

(No Model.)

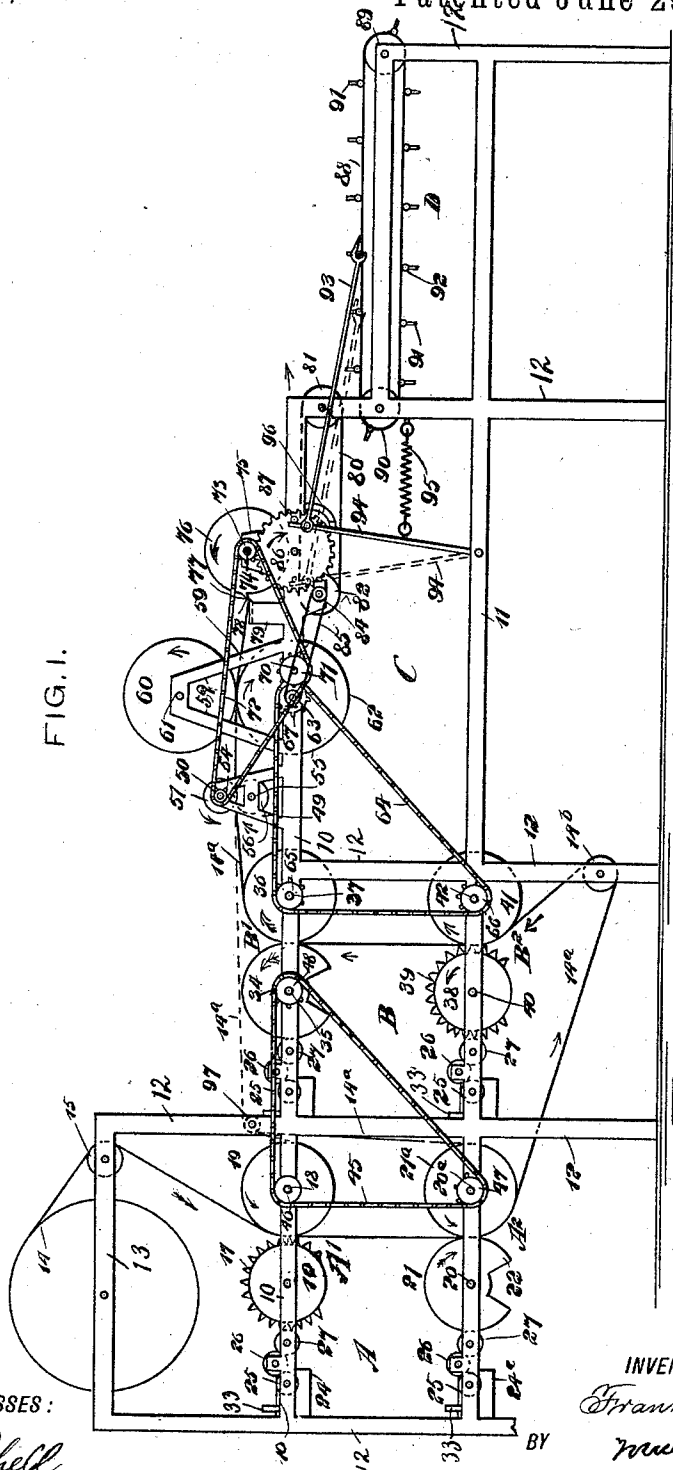
2 Sheets—Sheet 1.

F. HUDSON.
RULING MACHINE.

No. 585,476.

Patented June 29, 1897.

FIG. 1.



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(No Model.)

2 Sheets—Sheet 2.

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FIG. 3

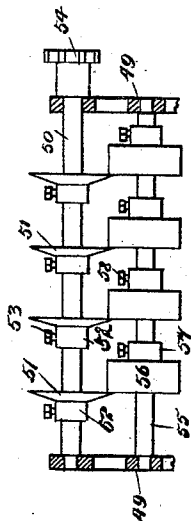


FIG. 5

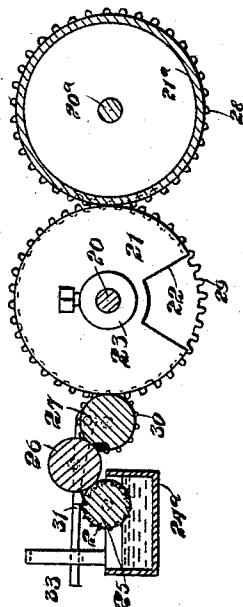


FIG. 2

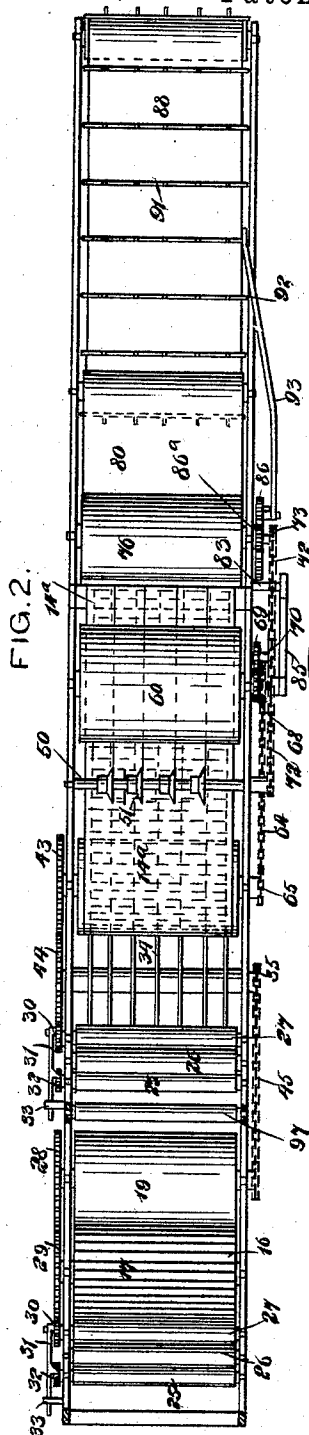
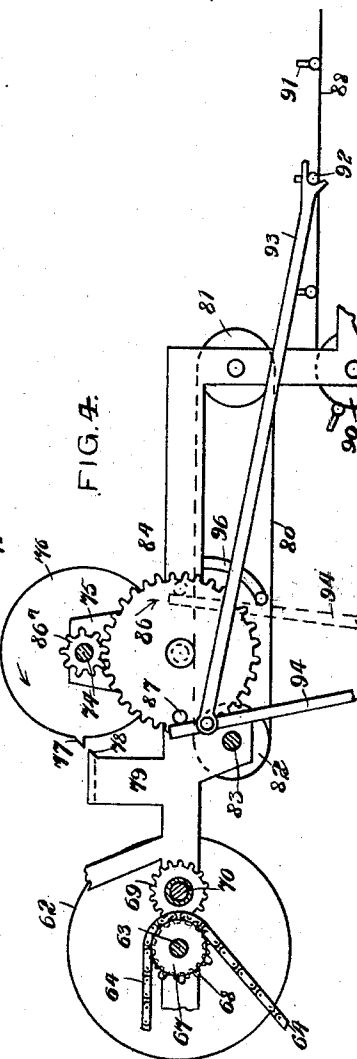


FIG. 4



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UNITED STATES PATENT OFFICE.

FRANK HUDSON, OF COVINGTON, KENTUCKY.

RULING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 585,476, dated June 29, 1897.

Application filed October 22, 1896. Serial No. 609,691. (No model.)

To all whom it may concern:

Be it known that I, FRANK HUDSON, of Covington, in the county of Kenton and State of Kentucky, have invented a new and Improved Ruling-Machine, of which the following is a full, clear, and exact description.

My invention relates to an improvement in ruling-machines adapted for ruling any kind or combination of lines on paper, either writing or wrapping paper, bill-heads, letter-heads, ledger-sheets, and the like; and the object of the invention is to so construct the machine that a roll of paper taken directly from a paper-making machine may be placed upon the ruling-machine and the paper from the roll ruled on one or on both sides in any colored ink or any combination of colored inks, and whereby, further, the ruled paper may be cut to proper lengths and widths and counted into a predetermined number of sheets, the number of sheets being delivered from the machine to any desired receptacle or place, the operation of ruling, cutting, and assembling the cut sheets being performed continuously.

Another object of the invention is to construct a machine capable of the functions above set forth, which machine will be simple, durable, and economic and capable of being superintended by a single individual.

The invention consists in the novel construction and combination of the several parts, as will be hereinafter fully set forth, and pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the figures.

Figure 1 is a side elevation of the improved machine. Fig. 2 is a plan view of the machine. Fig. 3 is a detail view of the cutters for separating the paper into strips or sheets of desired widths. Fig. 4 is a partial side elevation of the machine, parts being in section, illustrating the cutters for cutting the paper into sheets of given length and for controlling the number of sheets to be placed in a pile or in the form of a package to be delivered from the machine; and Fig. 5 is a longitudinal section through a portion of the machine, showing a set of dies or rules, the roll

against which the dies or rules work, and the inking device for the dies or rules.

In carrying out the invention the frame of the machine may be of any desired shape or construction. Preferably, however, it consists of upper side rails 10, lower side rails 11, and uprights 12, connected with the upper and lower side rails, the two sides of the frame being connected or braced in any approved manner. The uprights 12 virtually divide the frame into sections, and four such sections are illustrated, designated, respectively, as A, B, C, and D. The uprights at the front section A of the frame are carried above the upper uprights and are connected by suitable cross-bars 13 at the top, and between these top cross-bars 13 the roll of paper 14 that is to be ruled is mounted to revolve, the paper being carried from the roll downward over an idler 15, located at the top of the front section A.

Between the top rails 10 of the main portion of the machine in the aforesaid section A a drum 16 is mounted to revolve, and this drum is provided with longitudinal dies or rules 17, secured upon or introduced into its periphery, but preferably the rules or dies do not extend all the way around the drum, as shown in Fig. 1. The rules or dies 17 are adapted to impinge upon a pressure-roller 19, which may also be termed an "impression-roller," the paper to be ruled being passed between the impression-roller 19 and the drum carrying the rules, the two being in close relation.

Between the longitudinal bars at the bottom portion of the frame-section A a second ruling device is located. The upper device just described is adapted to rule the paper transversely and is designated as A', while the lower device A² is for the purpose of ruling the paper longitudinally. This lower ruling device consists of a series of disk rules or dies 21, which are secured upon a shaft 20, the shaft being mounted to revolve in the frame-section A, and each of the disk rules is provided with an opening 22 in its periphery. The edges of the disks are preferably beveled to form sharp and well-defined surfaces. The disk dies or rules are spaced by securing-hubs 23 thereon, as best shown in

Fig. 5. These disk dies or rules are adapted to practically impinge upon an impression roller or cylinder 21^a, which is secured on a shaft 20^a, the lower impression-roller being below the upper impression-roller 19, and the paper 14^a from the roll 14 is continued downward from between the ruling members of the upper ruling device downward between the members of the lower ruling device.

An ink-fountain is provided for each ruling device A' and A², and these fountains, which are designated, respectively, as 24 and 24^a, are preferably placed adjacent to the front of the frame-section A. A take-up roller 25 is mounted to revolve in each fountain, and the ink is carried from the take-up roller of each fountain to an inking-roller 27 through the medium of a distributing-roller 26, as is also best shown in Fig. 5.

A gear 28 is mounted usually upon the left-hand end of each of the impression-rollers in the section A of the frame, and the shaft of each ruling device operating in connection with the impression-rollers is likewise provided at its left-hand end with a gear 29, the gears 28 and 29 of the ruling devices being in mesh. The gears 29 mesh with gears 30 on the left-hand end of the shafts carrying the inking-rollers, and each of the gears 30 is pivotally attached to one end of a dog 31, the dogs engaging with ratchet-wheels 32, secured on the left-hand ends of the shafts of the take-up rollers 25, and each dog is carried beyond the take-up roller in connection with which it is to operate through a suitable aperture in a guide 33, located on the ink-fountain to which the take-up roller belongs.

In the second section B of the frame devices B' and B² are located for ruling the paper transversely and longitudinally, but the ruling devices in the second section B rule the paper on the side left blank by the ruling devices in the first section A of the frame. Preferably, however, the ruling devices in the section B of the frame are placed reversely to the devices in the first section A. The ruling devices are constructed in the same manner as those described in connection with the section A of the frame, and the upper device B' consists of a series of disk rules or dies 34, secured upon a shaft 35, the disk rules operating upon an impression-roller 36, secured on a shaft 37. The lower ruling device B² in the frame-section B consists of a drum 38, carrying longitudinally-peripheral rules or dies 39, the drum 38 being mounted on a shaft 40, and the rules on this drum operate in connection with an impression-roller 41, carried by a shaft 42. Each of the ruling devices B' and B² is provided with two gears 43 and 44, one carried by each shaft 37 and 42 of the impression-rollers and the other gear being carried by the shafts on which the rules are secured, and each of the ruling devices B' and B² is provided with inking devices similar to those described in connection with the rules in the section A of the

frame and are correspondingly designated and correspondingly operated.

The paper 14^a, after leaving the lower ruling devices in the section A, is passed over an idler 14^b and is then carried upward between the lower ruling devices B² in the section B of the frame, where the paper is given its transverse lining on the opposite side, and the paper is then again carried upward between the impression and the ruling rolls of the upper ruling device B', receiving on the same side the longitudinal ruling.

At the right-hand side of the machine a belt 45 is made to connect the upper and lower impression-rollers of the ruling devices in the first section of the frame A with the shaft carrying the rules of the upper device B' of the second frame-section B. This endless belt 45 is passed over a sprocket-wheel 46, secured upon the right-hand end of the shaft 18 of the first frame-section, thence over a sprocket-wheel 47, secured to the shaft 20^a in the lower portion of the said first frame-section, and finally the belt 45 is carried over a sprocket-wheel 48, which is secured over the right-hand end of the shaft 35, carrying the rules in the upper portion of the second section B of the frame. At the upper portion of the third frame-section C of the frame, near the front of this section, standards 49 are formed, and in the upper portion of these standards a shaft 50 is journaled, carrying disk cutters 51, provided with hubs 52, adjustably secured on the shaft by means of set-screws 53, as illustrated in Fig. 3, and at the right-hand end of the cutter-shaft 50 a sprocket-pinion 54 is attached. The disk cutters 51 are flat upon one side face and tapering upon the opposite side face, the hubs being at the tapering faces of the cutters, as is also shown in Fig. 3.

A second shaft 55 is journaled in the lower portion of the bearings 49, as shown in Figs. 1 and 3, and on the lower shaft 55 a series of plain wheels 56 is secured, having hubs 57 and set-screws 58, which pass through the hubs to the shaft 55. The plain wheels 56 are so placed on the shaft 55 that the flat faces of the cutters 51 will engage with the side faces of the wheels 56, as clearly shown in Fig. 3, and these cutters and wheels, acting in conjunction, serve to cut the ruled paper longitudinally.

At the rear of the bearings 49 higher bearings 59 are formed upon the upper portion of the frame-section C. In the upper ends of these larger bearings 59 a friction-roller 60 is located, being secured upon a shaft 61, and in the upper longitudinal or horizontal bar 10 of the frame, immediately below the upper friction-roller 60, a second friction-roller 62 is located, being practically in contact with the upper friction-roller 60, and the two rollers move by such contact. The lower friction-roller 62, both of the friction-rollers being feed-rollers, is secured upon a shaft 63. A belt 64 is carried over pulleys 65 and 66,

secured upon the right-hand ends of the shafts carrying the impression-rollers 36 and 41 in the second section of the frame, the belt 64 being likewise passed over a pulley 67, secured upon the right-hand end of the shaft 63 of the lower feed drum or roller 62, as shown in Fig. 1. The power is applied to the shaft 63, and it in turn transmits motion to all parts of the machine. The feed rollers or drums 60 and 62 serve to draw the paper from the rolls and feed it to the cutters. The shaft 63, carrying the pulley 67, is provided with a gear 68, as shown in Figs. 2 and 4, and this gear is in mesh with a second gear 69, which is located upon a sleeve placed on stud-shaft 70, in the upper portion of the frame at the rear of the shaft 63, (shown also in Figs. 1, 2, and 4,) and the sleeve carrying the gear 69 is provided at its outer end with a pulley 71. A belt 72 is passed around the pulley 54 of the cutter-shaft 50, thence around the pulley 71 on the stud-shaft 70, and is finally passed around a pulley 73, which is secured on a shaft 74, and this shaft is journaled in bearings 75, located upon the rear portion of the frame-section C, as shown particularly in Fig. 4. The shaft 74 has a drum 76 secured upon it, and the said drum 76 is provided with a single cutter 77, peripherally located and extended from side to side. Preferably the upper surface of this cutter or blade is beveled and the under side is straight, as shown in Fig. 4. The blade or cutter 77 is adapted to pass in close proximity to and almost in actual contact with a horizontal cutting-blade 78, having a straight upper face and an inclined lower face, as is also shown in Fig. 4, the horizontal cutters 78 being supported upon standards 79, located between the bearings 59 and 75, and as these two cutters are brought together they will act to cut the ruled paper transversely or in lengths.

The ruled paper 14^a, after being passed from the upper and final ruling device B', is carried between the cutters 51 and their coacting wheels, so that the paper may be cut in strips of desired width. The paper thus cut is then fed between the feed-rollers 60 and 62 and fed by the said rollers to the cutters 77 and 78, which cut the paper in desired lengths. The knives 51, which cut the paper longitudinally, travel slightly faster than the paper, but in the same direction.

Below the rear portion of the upper part of the frame-section C an endless carrying-belt 80 is located, which is passed over rollers 81 and 82, suitably journaled, as shown in Figs. 1 and 4, the shaft 83 of the forward drum or roller 82 being provided with a pulley 84, and this pulley is connected by means of a belt 85 with a small pulley on the right-hand end of the shaft 63, carrying the lower feed-roller 62.

A pinion 86^a is secured upon the right-hand end of the shaft 74, carrying the rear or transverse cutter 76, and this pinion is made to mesh with the teeth of a gear-wheel 86, journaled upon the right-hand side of the frame

and provided with a wrist-pin 87 at a point near its periphery, so that the shaft carrying the transverse cutter 77 will make a number of revolutions to each revolution of the gear 86.

A second conveyer or carrying belt 88 is located at the upper portion of the last section D of the frame, as shown particularly in Fig. 1. This belt 88 is passed over two drums or rollers 89 and 90, and the belt is provided upon its outer face with a series of transversely-located partitions 91, dividing this last conveyer or carrying belt into a number of pockets, and the pockets are of such width that they will neatly receive the sheets of ruled paper cut to the desired length.

The partitions 91 are provided with end projections or lugs 92, extending beyond the right-hand edge of the belt, as shown in Figs. 1 and 4, and these projections or lugs 92 are adapted to be engaged by the forked end of a shifting arm 93, the said shifting arm being pivoted at or near the upper end of a lever 94, which at its lower end is fulcrumed upon a support, the lower longitudinal bar 11, for example, at the right hand side of the frame-section C. The upper end of the lever 94 is adapted to be engaged by a wrist-pin 87 as the gear-wheel 86 is revolved, and a spring 95 is secured to the rear face of the lever 94 and to a support on the frame at the rear portion of the lever, so that the lever 94, when it is engaged by the wrist-pin 87 at the rear portion of the machine, as shown in Fig. 4, will be carried by the said wrist-pin in a forwardly direction, the gear so traveling, as shown in positive lines in Fig. 4, placing the spring 95 under tension, and when the lever 94 is released from the wrist-pin the spring 95 will draw the lever rearward to the position shown in positive lines in Fig. 1, where its rearward movement may be and preferably is limited by engaging with the stop 96, projected downwardly from the frame.

The operation of the machine is as follows: The paper is passed from the roll 14 between the upper ruling devices A' of the first frame-section, where one side of the paper is transversely ruled. The paper continues downward through the lower ruling devices A² in the same section of the frame, where the paper is given its longitudinal ruling. The paper being then passed over the idler 14^b is carried up through the ruling devices in the second section B of the frame and receives its transverse and longitudinal ruling on its opposite side. After passing from the ruling devices the paper is carried between the longitudinal cutters 51 and their coacting wheels 56, thence between the feed-rollers 60 and 62 to the stationary horizontal cutter 79, which is in the nature of an anvil, at which point the paper is cut in desired lengths by the rotating transverse cutter 77. As the paper is cut in its different lengths it will fall upon the first conveyer-belt 80 and will be delivered from the said belt into a pocket on the second conveyer-belt in position to re-

ceive it, and after this pocket has received its quota of sheets the pocket will be fed rearward toward the delivery end of the second conveyer-belt by the action of the shifting rod 93, brought about by the shifting gear 86, and the said gear 86 is so calculated in diameter that before one revolution of the gear is made a predetermined number of sheets will have been cut and delivered to the pocket placed in position to receive the sheets before the pocket is moved forward and an empty pocket brought in position for another supply. The ruled sheets may be delivered from the final conveyer 88 to a table or other support or receptacle placed in position to receive them.

All parts will be so geared that the impression-rollers and dies will move at a uniform speed with the paper. In the event it is desired to rule the paper only on one side and in one direction the paper can be passed simply around the impression-roller 19 in the first section of the frame, thence over an idler 97 (shown in dotted lines in Fig. 1) direct to the cutters, and if it is desired to rule the paper transversely and longitudinally on one side only the paper is passed in contact with both of the ruling devices of the first section of the frame, and thence upward from the lower device over the said idler 97 direct to the cutters, as is also shown by dotted lines in Fig. 1, and if at any time it is not desired to rule the paper passed through the ruling devices while the machine is in motion it is simply necessary to remove the distributing-rollers of the inking devices from the machine or carry them away from the take-up rollers and the roller which applies the ink to the rules.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A ruling-machine, comprising ruling devices arranged one above the other for ruling the paper transversely and longitudinally, one of the ruling devices consisting of a drum having longitudinal rules, and an impression-roller, and the other disk rules, and an impression-roller, cutters arranged in rear of the ruling devices for cutting the paper longitudinally, a cutter in rear of the first cutter for cutting the paper transversely, and feed-rollers between the said cutters, substantially as described.

2. A ruling-machine, comprising two sets of ruling devices arranged one in rear of the other for ruling the paper longitudinally and transversely on both sides, each set consisting of a drum having longitudinal rules, disk rules and impression-rollers for said drum and disks, cutters arranged in rear of the ruling devices for cutting the paper longitudinally, a cutter in rear of the first cutter for cutting the paper transversely, feed-rollers between the cutters, and an endless conveyer provided with pockets receiving the sheets of paper, substantially as described.

3. In a ruling-machine, the combination, with a support for a roll of paper, a drum mounted below the said support and provided with a series of longitudinally-disposed rules, a revolving impression-roller for the horizontal rules, a shaft located beneath the horizontal rules, disk rules adjustable upon the said shaft, an impression-roller for the disk rules, and inking devices for both of the rules, of a series of cutters in rear of the rules and arranged to cut the material longitudinally, cutters arranged in rear of the first cutters and adapted to cut the material transversely, and feed-rollers between the two cutters, as and for the purpose set forth.

4. In a ruling-machine, the combination of two sets of ruling devices arranged in rear of one another for ruling the paper transversely and longitudinally on both sides, each set comprising a drum having longitudinal rules, disk rules and impression-rollers for said drum and disks, a plurality of cutters arranged in rear of the ruling devices for cutting the paper longitudinally into strips and a cutter in rear of the said cutters for cutting the strips transversely into lengths, substantially as described.

5. In a ruling-machine, the combination, with a support for a roll of paper, a drum mounted below the said support and provided with a series of longitudinally-disposed rules, a revolving impression roller or cylinder for the horizontal rules, a shaft located beneath the horizontal rules, disk rules adjustable upon the said shaft, an impression-roller for the disk rules, and inking devices for both of the rules, of a series of cutters in rear of the rules and arranged to cut the material longitudinally, cutters arranged in rear of the first cutters and adapted to cut the material transversely, a feed device between the two cutters, a conveyer provided with pockets receiving the material from the cutters, and a device for regulating the movement of the conveyer, whereby each pocket will receive a predetermined number of sheets, as and for the purpose specified.

6. In a ruling-machine, the combination with ruling devices arranged one above the other for ruling the paper on one side transversely and longitudinally, comprising a drum having longitudinal rules, disk rules, and impression-rollers for the drum and disks, of a second set of ruling devices in rear of the first set and in reverse order thereto for ruling the paper on one side transversely and longitudinally, comprising disk rules, a drum having longitudinal rules and impression-rollers for the disks and drum, cutters in rear of the second set of ruling devices for cutting the paper into strips, and a cutter in rear of the said cutters for cutting the strips into lengths, substantially as described.

7. In a ruling-machine, the combination with ruling devices arranged one above the other for ruling the paper on one side transversely and longitudinally, of a second set of

ruling devices arranged one above the other and in rear of the first set for ruling the other side of the paper transversely and longitudinally, cutters in rear of the second set of ruling devices for cutting the paper into strips, a cutter in rear of the said cutters for cutting the paper into lengths, and feed-rollers between the cutters, substantially as described.

8. In a ruling-machine, the combination with ruling devices for ruling the paper transversely and longitudinally on both sides, of cutters arranged in rear of the ruling devices for cutting the paper longitudinally into strips, a cutter for cutting the strips transversely into lengths, feed-rollers arranged between the cutters, a conveyer provided with pockets for receiving the sheets of ruled paper, and means operated from the transverse cutter for imparting an intermittent motion to the conveyer, substantially as described.

9. In a ruling-machine, the combination with ruling devices for ruling the paper transversely and longitudinally on both sides, of cutters arranged in rear of the ruling devices for cutting the paper longitudinally into strips, a cutter for cutting the strips transversely into lengths, feed-rollers between the cutters, a carrying-belt for receiving the sheets of paper, a conveyer provided with pockets for receiving the sheets from the carrying-belt, and means operated from the transverse cutter for imparting intermittent motion to the said conveyer, substantially as described.

10. The combination, with rotary cutters

and their driving mechanism, of a conveyer-belt provided with pockets, a gear operating in conjunction with the rotary cutters and traveling at a lesser speed, the said gear being provided with a wrist-pin, a shifting arm having one end formed for engagement with the pockets on the conveyer, and a lever, tension-controlled in one direction and operated in the opposite direction by the aforesaid wrist-pin, the said lever carrying the said shifting arm, as and for the purpose set forth.

11. In a ruling-machine, the combination of an endless carrier provided with pockets, a pivoted and spring-pressed lever, a shifting arm pivoted to the lever and having its free end engaging projections on the carrier, and means for swinging the lever to place the spring thereof under tension and then releasing the same, substantially as described.

12. In a ruling-machine, the combination with an endless carrier provided with pockets and lugs projecting from one side, of a pivoted and spring-pressed lever, a shifting arm pivoted to the lever and engaging the lugs of the carrier, and a wheel provided with a wrist-pin engaging the lever to swing it forward to place the spring thereof under tension, and then releasing the same, substantially as described.

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