

(No Model.)

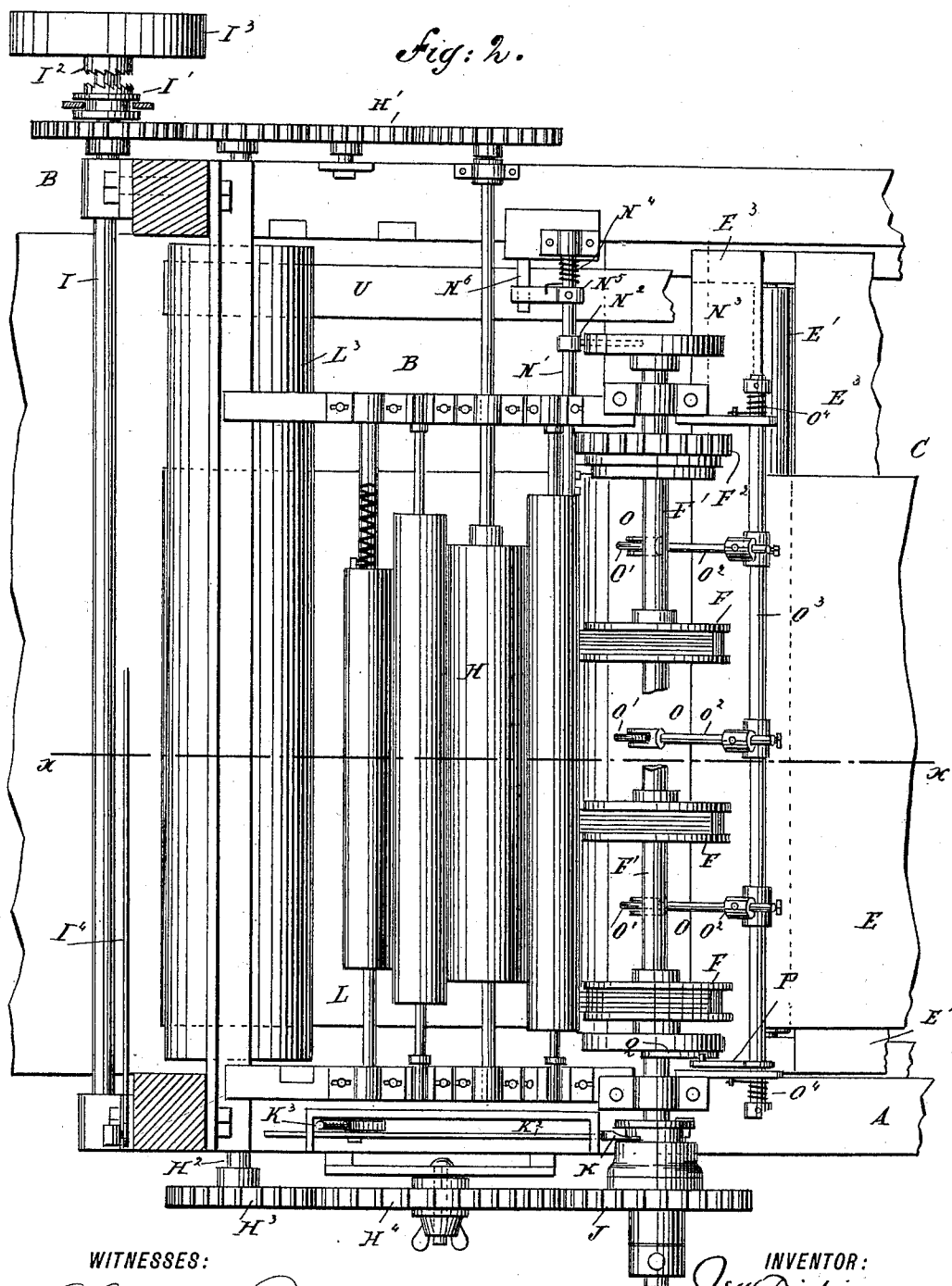
6 Sheets—Sheet 2.

J. W. DICKIESON.

COMBINED PRINTING AND RULING MACHINE.

No. 415,902.

Patented Nov. 26, 1889.



WITNESSES:

Chas. Vildy.
C. Sedgwick

INVENTOR:

INVENTOR:
J. W. Dickieson
BY Munn & Co

ATTORNEYS.

(No Model.)

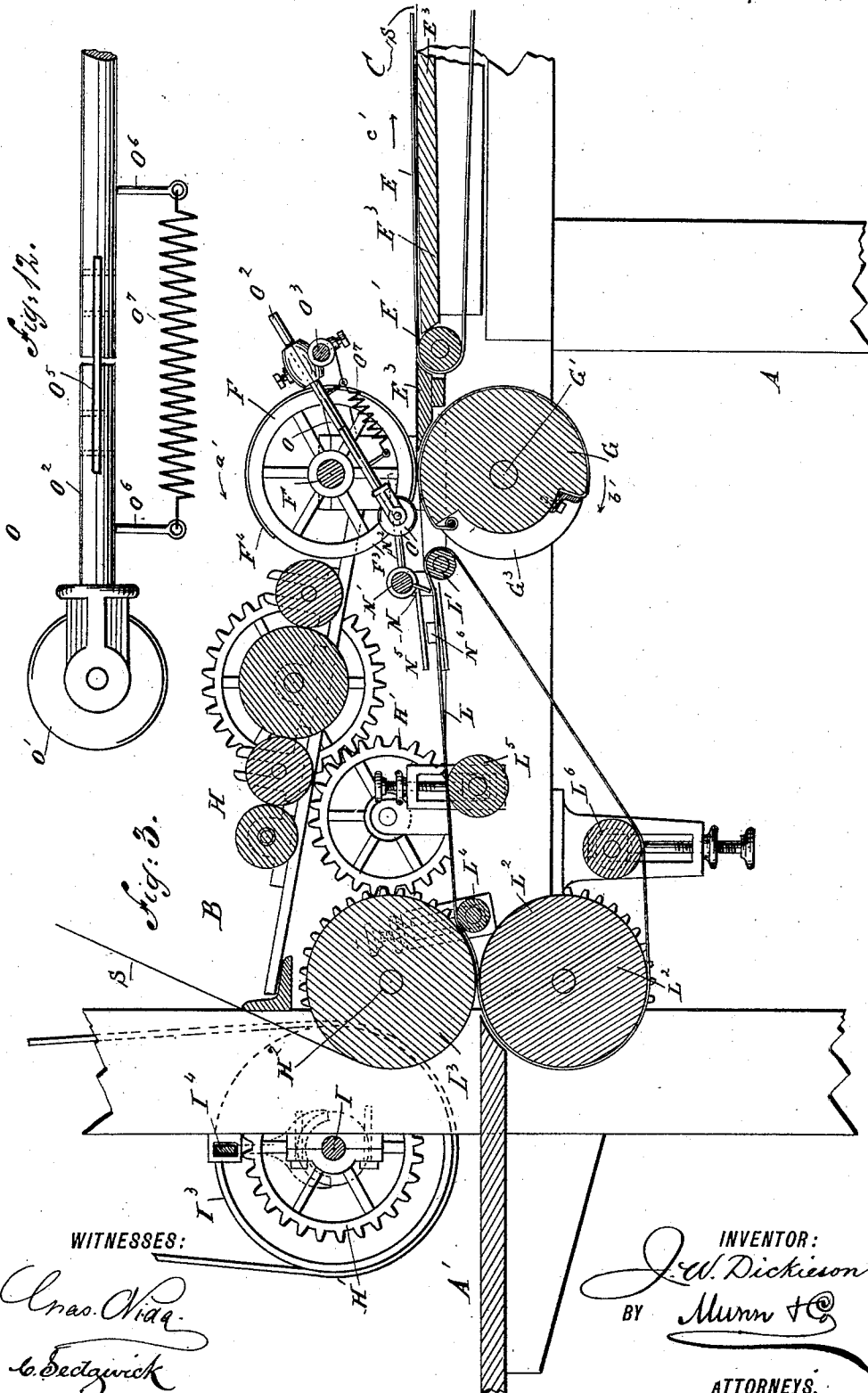
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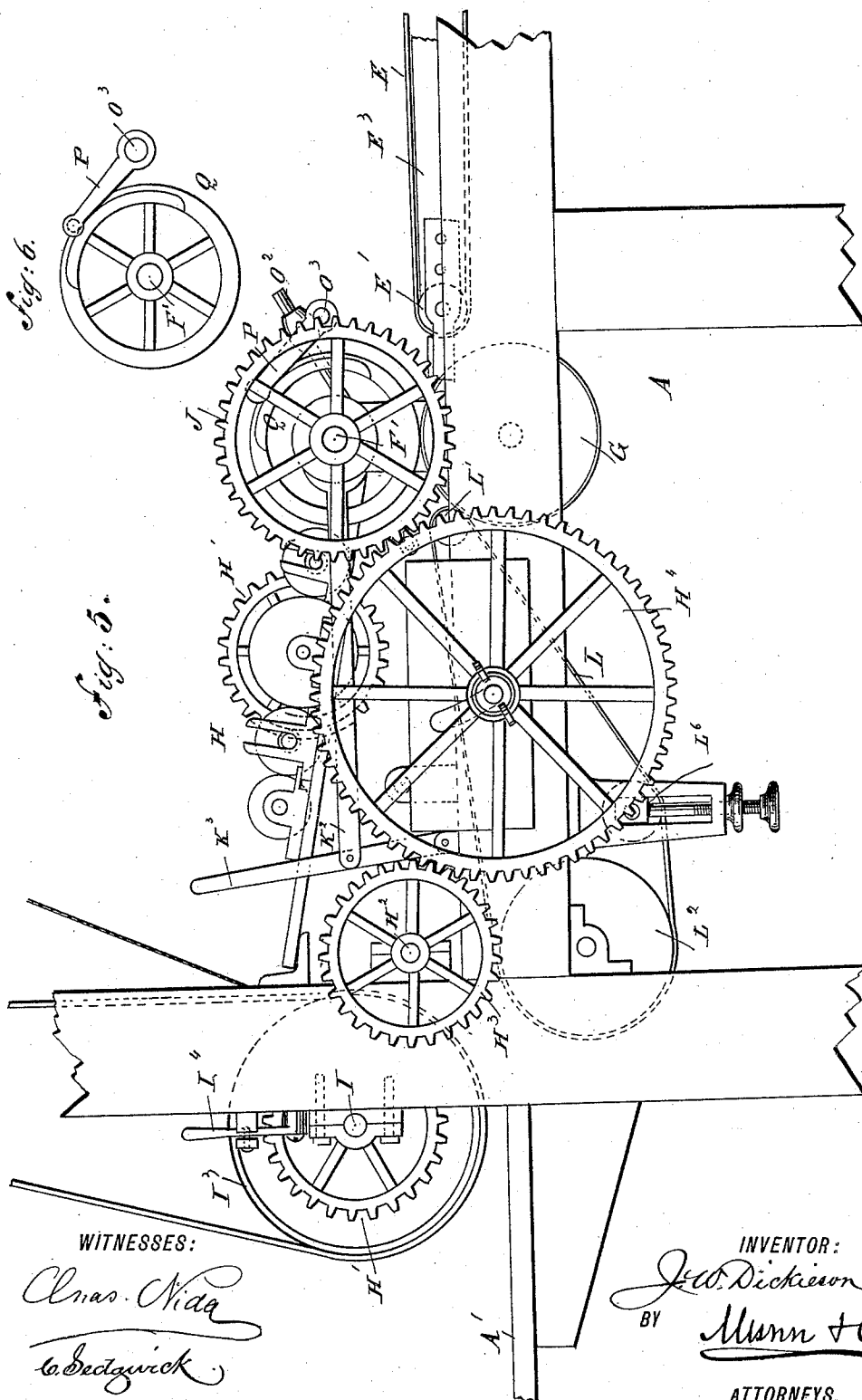
6 Sheets—Sheet 5.

J. W. DICKIESON.

COMBINED PRINTING AND RULING MACHINE.

No. 415,902.

Patented Nov. 26, 1889.



WITNESSES:

Chas. V. Aa
W. Sedgwick

INVENTOR:

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ATTORNEYS.

(No Model.)

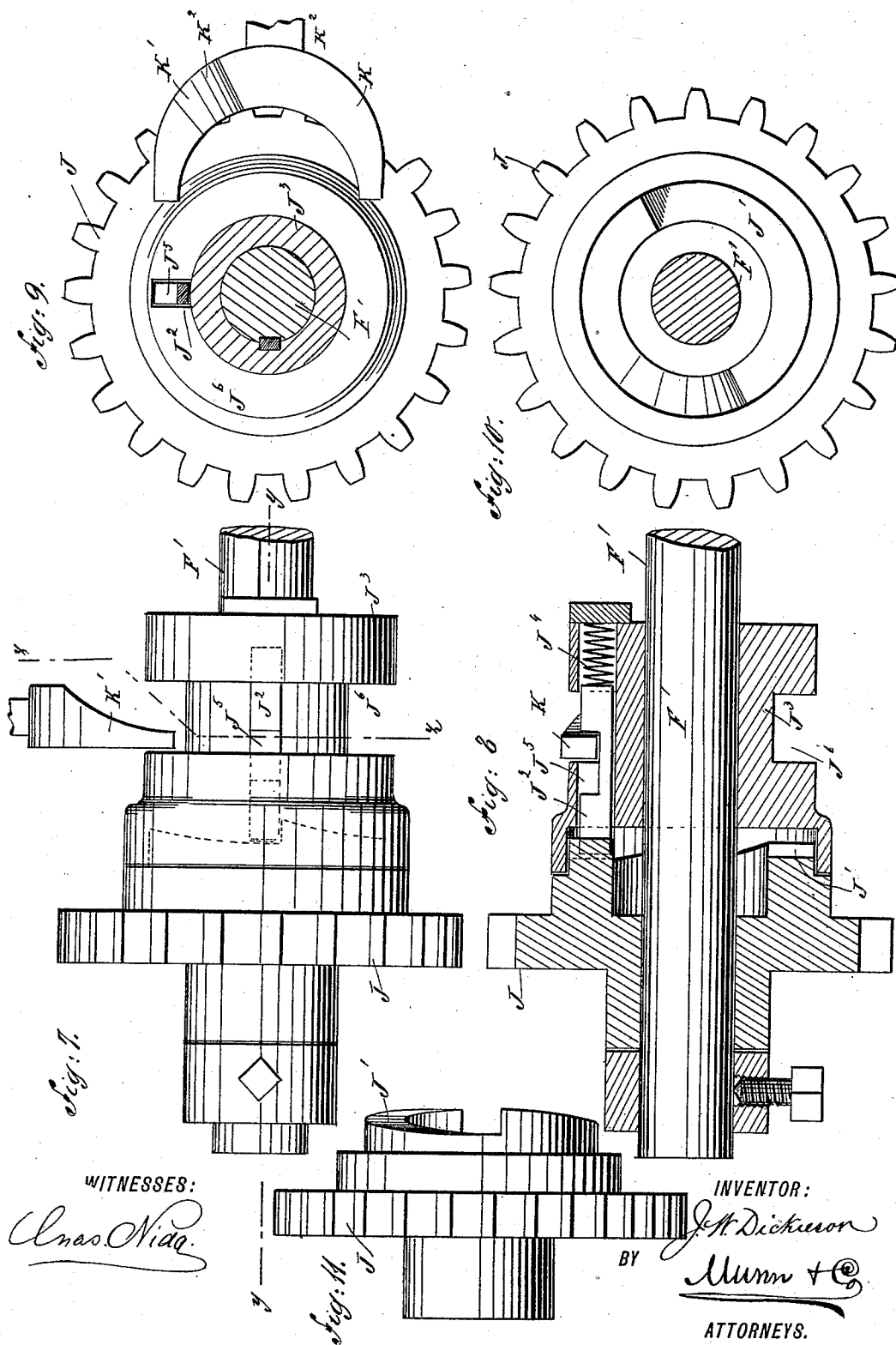
6 Sheets—Sheet 6.

J. W. DICKIESON.

COMBINED PRINTING AND RULING MACHINE.

No. 415,902.

Patented Nov. 26, 1889.



UNITED STATES PATENT OFFICE.

JAMES W. DICKIESON, OF BROOKLYN, ASSIGNOR, BY MESNE ASSIGNMENTS,
TO THE RELIABLE PRINTING AND BLANK BOOK MANUFACTURING COM-
PANY, OF NEW YORK, N. Y.

COMBINED PRINTING AND RULING MACHINE.

SPECIFICATION forming part of Letters Patent No. 415,902, dated November 26, 1889.

Application filed August 21, 1888. Serial No. 283,338. (No model.)

To all whom it may concern:

Be it known that I, JAMES W. DICKIESON, of Brooklyn, in the county of Kings and State of New York, have invented a new and Improved Combined Printing and Ruling Machine, of which the following is a full, clear, and exact description.

The object of the invention is to combine a printing-press with a ruling-machine in such a manner that the printing-press constitutes the feed of the ruling-machine, and the paper is consequently first printed and then ruled, whereby work can be produced which is far superior to that produced by machines in which the paper is first ruled and then printed.

The invention consists of a printing-press operating a ruling-machine, and constituting the feed of the same.

The invention also consists of certain parts and details and combinations of the same, as will be fully described hereinafter, and then pointed out in the claims.

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

Figure 1 is a side elevation of the improvement. Fig. 2 is an enlarged plan view of the printing-press and one end of the ruling-machine. Fig. 3 is a sectional side elevation of the same on the line *xx* of Fig. 2. Fig. 4 is a rear side elevation of the same. Fig. 5 is a front side elevation of the same. Fig. 6 is a face view of the gripper-cam. Fig. 7 is an enlarged plan view of the clutch for stopping and starting the printing-press. Fig. 8 is a sectional side elevation of the same on the line *yy* of Fig. 7. Fig. 9 is a sectional end elevation of the same on the line *zz* of Fig. 7. Fig. 10 is a face view of the clutch gear-wheel with the shaft in section. Fig. 11 is a side elevation of the same. Fig. 12 is an enlarged side elevation of the gripper-arm. Fig. 13 is a plan view of a belt-pulley, and Fig. 14 is a transverse section of part of the ruling-machine on the line *ww* of Fig. 1.

The frame A, of suitable construction, supports near its front end a printing-press B, next to which is located and extends rear-

wardly on the frame A the ruling-machine C, provided with the usual mechanism of ruling-machines, including the pen device D, of any approved construction and operating in the usual manner.

The ruling-machine C is further provided with the usual endless belt E, passing over the pulleys E' and E², of which the latter is mounted to rotate in fixed bearings on the main frame A, while the pulley E' is mounted to rotate near the end of and in bearings secured to a table E³, mounted to slide forward and backward on top of the main frame A. The table E³ is pressed and held in its outermost position by means of the arms E⁴, engaging the right-hand end of the said table E³ and secured to a shaft E⁵, mounted to turn in suitable bearings on the frame A. (See Fig. 14.)

On one outer end of the shaft E⁵ is secured a handle or arm E⁶ for turning the said shaft E⁵, so as to move the table E³, with the roller E', into its outermost position, thus stretching the endless belt E. When the outermost position of the table E³ is reached, the shaft E⁵ is locked in position by an arm E⁷ pivoted to the frame A and swung over the top of the handle or arm E⁶, as is plainly shown in Figs. 1 and 14.

The printing-press B is provided with a number of form or type cylinders F, located above an impression-cylinder G, extending transversely and secured on a shaft G', mounted to rotate in suitable bearings on the main frame A. The form or type cylinders F are secured on a shaft F', mounted to rotate in suitable bearings on the main frame A and provided with a gear-wheel F², meshing into a gear-wheel G², secured on the said shaft G', so that the impression-cylinder G and the form or type cylinders F rotate together at the same rate of speed, said gear-wheels F² and G² being alike in diameter.

In the impression-cylinder G is formed the usual transverse recess G³, in which the ends or edges of the blankets which surround the impression-cylinder are secured, as is plainly shown in Fig. 3. A similar recess F³ extends between the ends of the form or type plates

F⁴ on the type-cylinders F, the said recess F³ passing over the recess G³ when the cylinders F and G are rotated. The type or electro plates F⁴ on the form-cylinders F are secured to the same in any suitable manner, and the said type or electro-plates are inked by an inking device H, of any approved construction, located in front of the type-cylinders F and mounted in suitable bearings on the main frame A.

The inking device H is set in motion by a train of gear-wheels H', connected with the main driving-shaft I, mounted to rotate loosely in suitable bearings on the front end of the frame A and extending transversely across the same. On the shaft I is held to slide and to rotate a clutch I', adapted to engage a corresponding clutch I², formed on the hub of the driving-wheel I², mounted to rotate loosely on the shaft I and receiving a rotary motion by the usual belt from a suitable motor. The clutch I' can be thrown into and out of contact with the clutch I² by a lever I⁴, held transversely on the front end of the frame A. When the lever I⁴ is shifted to the left; then the clutch I' is thrown in contact with the clutch I² and the shaft I, and the shaft I and the train of gear-wheels H' are rotated, thus imparting motion to the inking device H.

The shaft H² of one of the gear-wheels of the train of gear-wheels H' carries at its other end a gear-wheel H³, which meshes into an intermediate gear-wheel H⁴, held to rotate on an adjustable stud on the main frame A and meshing into a gear-wheel J, mounted to rotate loosely on the shaft F', carrying the form or type cylinders F. On the face of the hub of the gear-wheel J is formed a spiral cam J', against which abuts a bolt J², held to slide transversely in suitable bearings formed in the clutch-collar J³, secured on the shaft F' alongside the gear-wheel J, as is plainly shown in Figs. 7 and 8. The inner end of the bolt J² rests against the spring J⁴, held in the said clutch-collar J³ and serving to press the front end of the said bolt J² in contact with the front of the spiral cam J'.

In the bolt J² is formed a recess J⁵, adapted to be engaged by a fork K, formed at one prong into a wedge K', as is plainly shown in Figs. 7 and 9. The fork K is adapted to slide into the annular recess J⁶, formed in the clutch-collar J³, and is secured to a rod K², mounted to slide horizontally on suitable bearings on top of the main frame A. A lever K³, fulcrumed on the main frame A, is pivotally connected with the said rod K² and serves to move the latter and its fork K into and out of contact with the clutch-collar J³ and the bolt J². The clutch mechanism just described serves to stop or rotate the shaft F'.

The sheets of paper are passed between the form-cylinders F and the impression-cylinder G by an endless belt L, located in front of the said cylinders and extending to the inner end of the feed-table A', located at the front end of the machine and supporting the

sheets of paper to be printed and ruled. The endless belt L passes over a small roller L', extending transversely and mounted in suitable bearings in the main frame A and as close to the impression-cylinder G as possible. The front end of the endless belt L passes over a large roller L², mounted to rotate in suitable bearings on the main frame A and extending with its top in line with the upper surface of the feed-table A'.

Directly above the roller L² is located a roller L³, under which passes the endless belt L, said roller L³ being secured on the shaft H², previously mentioned, and turning with the same. The shaft of the roller L² is geared with a gear-wheel of the train of gear-wheels H' and fastened on the shaft H², as is plainly shown in Fig. 4. The endless belt L is held in contact with the under side of the roller L³ by means of a small roller L⁴, located above the roller L² and mounted in adjustable bearings held on the main frame A, as is plainly shown in Fig. 3. The endless belt L is further supported between the roller L⁴ and the roller L' by a large or medium-sized roller L⁵, also mounted in adjustable bearings held on the main frame A. The proper tension is given to the endless belt L by means of a roller L⁶, turning in adjustable bearings and provided with conical ends L⁷, as is plainly shown in Fig. 13. The belt passes over the roller L⁶ between the conical ends L⁷, which latter prevent the belt from shifting sidewise, thus holding it always in place when passing over the various rollers. It will be seen that the sheet of paper passes over the feed-table A' onto the endless belt L, passes upward between the endless belt of the roller L³, and then passes along the belt L to be finally delivered between the type-cylinders F and the impression-cylinder G.

On top of the endless belt L, near its inner end and in front of the roller L', is held a gate N, extending transversely and secured on a shaft N', mounted to turn in suitable bearings on the main frame A. The said gate N serves to stop the sheet of paper traveling on the endless belt L until the operator throws the gate N upward, as hereinafter more fully described. On the shaft N' is held an arm N², operated on by a segmental cam N³, secured to one end of the shaft F', carrying the form-cylinders F, said cam being plainly shown in Fig. 4. A spring N⁴ is coiled or otherwise secured on the shaft N' so as to hold the gate N in a downward position—that is, on top of the belt L. The gate N presses slightly on the belt L, so as to cause a slight bend and to insure the retention of the sheet of paper until the printing-surfaces are in the proper place. A stop-arm N⁵ is secured to the shaft N' and rests on a stop N⁶, secured to the main frame A, said stop-arm N⁵ and the stop N⁶ serving to limit the downward motion of the gate N, caused by the action of the spring N⁴. Thus the gate N is always down until the segmental cam N³ acts on the arm N², so that

the latter is pressed downward, the shaft N' is turned, and the gate N is swung upward, thus permitting the sheet of paper on the endless belt L to travel forward between the form-cylinders F and the impression-cylinder G.

Between the type-cylinders F are held the roll-grippers O, each consisting of a wheel O', adapted to roll on top of the impression-cylinder G, slightly in front, as is plainly shown in Fig. 3. The wheel O' is mounted to rotate in an arm O², secured by suitable means on a shaft O³, mounted to turn in suitable bearings formed on the main frame A. Springs O⁴, coiled on the shaft O³, serve to swing the arms O² downward, so as to hold the wheels O' firmly in contact with the sheets of paper passing over the impression-cylinder G. In order to increase the tension of the wheels O' on the sheets of paper and the impression-cylinder G, I make each arm in two pieces connected with each other by a plate-spring O⁵, and an arm O⁶ is secured to the arm O² a short distance beyond the ends of the said plate-spring O⁵. The outer ends of the arms O⁶ are connected with each other by a coil-spring O⁷, which serves to bend the plate-spring O⁵, so as to press the wheel O' firmly in contact with the sheet of paper when passing over the impression-cylinder G.

Near one outer end of the shaft O³ is secured a cam-arm P, operated on by a segmental cam Q, secured on the shaft F', carrying the impression-cylinders F. The cam Q is so arranged that the roll-grippers O are raised upward away from the impression-cylinder G whenever the recess G³ of the impression-cylinder passes under the roller O'. The moment the end of the recess G³ has passed the roller O' the cam-arm P drops over the cam Q and the springs O⁴ and O⁷ again press the roller O' downward toward the impression-cylinder G and against the paper passing over the said impression-cylinder.

The front end of the table E³ extends directly behind the impression-cylinder G, so as to deliver the paper from the impression-cylinder G and the form-cylinders F to the endless belt E of the ruling-machine C. A number of tapes S pass around the roller L³ onto the endless belt L, so that the paper fed over the feed-table A' onto the endless belt L is held on the latter by the tapes S. The latter, after leaving the endless belt L, pass over the impression-cylinder G between the form-cylinders F and then pass over the front end of the table E³ onto the endless belt E of the ruling-machine C, and then pass over a roller T, located on top of the endless belt E, as is plainly shown in Fig. 1. The tapes S then pass upward over a roller T', located directly above the printing-press B on the main frame A, and then the tapes pass downward over the roller F³, as before described.

It is understood that the gate N is sufficiently cut away to form a free passage for the tapes S in passing over the endless belt

L in the immediate neighborhood of the said gate N.

The endless belt E is driven from the printing-press B by means of a belt U, passing over the roller L², and also over the roller E² at the rear end of the main frame A.

The operation is as follows: When the operator desires to start the machine, he moves the lever I¹ to throw the clutch I' into contact with the clutch I² of the driving-pulley I³, having a rotary motion, whereby the main driving-shaft I imparts, by means of the train of gear-wheels, motion to the inking device H and at the same time rotates the clutch-wheel J and causes the belt L to travel with its upper part from the feed-table A' rearwardly toward the impression-cylinder G. The tapes S also receive a traveling motion in the same direction as the endless belt L by passing over the roller L³ in gear with the roller L². When the fork K is disengaged from the clutch-collar J³, as shown in Figs. 7 and 9, the bolt J² is pressed at one end into contact with the back of the spiral cam J' by the action of the spring J⁴, as is plainly shown in Figs. 7 and 8, so that the rotary motion of the gear-wheel J imparts a rotary motion to the clutch-collar J³, fastened on the shaft F', thereby rotating the latter, and consequently the form or type cylinders F, in the direction of the arrow a'. (See Fig. 3.) At the same time a rotary motion is imparted in the direction of the arrow b' to the impression-cylinder G, which rotates simultaneously with the type-cylinders F. The rotary motion of the shaft F' opens the gate N at every revolution of the said shaft shortly before the beginning of the type or electro plate F⁴ is in its lowermost position at the beginning of the impression-cylinder G. The gate N closes as soon as the cam N³ disengages the arm N² of the shaft N', carrying the said gate N, and the spring N⁴ causes a return motion of the said gate N. The roll-grippers O are also lifted at every revolution of the shaft F' by the action of the cam Q on the arm P, secured to the gripper-shaft O³. This lifting of the roll-grippers O takes place when the end of the type O⁴ is in its lowermost position, and the beginning of the recess G³ in the impression-cylinder G is in its lowermost position, so that the wheel O' of each gripper is held above the impression-cylinder G at the time the recess G³ passes under the type-wheels F. The rotary motion of the main driving-shaft I also imparts a forward motion to the endless belt E in the direction of the arrow c', so that when the operator now feeds a sheet of paper onto the endless belt L, between the rollers L² and L³, then the said sheet of paper is carried forward on top of the endless belt L under the tapes S, which hold the sheet in place on the said belt. When the sheet arrives at the gate N the latter is closed, so that the sheet cannot travel farther and remains in position between the belt L and the tapes S until the said gate N opens, as above described, by the

action of the cam N^3 on the arm N^2 of the gate-shaft N^1 . The gate N opens, as before described, before the beginning of the type F^4 is in its lowermost position, so that the sheet of paper is fed between the impression-cylinder G and the type-cylinders F by the forward motion of the belt L and the tapes S . The sheet of paper passes onto the impression-cylinder G under the wheels O' of the roll-grippers O , so that the paper is held firmly in place on the impression-cylinder G and travels with the same. The types F then commence to print on the sheet of paper and the latter passes over the end of the table E^3 onto the endless belt E , on which it is held by the tapes S . The endless belt E carries the sheet rearward under the pen device D , which rules the sheet in the usual manner after the printing has taken place, as above described. The printed and ruled sheet goes farther rearward on the endless belt E and is delivered to the usual tapes (not shown) before it is deposited in the collecting-box in the usual manner.

It will be seen that the gate N retains the paper until the printing-surfaces are in the proper place, so that the beginning of the printing is always in the proper place on the sheet of paper. It will further be seen that the gripper-wheels O' of the roll-grippers O hold the paper firmly in position on the impression-cylinder G while the printing takes place, in addition to the action of the tapes S , which also pass over the sheets of paper above the impression-cylinder G .

When the operator desires to stop the printing without stopping the other parts of the machine, he moves the lever K^3 to the right, so that the fork K passes into the annular groove J^6 of the clutch-collar J^3 , and the point of the upper prong enters the recess J^5 of the bolt J^2 when the latter arrives in its uppermost position on the rotation of the said clutch-collar J^3 . One edge of the recess J^5 of the bolt J^2 then passes over the wedge K' of the upper prong of the fork K , so that the said bolt J^2 is moved inward and is drawn out of contact with the spiral cam J' , whereby the clutch-collar J^3 is disengaged from the gear-wheel J , and the latter keeps on rotating without rotating the shaft F' . The rotary motion of the form-cylinders F and the impression-cylinder G is thus stopped in the position shown in Fig. 3 and the gate N is closed, so that the sheet of paper on the belt L cannot travel farther. The form-cylinders F are then in the position shown in Fig. 3, and the beginning of the type F^4 has not come in contact with the first inking-roller of the inking device H , so that the latter may rotate without injury to its inking-rollers upon the type F^4 . It is understood that the type F^4 projects slightly above the periphery of the cylinders F , carrying the type, as is plainly shown in Fig. 3. A suitable device may be employed for stopping the motion of the inking device, if desired. When the operator moves the lever K^3 back to its former posi-

tion, the fork K is withdrawn from the clutch-collar J^3 , and the tension of the spring J^4 causes an outward sliding motion of the bolt J^2 , which again engages the back of the cam J^4 on the gear-wheel J , and the rotation of the latter carries said bolt J^2 along, and the clutch-collar J^3 thus rotates the shaft F' , the form-cylinders F , and the impression-cylinder G , as above described. Thus it will be seen that by the special construction of the clutch on the shaft F' and the fork K the form-cylinders F and the impression-cylinder G are stopped at a time when the gate N is closed. When the said form-cylinders F and the impression-cylinder G again rotate, the gate N opens at a time when the said cylinders F are in the proper position and commences the printing on the sheet of paper at the proper time. It will further be seen that the impression-cylinder G , the roll-grippers O , and the tapes S feed the printed sheet of paper onto the endless belt E of the ruling device C , so that the said belt E carries the sheet of paper to the pen device D , in order to rule the sheet. The printing-press B thereby constitutes the feed for the ruling-machine C .

The table E^3 , carrying the roller E' , is made to slide rearwardly, so as to give the operator sufficient room to work on the type F^4 or on the impression-cylinder G whenever necessary. In order to slide the table E^3 rearward, it is necessary that the arm E^7 should be disconnected from the arm E^6 , after which the latter is moved upward, so that the arm E^4 disengages the end of the table E^3 and the latter can be moved rearward by hand to any desired place on the frame A .

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

1. The combination, with a ruling-machine, of a rotary printing-press operating said ruling-machine, and constituting the feed for the same, substantially as shown and described.

2. The combination, with a rotary printing-press, of a ruling-machine operated by the said printing-machine located in front of the ruling-machine and forming the feed for the same, whereby the sheet of paper is first printed and then ruled, substantially as shown and described.

3. The combination, with a rotary printing-press provided with a sheet-conveying mechanism discharging onto the cylinders, of a ruling-machine operated from the said printing-press, which forms the feed for the said ruling-machine, substantially as shown and described.

4. The combination, with an impression-cylinder and form-cylinders held above the said impression-cylinder and rotating with the same, of roll-grippers held on top of the impression-cylinder and between the said form-cylinders, substantially as shown and described.

5. The combination, with an impression-

cylinder and form-cylinders held above the said impression-cylinder and rotating with the same, of roll-grippers held on top of the impression-cylinder and between the said form-cylinders, the said grippers being controlled by one of the said cylinders, substantially as shown and described.

6. The combination, with an impression-cylinder and form-cylinders held above the said impression-cylinder and rotating with the same, of roll-grippers held on top of the impression-cylinder and between the said form-cylinders, and a cam held on the shaft of the form-cylinders to control the said grippers, substantially as shown and described.

7. The combination, with an impression-cylinder having a transverse recess, and form-cylinders rotating with the said impression-cylinder, of a conveying mechanism discharging between the said cylinders, a gate held on top of the said conveying mechanism, a cam on one of the said cylinders for controlling the said gate, and roll-grippers held on top of the said impression-cylinder between the said form-cylinders and controlled by a cam on the latter, substantially as shown and described.

8. The combination, with the printing-cylinders, of a clutch mechanism for stopping and starting the said cylinders at the same point, substantially as shown and described.

9. The combination, with the printing-cylinders, of a conveying mechanism discharging onto the printing-cylinders, a gate held

on top of the said conveying mechanism in front of the said printing-cylinders, a cam operating with the said printing-cylinders and controlling the said gate, and a clutch mechanism for stopping and starting the said printing-cylinders and cam at the proper place, substantially as shown and described.

10. The combination, with a rotary printing-press, of a ruling-machine operated by the said printing-press and provided with an endless belt onto which discharges the said rotary printing-press, substantially as shown and described.

11. The combination, with a rotary printing-press, of a ruling-machine operated by the said printing-press and provided with an endless belt onto which discharges the said rotary printing-press, and also provided with a sliding table carrying a roller, over which passes the said belt, substantially as shown and described.

12. The combination, with a rotary printing-press, of a ruling-machine operated by the said printing-press and provided with an endless belt onto which discharges the said rotary printing-press, and also provided with a sliding table carrying a roller over which passes the said belt, and means, substantially as described, for moving and locking the table in place, as set forth.

JAMES W. DICKIESON.

Witnesses:

THEO. G. HOSTER,
C. SEDGWICK.