very easily effected for the principal sizes in use by means of the following arrangement: The circumference of the tappet-wheel is divided into three hundred and sixty degrees, of which O, Fig. 9, corresponds to the instant of cut of the knife. For a sheet of any length to be ruled with lines and spaces of predetermined lengths, as illustrated at *abcdef*, Fig. 7, the position of the first tappet T to produce the shifting of the ruling-disks should be determined, *a*, Fig. 8. The second tappet should be placed at the proper point in the rear of the first tappet, and so on in succession, until all the tappets which are to produce the shifting of the ruling-disks are placed in position. It is necessary, in the next place, to make the shiftings of the ruling-disks correspond with the transverse cuts. The position of the parts for this operation may be determined by calculation.

If it be desired to produce the shifting of the ruling-disks in three colors, it is necessary that the levers *y* for producing the stops should be shifted in position with regard to the tappets for the different sizes of sheets. The middle lever is supposed to be fixed and the two others advance and recede in proportion to the size of the sheet, so as to form the calculated angle, Fig. 10.

The proper angle for the principal sizes of sheets can be readily determined and marked off upon the tappet-wheel, thus avoiding trial adjustments at each change of size, all that is required being to fix the position of the belt upon the cones to give the length of paper desired between the transverse cuts and then to shift the tappet-ring upon the wheel until the first tappet comes opposite the mark upon the wheel for that particular size.

My invention also includes a system of tapes or cords and guide-rollers for conducting the paper from the longitudinal cutter to the end of the machine, as indicated in the drawings. The machine is also provided with means of working it by hand for facilitating its adjustment, consisting of a toothed ring Z, gearing with a shifting-pinion Z' on a shaft II and operated by a winch-handle. The shafts I and II also carry a tension device U for the friction-belt F.

While I have shown and described with some particularity the various parts and operation of one form of machine embodying my invention I would have it understood that I do not limit myself to the exact combination and arrangement shown and described, since various modifications might be made without departing from the spirit of my invention. Thus, while I have shown one

means for varying the speed of the transverse cutting-knife to enable sheets of various lengths to be cut, it is obvious that any other suitable means might be employed.

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

1. In a machine of the character described, the combination of a rotary cutter, means for operating the same, ruling devices and connections between the rotary cutter and the ruling devices, for throwing the latter into and out of operation, substantially as described.

2. In a machine of the character described, the combination of a rotary cutter, means for driving the cutter at different rates of speed, ruling devices, a tappet or cam wheel operated by the cutter and links connected to the ruling devices and operated by the tappet wheel, whereby the ruling devices can be thrown into and out of operation at predetermined times, substantially as and for the purposes specified.

3. In the herein described machine, the combination of ruling disks carried by shafts mounted to oscillate as described about their inking rollers, a transverse cutter, tappet wheels operated by, or in relation to, the transverse cutter, and lever and link connections between the tappet wheels and ruling disk shafts whereby the latter are oscillated at the proper moments for producing the stops in the ruling, substantially as specified.

4. The combination of adjustable circular cutters, a rotary transverse cutter, driven through variable speed gear, tappet wheels having adjustable tappets and driven from, or in relation to, the transverse cutter, ruling disks inked by rollers and founts and carried by shafts adapted to be oscillated by the tappet motion so as to stop the ruling uniformly for each size of sheet, all substantially as hereinbefore described and illustrated in the accompanying drawings.

5. In a machine for continuously and simultaneously ruling and cutting paper into sheets of various sizes, the combination of adjustable circular cutters, a rotary transverse cutter, variable speed gear for driving the same, tappet wheels having adjustable tappets and driven from, or in relation to, the transverse cutter, ruling disks, means for inking the same, said ruling disks being carried by shafts adapted to be oscillated, tappets, and connections between the shafts of the ruling disks and the tappets, so as to stop the ruling uniformly for each size of sheet, all substantially as hereinbefore described and illustrated in the accompanying drawings.

The foregoing specification of my improvements in machines for ruling paper signed by me this 4th day of December, 1893.

GABRIEL LOUIS GEISLER.

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