H. A. RICE & C. G. PATTERSON.

PRINTING MACHINE.

APPLICATION FILED MAY 26, 1913.

1,101,565. Patented June 30, 1914.

5 SHEETS—SHEET 1.

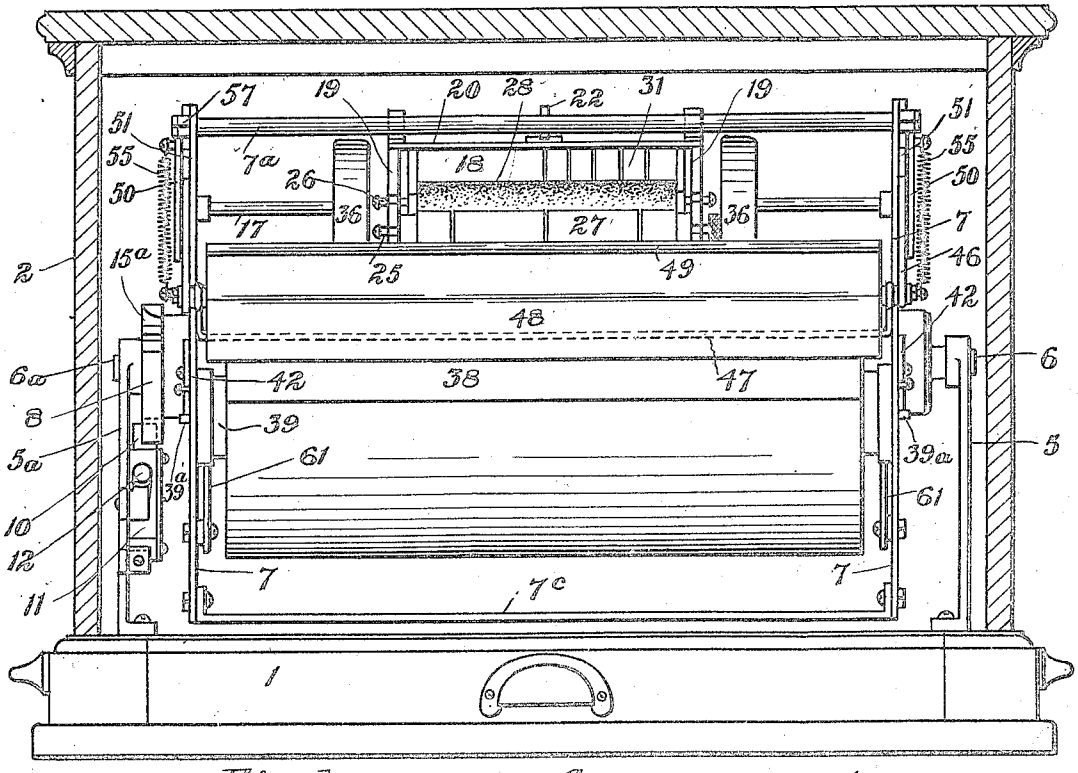


Fig. 1

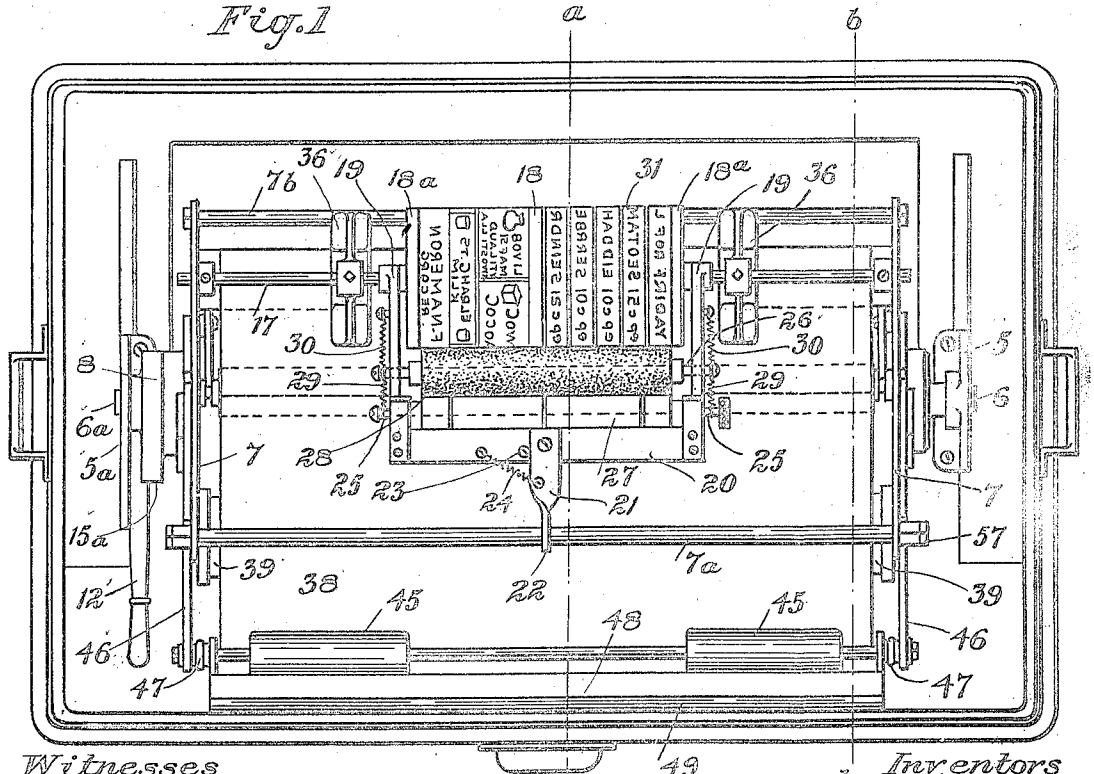


Fig. 2

Witnesses
Chas. Bernstein
W. G. McMillan

Inventors
Harold A. Rice
Charles G. Patterson
by Chas. A. Perkins atty.

H. A. RICE & C. G. PATTERSON.

PRINTING MACHINE.

APPLICATION FILED MAY 26, 1913.

1,101,565. Patented June 30, 1914.

5 SHEETS—SHEET 2.

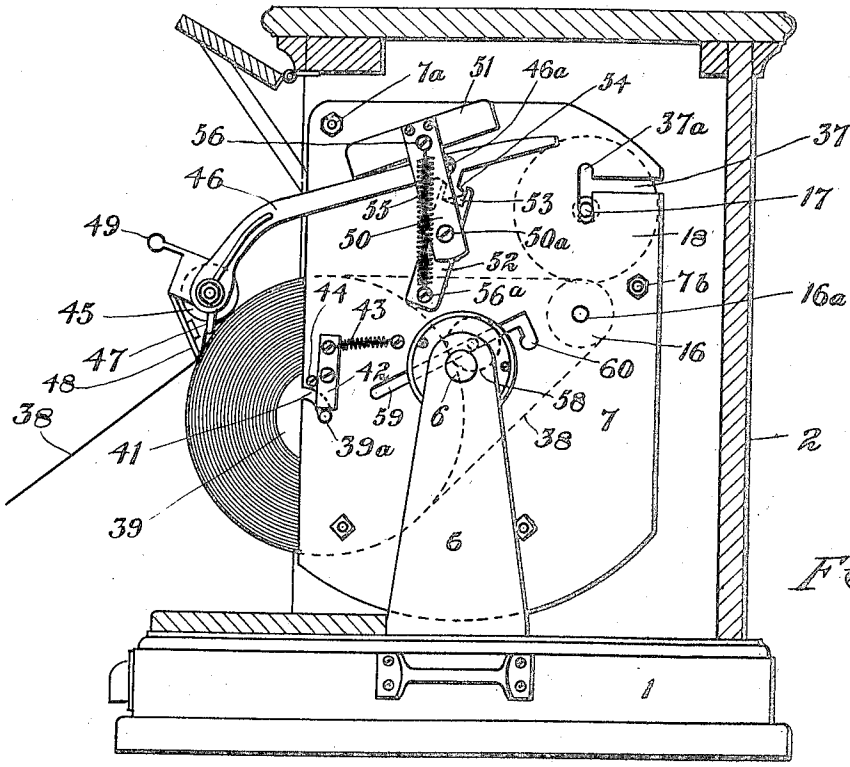


Fig. 3

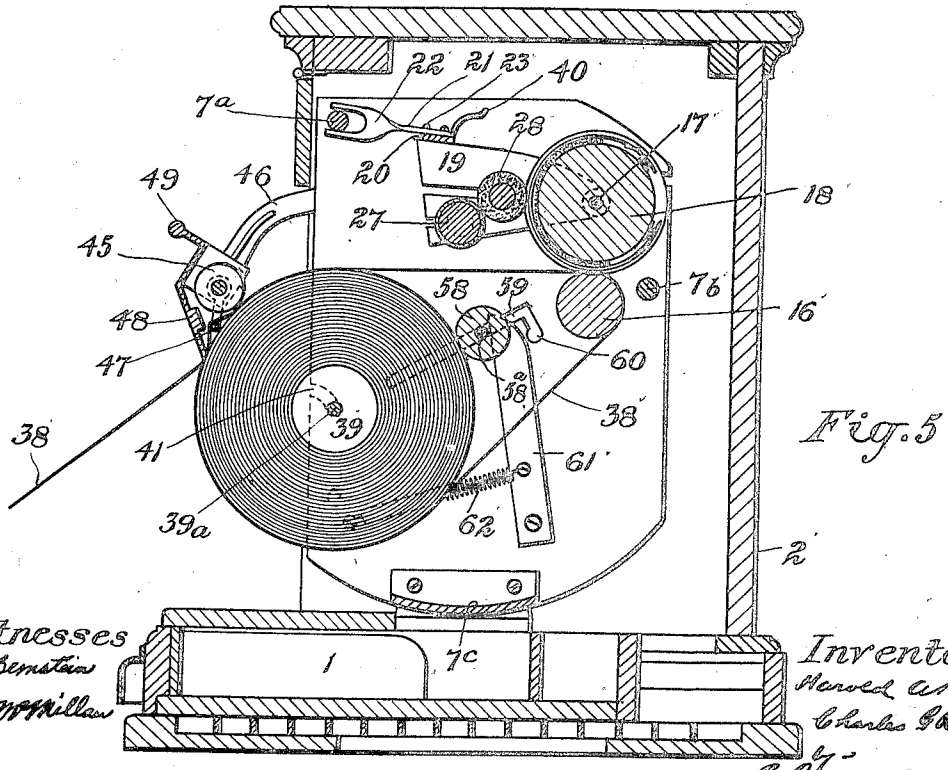


Fig. 5

Witnesses
Edward Bernstein
W. G. McMillan

Inventors
Harold A. Rice
Charles G. Patterson
by Chas. W. Parker
attorney

H. A. RICE & C. G. PATTERSON.

PRINTING MACHINE.

APPLICATION FILED MAY 26, 1913.

1,101,565.

Patented June 30, 1914.

5 SHEETS—SHEET 3.

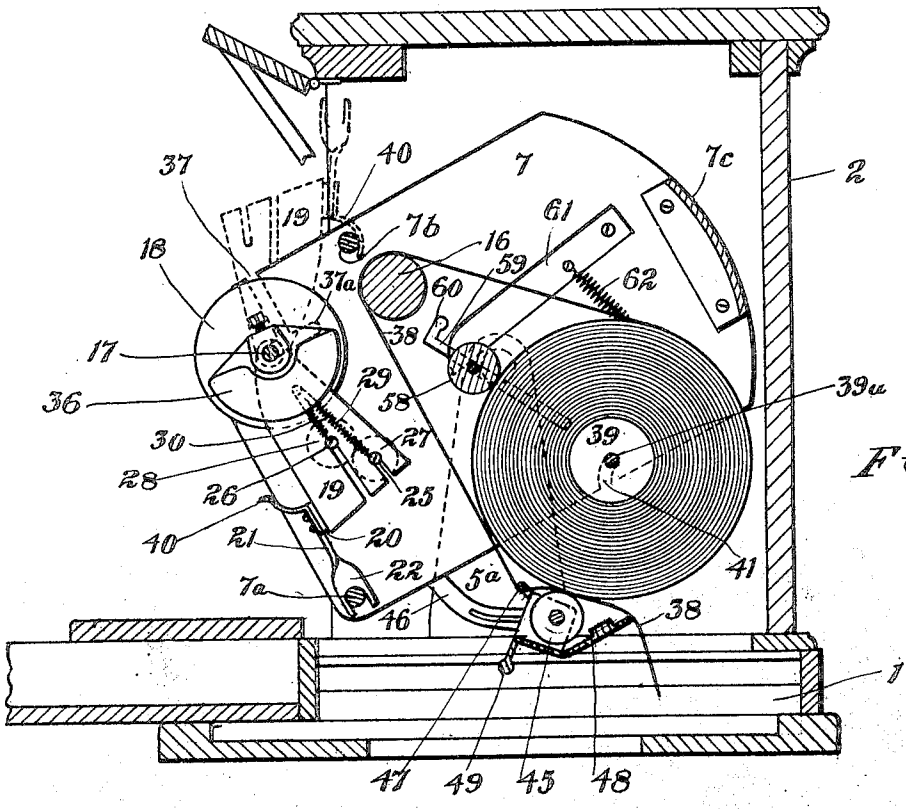


Fig. 6

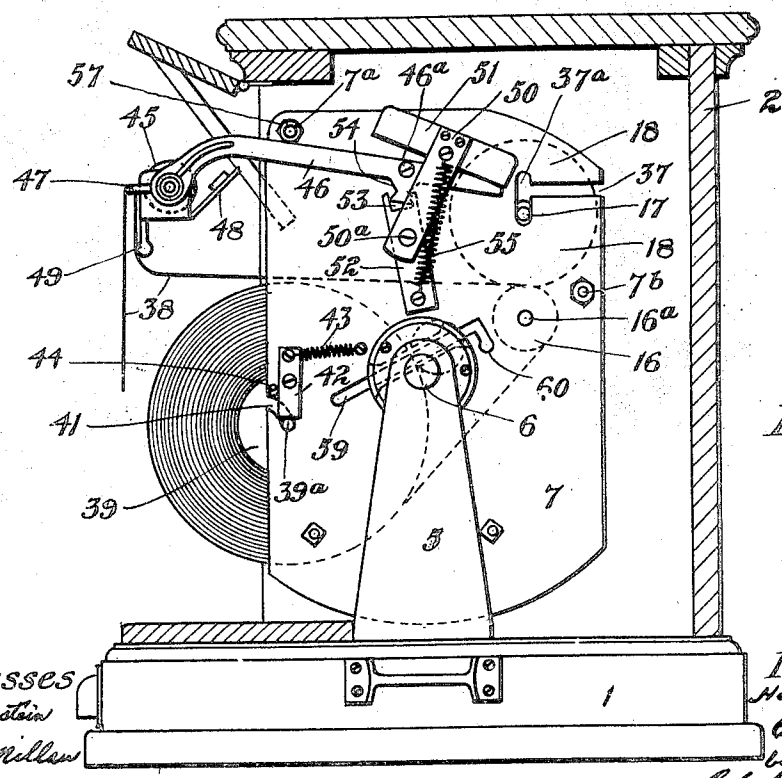


Fig. 4

Witnesses

Edward Bernstein

H. G. McMillen

Inventors

Harold A. Rice

Charles G. Patterson

by Chas. H. Richon

atty.

H. A. RICE & C. G. PATTERSON.

PRINTING MACHINE.

APPLICATION FILED MAY 26, 1913.

1,101,565.

Patented June 30, 1914.

5 SHEETS—SHEET 4.

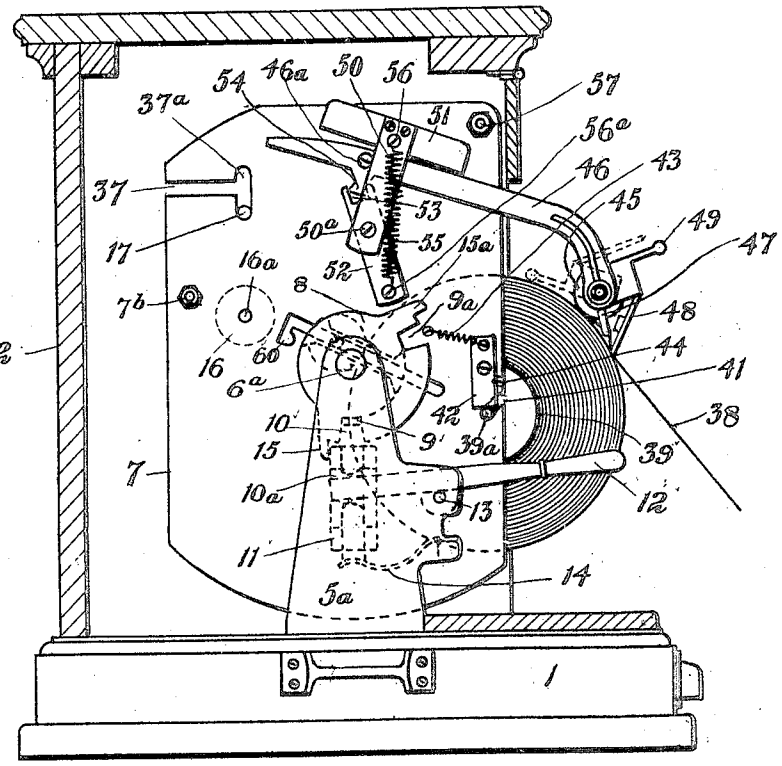


Fig. 7

Fig. 8

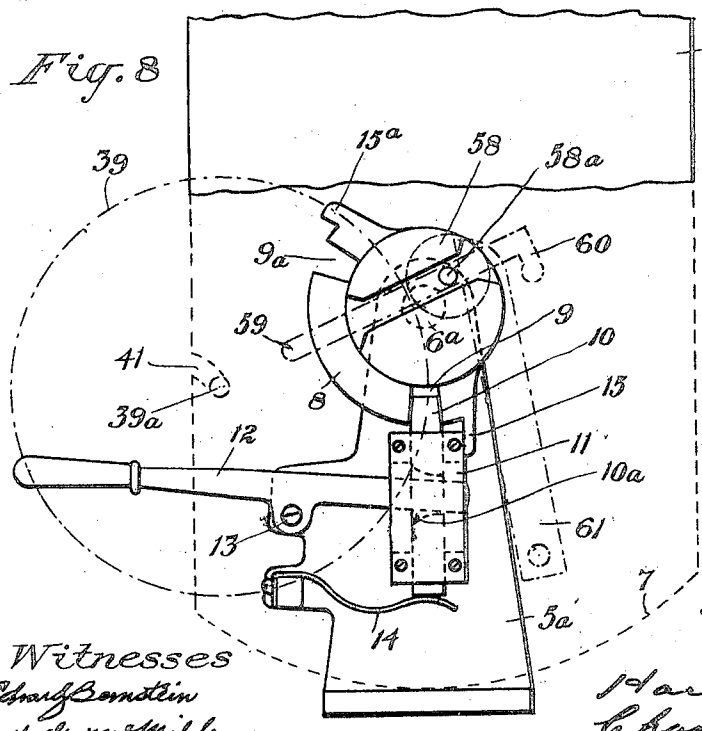
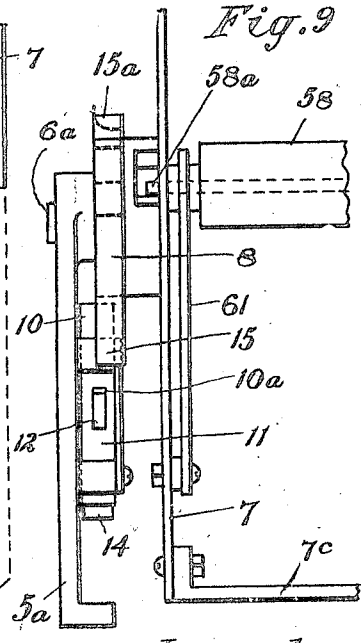


Fig. 9



Witnesses

Edward Bernstein

W. G. McMillan

Inventors

Harold A. Rice

Charles G. Patterson

by Chas. H. Rice

attorney

H. A. RICE & C. G. PATTERSON.

PRINTING MACHINE.

APPLICATION FILED MAY 26, 1913.

1,101,565. Patented June 30, 1914.

5 SHEETS—SHEET 5.

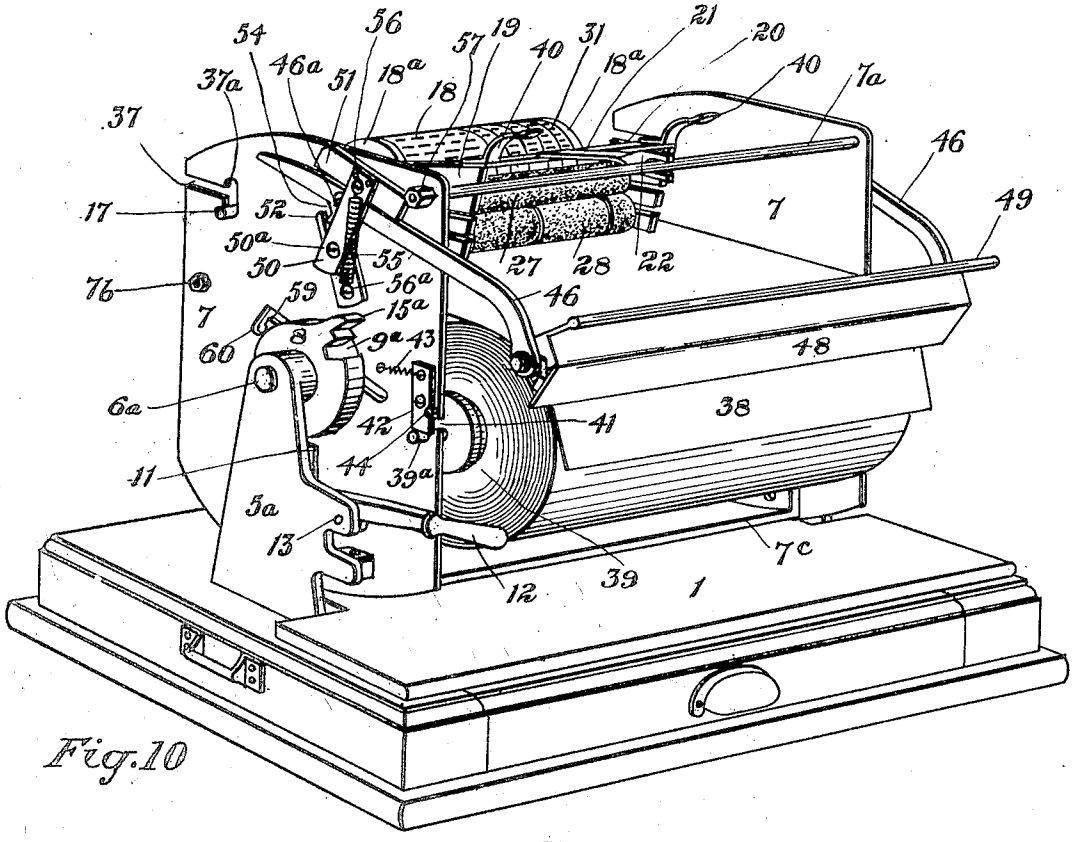
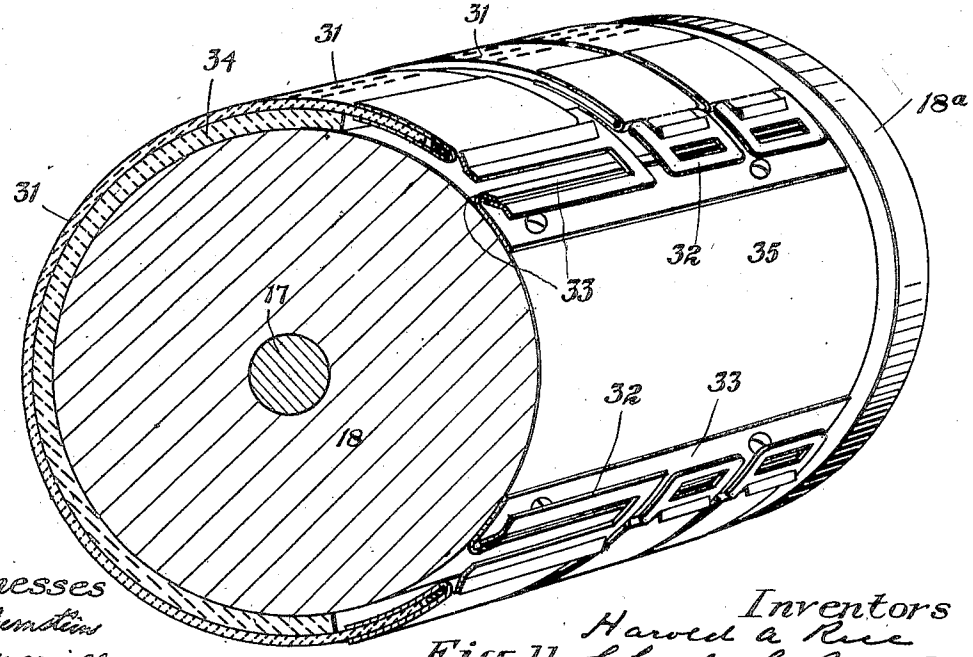


Fig. 10



Witnesses
Chas. Gunstin
W. J. McMillan

Fig. 11

Inventors
Harold A. Rice
Charles G. Patterson
by Chas. A. Rice
attorney

UNITED STATES PATENT OFFICE.

HAROLD ALBERT RICE AND CHARLES GEORGE PATTERSON, OF TORONTO, ONTARIO, CANADA, ASSIGNORS TO THE NATIONAL ADVERTOGRAPH COMPANY LIMITED, OF TORONTO, CANADA, A CORPORATION OF ONTARIO, CANADA.

PRINTING-MACHINE.

1,101,565. Specification of Letters Patent. Patented June 30, 1914.

Application filed May 26, 1913. Serial No. 770,013.

To all whom it may concern:

Be it known that we, HAROLD ALBERT RICE and CHARLES GEORGE PATTERSON, both of the city of Toronto, in the county of York and Province of Ontario, Dominion of Canada, have invented certain new and useful Improvements in Printing-Machines; and we hereby declare that the following is a full, clear, and exact description of the same.

Our invention relates to a printing machine in which the paper is automatically printed as it is manually drawn from the roll, and the objects of our invention are: (*a*) to mount the printing cylinder, platen and paper roll so that they can be unitedly moved to and from their working position without disturbing their working relation whereby the printing of the paper can be effected, or convenient access may be had to the printing mechanism when changing the type bands, recharging the inking roll, or threading the paper around the platen; (*b*) to provide these parts with a locking mechanism which will securely hold them in their working position or when moved therefrom; (*c*) to provide the printing cylinder with a sliding movement whereby it will engage the platen when in its working position, and will automatically move away from the platen when moved from its working position; (*d*) to provide the paper with a tension roll which will maintain a continuous contact with the paper roll and automatically follow the decreasing diameter of the paper roll as the paper is withdrawn therefrom.

Figure 1, is a front sectional elevation of the printing machine showing the structural character and relative position of the parts; Fig. 2, is a plan view, with the cabinet top removed, of the parts shown in Fig. 1; Fig. 3, is a vertical sectional elevation from the right of Fig. 1, showing the parts in their working position; Fig. 4, is a similar view to Fig. 3, showing the paper knife and tensioning means in their elevated position; Fig. 5, is a vertical section on the line *a*—*a* Fig. 2, with the parts in the position shown in Fig. 3; Fig. 6, is a vertical section on the line *b*—*b* Fig. 2, from the same end of the machine as Fig. 3, showing the parts in their tilted position; Fig. 7, is a sectional elevation from the left side of the machine, with the parts in their working position, as shown in Fig. 3; Fig. 8, is a detail view of the locking members from the opposite side to that shown in Fig. 7; Fig. 9, is an end elevation of the parts shown in Fig. 8; Fig. 10, is a perspective view of the machine with the cabinet top removed; and, Fig. 11, is a perspective section of the printing cylinder.

Like characters of reference refer to like parts throughout the specifications and drawings.

It is optional whether we use a cabinet or not, but it is found advisable for protective purposes to provide the apparatus with a cover which will prevent interference with the printing cylinder, inking rolls, their related parts, and the paper, during the ordinary use of the machine, and for that reason we have shown in the accompanying drawings, a cabinet comprising a base 1 and a superstructure 2 of suitable dimensions to accommodate the working parts of the apparatus.

Secured to the base 1 are standards 5, 5^a, in which are oscillatingly mounted the arbors 6, 6^a of the side plates 7, forming part of the main frame of the machine, the side plates 7 being suitably connected together by spacing bolts 7^a, 7^b, and a bottom plate 7^c. The arbor 6^a is formed with an enlargement 8 having two locking grooves 9, 9^a to receive the locking bolt 10 which holds the apparatus in its working and tilted positions.

The locking bolt 10 is movable in a slideway 11 and is apertured at 10^a to receive the lever 12 fulcrumed at 13 to the standard 5^a. Connected to the standard 5^a is a spring 14 bearing against the locking bolt 10 to hold it in the locking groove with which, for the time being, it has locking relation.

The arbor enlargement 8 is provided with stops 15, 15^a in juxtaposition to the locking grooves 9, 9^a respectively, these stops 15, 15^a engaging the slideway 11 during their oscillation to limit the rotation of the side plates 7 and their related parts, and bring the respective grooves 9, 9^a into position to register with the locking bolt 10.

When the parts are in their working position, as shown in Figs. 2, 3, 5 and 7, the stop 15 is in engagement with the slideway 11 and the locking bolt 10 is then entered in

the locking groove 9, the spring 14 holding the locking bolt in its locking engagement therein.

To tilt the main frame and its related parts from the position shown in Figs. 2, 3, 5 and 7 to that shown in Fig. 6, the handle end of the lever 12 is raised and this movement of the lever causes its other end to depress the locking bolt 10 and withdraw it from the locking groove 9. The main frame and the parts carried thereby can then tilt from the position shown in Figs. 2, 3, 5 and 7 to that shown in Fig. 6 and when the parts have reached their limit of movement, the stop 15^a comes into engagement with the slideway 11, and brings the locking groove 9^a into position to receive the locking bolt 10 which secures the apparatus in its tilted position until it is again released by the operation of the lever 12.

Journaled in the side plates 7 are the arbors 16^a of the revoluble platen 16, and journaled in the side plates 7 above the platen, is the shaft 17, to which the printing cylinder 18 is fixedly connected, the printing cylinder having tires 18^a engaging the paper passing over the platen and effecting its revolution.

Loosely mounted on the shaft 17 at the ends of the cylinder 18 are the journal plates 19 forming part of the frame for the inking and distributing rolls, and connecting the journal plates 19 is a cross bar 20, to which is pivoted an arm 21 having at its free end forks 22 to engage with the spacing bolt 7^a, the cross bar 20 being provided with a stop 23 to limit the movement of the arm 21. Attached to the arm 21 and to the cross bar 20 is a spring 24 which draws the arm 21 into and holds it in engagement with the stop 23.

The journal plates 19 are slotted to receive the arbors 25 and 26 of the inking roll 27 and distributing roll 28, and holding the inking and distributing rolls in contact with each other and with the printing cylinder 18, are springs 29 and 30. The printing cylinder 18 is provided with removable type bands 31 having at their ends fasteners 32 engaging with corresponding fasteners 33 secured to the printing cylinder 18, as shown in Fig. 11 of the drawings, by means of which, the type bands 31 can be quickly and conveniently removed and replaced when changing or renewing the type. The fasteners 33 preferably extend completely across the printing surface of the printing cylinder 18 so that the type bands 31 may be conveniently set at any selected position thereon.

Between the type bands 31 and the printing cylinder 18 is a cushion 34 preferably of sponge rubber which by reason of its compressibility compensates for any unevenness in the thickness of the type bands, this cushion extending the type face of the type bands beyond the surface of the fasteners 32 and 33, the intervening space 35 between said fasteners and the tires 18^a, to contact the paper passing over the platen 16.

When the type faces of the type bands come into contact with the distributing roll, an impeding impact occurs, and to eliminate the effect of this impeding impact, we have provided the shaft 17 with counterbalances 36 suitably fixed on the shaft so as to assist the revolution of the printing cylinder when the ends of the type bands come into contact with the distributing roll 28.

As shown in Figs. 3, 4, 6 and 7, the side plates 7 are formed with T-shaped slots 37 having a vertical part 37^a for the up-and-down movement of the shaft 17 and printing cylinder 18.

When the working parts of the machine are in the positions shown in Figs. 3, 5 and 7, the shaft 17 is at the lower ends of the vertical slots 37^a, and when in the tilted position, as shown in Fig. 6, it automatically moves to the opposite ends of said slots.

When the parts are in the position shown in Figs. 3 and 7 the printing cylinder is in contact with the paper 38 passing over the platen 16, and when the parts are in their tilted position as shown in Fig. 6, the printing cylinder is clear of the paper so that the type bands can be removed and replaced without marking or printing it.

When the parts are in the position shown in Figs. 2 and 5, the fork 22 of the arm 21 is engaged with the spacing bolt 7^a to hold the inking and distributing rolls 27 and 28 in their normal position with relation to the printing cylinder 18 and paper 38, the principal purpose of the forked arm being to keep the inking and distributing rolls out of contact with the paper as it feeds from the paper roll 39 around the platen 16 to the paper knife 48.

When access to the type bands on the printing cylinder is required, the parts are tilted from the position shown in Figs. 3 and 5 to the position shown in Fig. 6, and when in this position, the forked arm may be moved out of engagement with the spacing blot 7^a. When the forked arm is disengaged from the spacing bolt 7^a, it and the journal plates 19 and inking and distributing rolls 27 and 28 are moved from the position shown in full lines in Fig. 6 to that shown in dotted lines in the same figure, and spring catches 40 then engage the spacing bolt 7^b and hold the inking and distributing rolls in a convenient position to permit of access to them.

The arbors 39^a of the paper roll 39 are journaled in the side plates 7, the side plates being provided with slots 41 for the removal and replacement of the paper roll. Pivoted to the side plates are spring ten-

sioned locking members 42 which bear on the arbors 39ª and hold them in their slotted bearings in the side plates 7, the locking members 42 being provided with tension springs 43 and stops 44 to maintain them in their operative position with relation to the arbors.

The paper 38 passes from the paper roll 39 around the platen 16 and then under a friction roll 45. The friction roll 45 is journaled in two arms 46 pivoted interjacent their ends, as shown at 46ª, to the side plates 7 and extending sufficiently beyond the front of the side plates to allow the friction roll 45 to come into contact with the paper and paper roll.

Suspended from the friction roll 45 is a bail 47, the paper passing from the paper roll 39 around the platen 16 and between the friction roll 45 and bail 47.

Rotatably mounted on the friction roll 45 is the knife 48, the cutting edge of which engages the paper after it passes between the friction roll 45 and bail 47, and forming part of the knife 48 is a counterbalance 49 serving as a handle by which the knife is turned from its cutting to its inoperative position, as shown in full and dotted lines respectively in Fig. 7.

When the paper is drawn from the paper roll, it passes over the platen 16 where it is printed by the type on the printing cylinder 18, and from there, it passes between the friction roll 45 and bail 47 and under the knife 48.

The desired length of paper when withdrawn from the paper roll 39, is torn along the edge of the knife 48 and when said length is torn off, the knife is tilted back into the position shown in dotted lines in Fig. 7, and when so tilted, the paper extending beyond the bail 47 is raised from contact with the paper wound on the roll, so as to be easily gripped by the user preparatory to drawing off the next desired length, the knife 48 then being turned back into the position shown in full lines in the same figure.

During the revolution of the printing cylinder, the counter-weights 36, when above its horizontal axis, will according to the law of gravity, seek the lowest point, and by doing so, may cause a partial revolution of the printing cylinder. This revolution of the printing cylinder is sometimes backward and sometimes forward, and when it revolves backward, it would draw the paper from between the friction roll 45 and the bail 47 if a tension is not provided to prevent it doing so. This tension means we have applied to the arms 46, and have so arranged the tensioning mechanism that the friction roll 45 maintains an uniform tension on the paper 38 regardless of any variation in the diameter of the paper roll 39. The tensioning device consists of T-shaped levers comprising lever arms 50 pivoted at 50ª to the side plates 7 and cross heads 51 bearing against the tops of the arms 46. The pivots 50ª are vertically below the pivots 46ª so that the lever arms 50 will rock from one side to the other of said pivots 46ª.

Oscillatingly mounted on the pivots 50ª are rocker arms 52 having at their upper ends, grooves 53 to receive the tongues 54 forming part of the arms 46. Connected to the rocker arms 52 and to the lever arms 50 are springs 55. When the arms 46 are in their lowered position, as shown in Figs. 3, 5 and 7, the lever arms 50 are thrown to the front of the pivots 46ª, and in this position the cross heads 51 bear upon the arms 46 between the pivots 46ª and the friction roll 45, forcing the arms downward and pressing the friction roll against the paper and paper roll, thus causing the friction roll to apply a tension to the paper roll to prevent the paper inadvertently unwinding or becoming loose in its winding. When the lever arms 50 are in this position, the lower ends of the arms 52 and the springs 55 are to the front of the pivots 50ª, with the springs 55 drawing the cross heads 51 against the arms 46. As the diameter of the paper roll 39 decreases, the friction roll 45 moves in toward the center of the paper roll and the cross heads follow the arms 46 under the influence of the springs 55, thereby maintaining a tension upon the arms 46. As the arms 46 move toward the center of the paper roll 39, the cross heads approach more closely to the friction roll 45 and increase the leverage of the cross heads on the arms 46. As the friction roll approaches the center of the paper roll 39, the pins 56 to which the outer ends of the springs 55 are connected, approach the pins 56ª, to which the inner ends are connected. The springs 55 during such approach gradually contract and diminish their tension in substantially the same ratio as the leverage of the arms 50 increases, to enable the friction roll 45 to maintain the same pressure on the paper roll at its maximum and minimum diameters.

When the arms 46 are raised into the position shown in Fig. 4, they throw the lever arms 50 to the rear of the pivots 46ª, and in this position, the cross heads 51 engage the arms 46 in rear of the pivots 46ª. As the arms 46 rise to the position shown in Fig. 4, the tongues 54 engaging in the grooves 53 rock the arms 52 so that the lower ends of said arms and the springs 55 will be in rear of the pivots 50ª, to maintain a downward pull on the cross heads 51, and enable them to apply the necessary pressure on the free ends of the arms 46 to hold the arms 46 in their elevated position, the upward movement of the arms 46 being limited by the nuts 57 on the spacing bolts 7ª.

To retard the revolution of the paper roll 39, we have provided a tension roll 58, the arbors 58ª of which are mounted in inclined slots 59 descending in the direction of the arbors of the paper roll 39.

At the ends of the slots 59 remote from the paper roll 39 are angular slots 60, the purpose of which is to receive the arbors 58ª and hold the tension roll 58 in an inoperative position when a new roll of paper is being placed in the machine.

When the paper roll is placed in the machine, the arbors are raised out of the L-shaped slots 60 and the tension roll 58 descends along the inclined slots 59 until it comes into contact with the paper roll 39 with which it remains continually in contact.

To make the contact of the tension roll with the paper roll positive, we have pivoted to the side plates 7, two arms 61 tensioned by springs 62 which bear against the arbors 58ª and force the tension roll into contact with the paper roll and maintain it in contact therewith.

From the foregoing description it will be understood that the main frame when moving to and from the working position of the apparatus carries with it all of the essential parts of the machine without disturbing their working relation, so that when the parts are restored to their working position they will automatically resume the performance of the functions for which they are intended.

Having thus fully described the nature of our invention, what we claim as new and desire to secure by Letters Patent, is:—

1. In a printing machine, a movable supporting frame, a printing cylinder and a platen mounted therein and unitedly movable thereby to and from their working position, and locking means to hold the supporting frame and the parts carried thereby in their working and non-working positions, said locking means comprising a locking member movable with the supporting frame, and a relatively stationary locking member co-acting therewith.

2. A printing machine comprising a frame adapted to revolubly hold a roll of paper, a platen and means for printing operatively mounted in said frame, in combination with means for rotatably supporting said frame whereby it can unitedly transpose the roll of paper, platen and printing means to and from their working position without disturbing their normal relation.

3. A printing machine comprising a frame adapted to revolubly hold a roll of paper, a platen and means for printing operatively mounted in said frame, in combination with means for rotatably supporting said frame whereby it can unitedly transpose the roll of paper, platen and printing means to and from their working position without disturbing their normal relations and means for selectively locking the said frame in its different positions.

4. In a printing machine, the combination of an oscillating supporting frame, a printing cylinder and a platen mounted therein, means for oscillatingly holding the supporting frame, and locking means for arresting the oscillation of the supporting frame and holding it in its arrested position, said locking means comprising locking members affixed to and movable with the supporting frame, a spring-tensioned locking bolt co-acting with said locking members, and a lever for withdrawing the locking bolt from locking engagement therewith.

5. In a printing machine, a tilting supporting frame, a platen carried thereby, and a printing cylinder opposed to the platen, said printing cylinder being revolubly and slidably mounted in the supporting frame whereby it comes into operative relation with the platen when the supporting frame is in its working position and automatically moves from the platen when the supporting frame is in its tilted position.

6. In a printing machine, a movable rotatable supporting frame, a printing cylinder and a platen mounted therein whereby the movement of said frame will transpose the platen and printing cylinder to and from their printing position without disturbing their fixed relations, an inking roll and a distributory roll suitably mounted with relation to the printing cylinder and held in contact therewith and with each other and means connected with the supporting frame and the inking and distributory rolls to maintain them in their fixed relation with the printing cylinder and platen.

7. In a printing machine a supporting frame, a printing cylinder and a platen mounted therein, journal plates revoluble with relation to the printing cylinder, an inking roll and a distributory roll mounted in said journal plates in operative relation with the printing cylinder and held in contact therewith and with each other, and means connected to the journal plates engaging with the supporting frame to hold the inking and distributory rolls in their fixed position with relation to the printing cylinder.

8. In a printing machine, a supporting frame, a printing cylinder and a platen mounted therein, journal plates revoluble with relation to the printing cylinder, an inking roll and a distributory roll mounted in said journal plates in operative relation with the printing cylinder and held in contact therewith and with each other, a forked arm pivotally connected to the journal plates and engaging with the supporting frame to hold the inking and distributory rolls in their fixed relation to the printing cylinder.

9. A printing machine comprising a supporting frame for revolubly holding a roll of paper, a printing cylinder, a platen opposed to the printing cylinder, and a tension roll, said supporting frame having slideways in which the arbors of the tension roll are movably journaled, whereby the tension roll will automatically maintain a continuous contact with the paper roll as its diameter decreases, said slideways having offsets to receive said arbors when it is desired to hold the tension roll inoperative with relation to the paper roll.

10. A printing machine comprising a rotatable frame carrying a roll of paper, a platen, and printing means to automatically print the paper as it passes from the roll, in combination with means for rotatably holding the frame whereby it changes the position of said parts without altering their normal relations.

11. A printing machine comprising a rotatable supporting frame, and a printing cylinder, and a platen in operative relation revolubly mounted therein, said printing cylinder being automatically movable to and from the platen during the rotation of said frame.

12. In a printing machine, a rotatable supporting frame, a printing cylinder and a platen revolubly mounted therein, means for rotatably holding the supporting frame whereby it will transpose the printing cylinder, and means for selectively locking the supporting frame against rotation.

13. In a printing machine, a frame, a platen and printing means mounted therein, means for supporting said frame whereby it can be moved to unitedly transpose the platen and printing means to and from their working position without disturbing their fixed relation, in combination with means for selectively maintaining said parts in their working and non-working positions, and means for arresting their movement when they reach their limit in either of said positions.

14. A printing machine comprising a rotatable frame carrying a roll of paper and means for automatically printing it as it passes from the paper roll, in combination with means for revolubly holding the frame whereby it can rotate between a working and a non-working position to change the location of said parts without altering their normal relations; and stopping means to arrest said frame when it reaches its limit of movement in either position.

15. A printing machine comprising a frame movable to and from a working position, grooved arbors for said frame having stopping members thereon, a platen and printing means mounted in said frame and means coöperating with said stopping members whereby the movement of said frame is arrested when it reaches the limit of either position, in combination with locking means having operative relation with the grooved arbors to lock the frame in either of said positions.

16. A printing machine comprising a rotatable frame carrying a roll of paper and means for automatically printing it as it passes from the paper roll, said means comprising a printing cylinder journaled in the rotatable frame, in combination with journal plates revolubly mounted within said frame, and inking and distributing rolls carried by said journal plates, whereby the inking and distributing rolls can be turned into and out of operative relation with the printing cylinder.

17. A printing machine comprising a frame rotatable to and from a working position, a platen journaled therein, a printing cylinder journaled in said frame in operative relation with the platen, and having a revolving and sliding engagement therewith whereby it will automatically adapt itself to the material passing over the platen, when the parts are in their working position and automatically move away from the platen when the parts are in their non-working position.

18. A printing machine comprising a frame rotatable to and from a working position, a platen journaled therein, a printing cylinder journaled in said frame to automatically move into and out of operative relation with the platen during the rotation of the frame, and means to selectively lock the frame against rotation when at its working and non-working positions.

19. A printing machine comprising a rotatable frame for revolubly holding a roll of paper, slotted bearings in said frame in line with the roll of paper, and a tension roll mounted in said slotted bearings to engage the roll of paper and automatically follow its decreasing diameter.

20. A printing machine comprising a rotatable frame for revolubly holding a roll of paper, slotted bearings in said frame in line with the roll of paper, and a tension roll mounted in said slotted bearings to engage the roll of paper and automatically follow its decreasing diameter, said slotted bearings having angular slots at their ends remote from the roll of paper to receive the tension roll and selectively hold it in an inoperative position with relation to the roll of paper.

21. A printing machine comprising a rotatable frame for revolubly holding a roll of paper, slotted bearings in said frame in line with the roll of paper, and a tension roll mounted in said slotted bearings to engage the roll of paper and automatically follow its decreasing diameter, in combination with means for causing the movement

of the tension roll in the direction of the roll of paper and yieldingly holding it in contact therewith.

22. A printing machine comprising a rotatable frame for revolubly holding a roll of paper, slotted bearings in said frame in line with the roll of paper, and a tension roll mounted in said slotted bearings to engage the roll of paper and automatically follow its decreasing diameter, said slotted bearings having angular slots at their ends remote from the roll of paper to receive the tension roll and selectively hold it in an inoperative position with relation to the roll of paper, in combination with means for causing the movement of the tension roll in the direction of the roll of paper and yieldingly holding it in contact therewith.

Toronto, May 16th, 1913.

HAROLD ALBERT RICE.
CHARLES GEORGE PATTERSON.

Signed in the presence of—
CHARLES H. RICHES,
EDWARD BERNSTEIN.