J. J. WALSER AND C. A. DRESSER.

TENSION MECHANISM FOR PRINTING PRESSES.

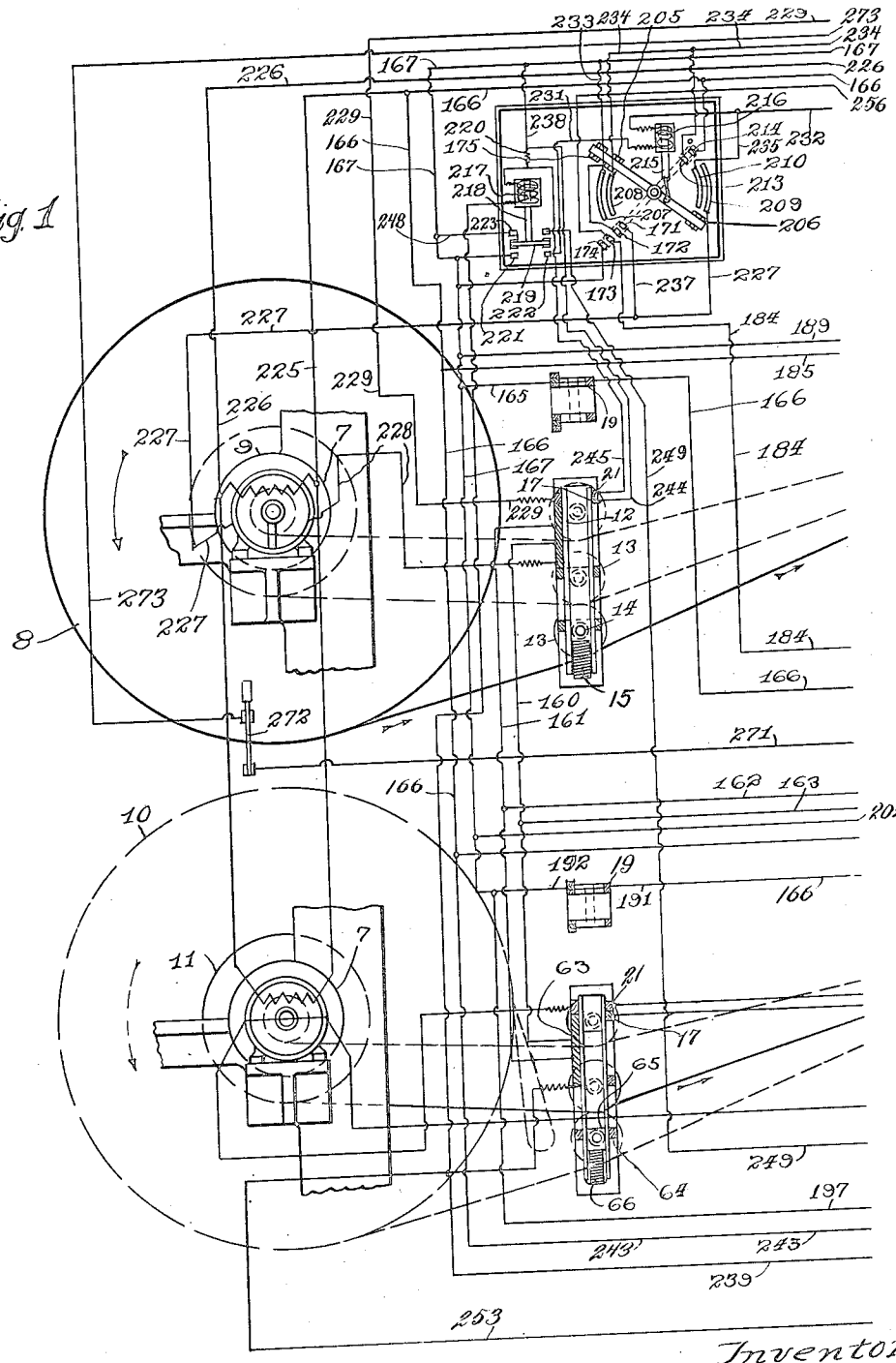
APPLICATION FILED JAN. 24, 1916.

1,304,923.

Patented May 27, 1919.

6 SHEETS—SHEET 1.

Fig. 1



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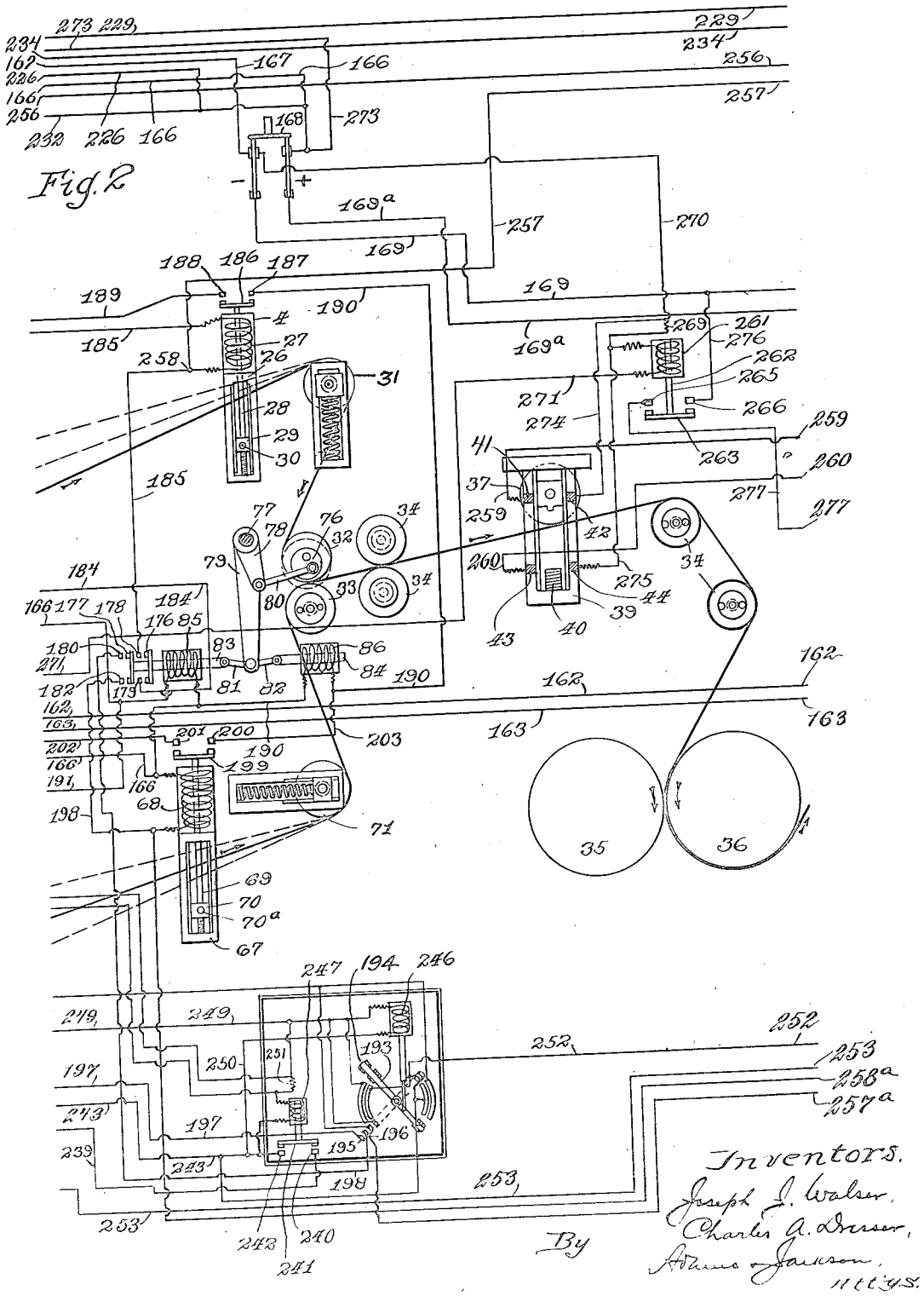


Fig. 2

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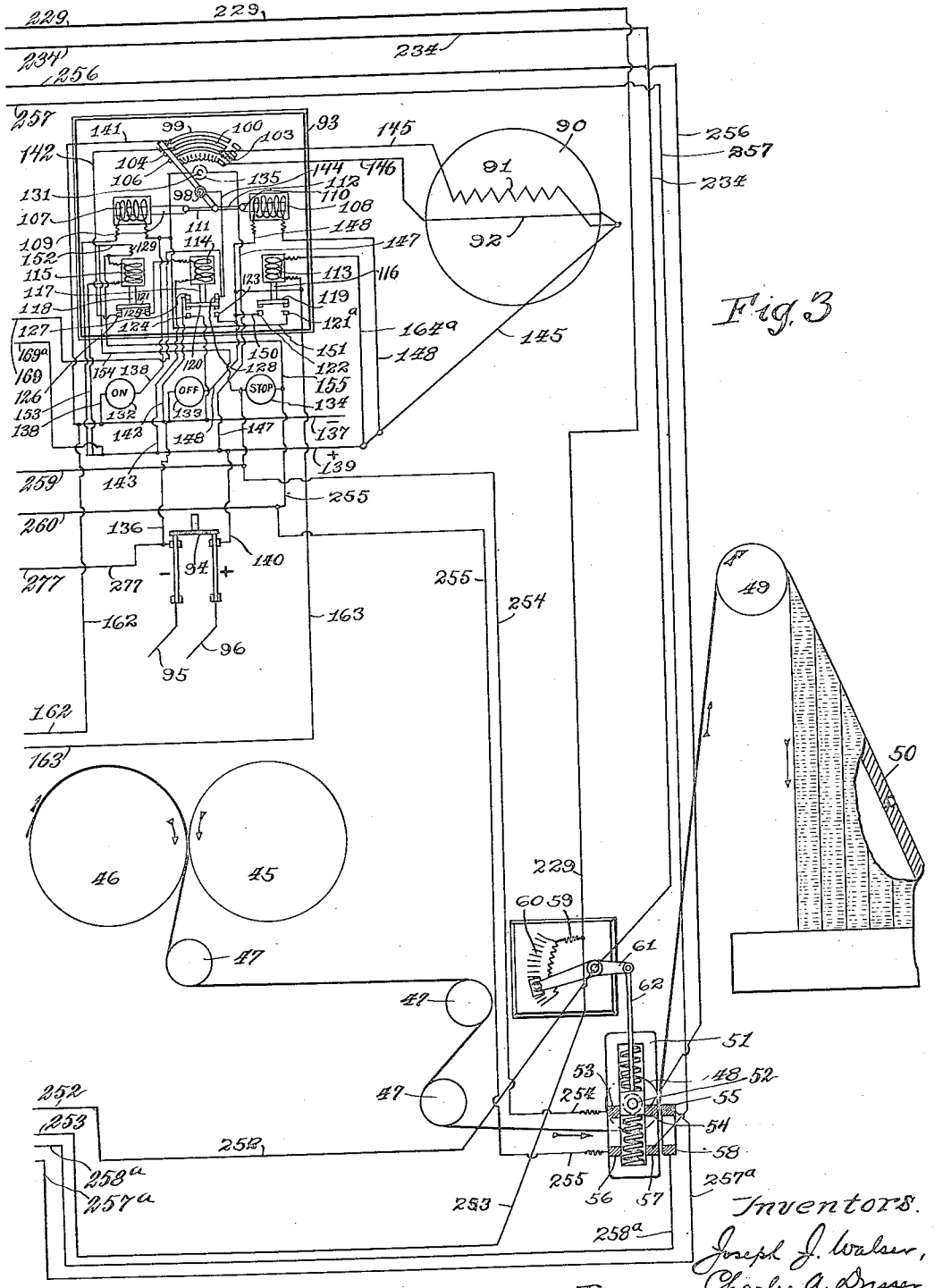


Fig. 3

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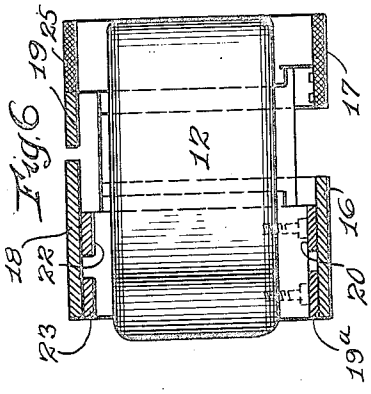
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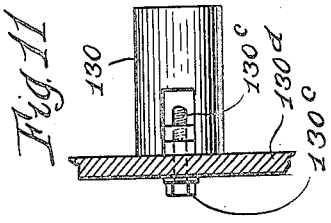
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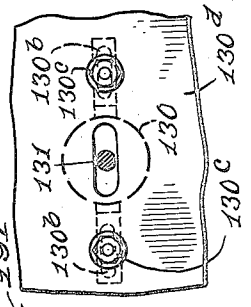
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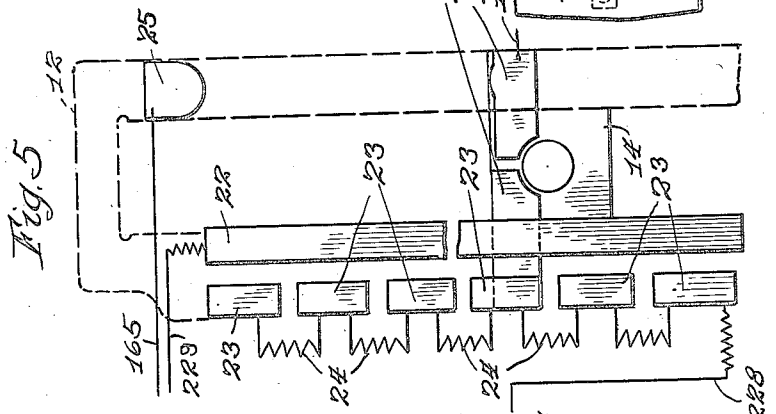
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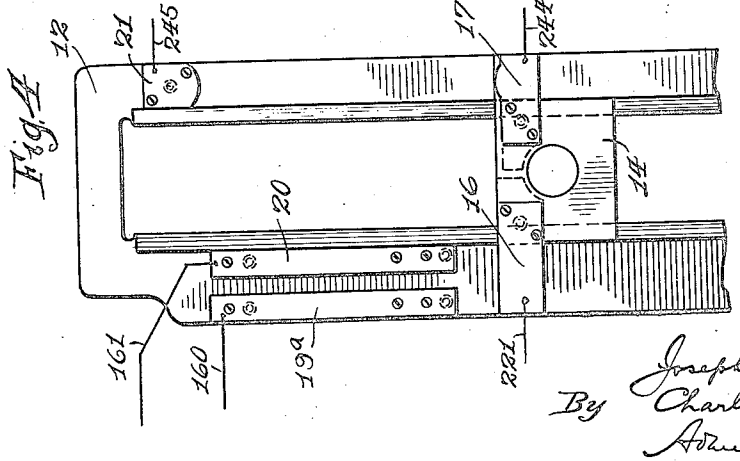
6 SHEETS—SHEET 4.











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TENSION MECHANISM FOR PRINTING PRESSES.

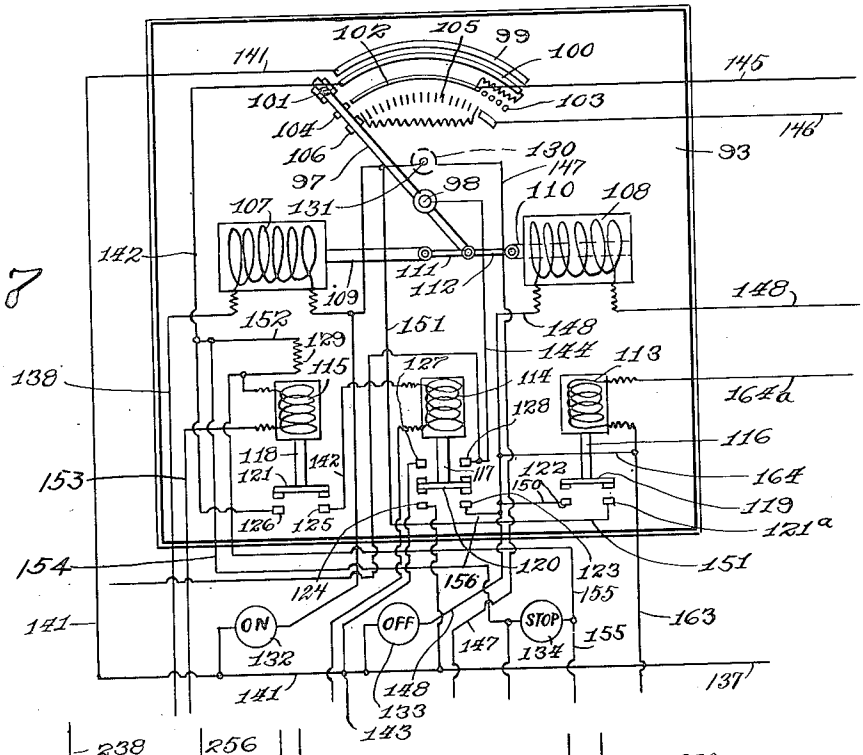
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Fig. 7



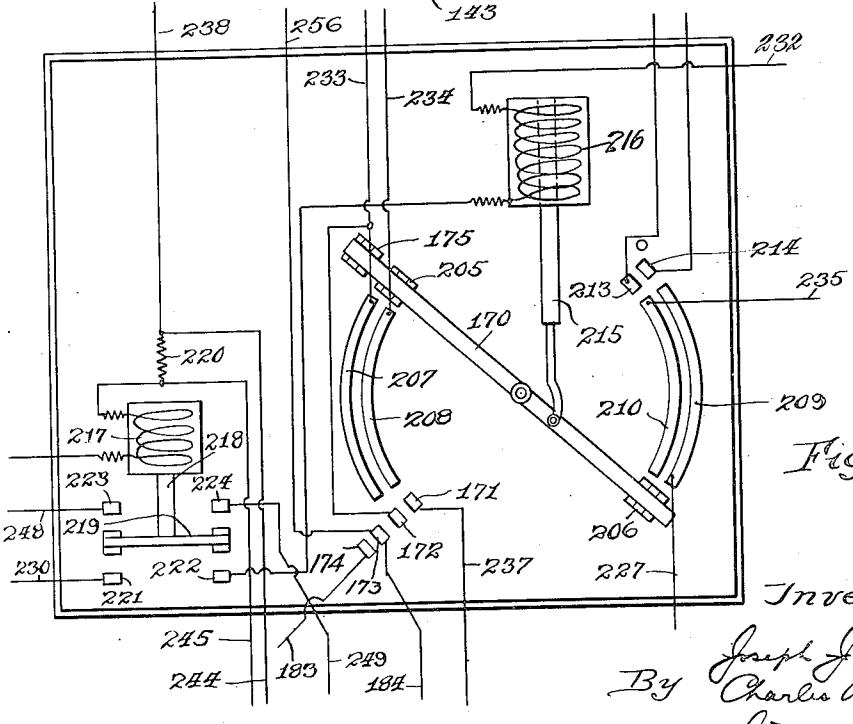


Fig. 8

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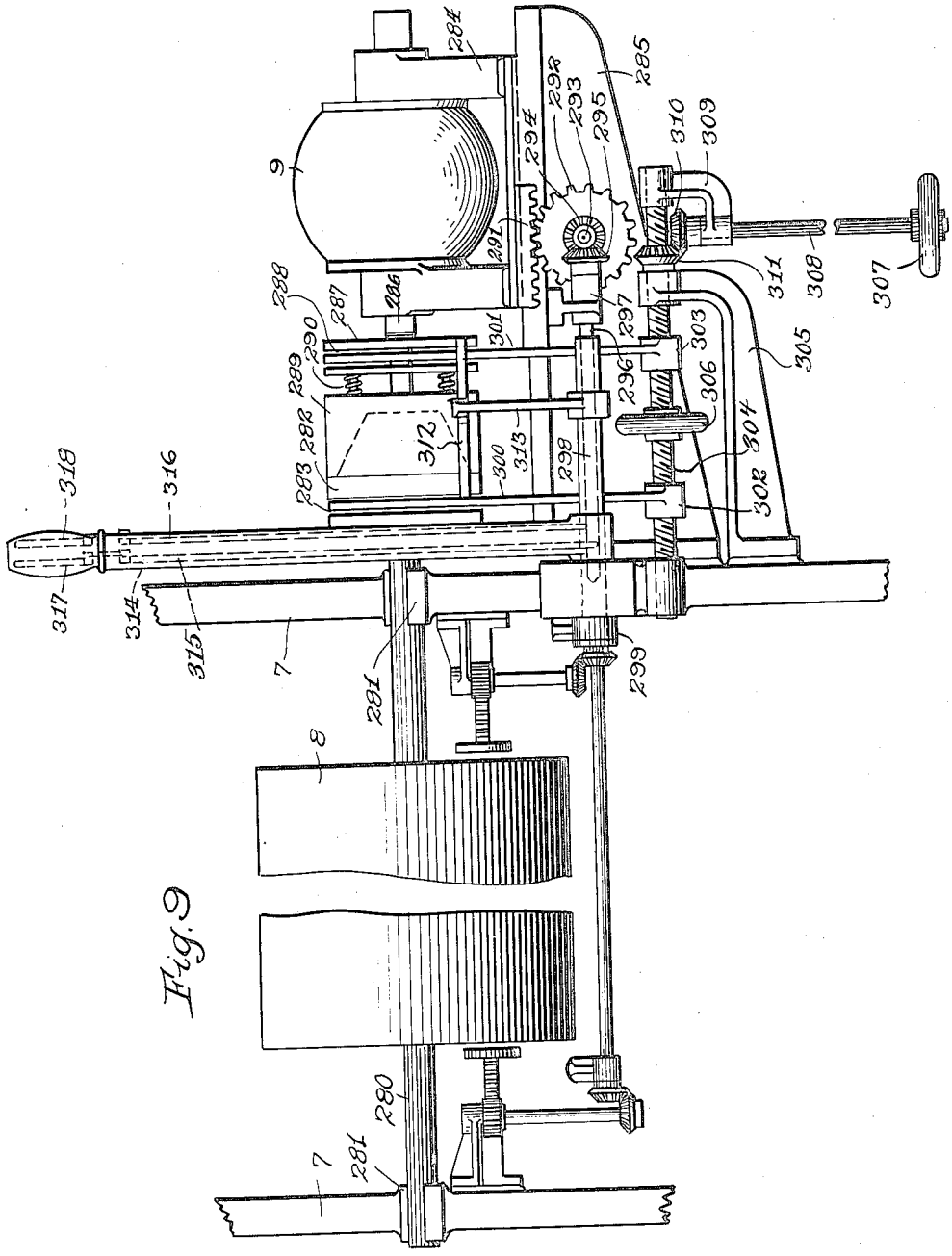


Fig. 9

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UNITED STATES PATENT OFFICE.

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TENSION MECHANISM FOR PRINTING-PRESSES.

1,304,923. Specification of Letters Patent. Patented May 27, 1919.

Original application filed March 27, 1912, Serial No. 686,477. Divided and this application filed January 24, 1916. Serial No. 73,876.

To all whom it may concern:

Be it known that we, JOSEPH J. WALSER and CHARLES A. DRESSER, citizens of the United States, and residing, respectively, at Chicago and Glencoe, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Tension Mechanisms for Printing-Presses, of which the following is a specification, reference being had to the accompanying drawings.

Our invention has to do with printing presses and analogous machines, and it has for its object to provide improved tension mechanism by which the web will always be maintained under proper tension notwithstanding variation in the diameter of the web-roll incident to its consumption, or due to other causes, such as variations in the speed of the press; also to provide improved electrically-controlled tension devices capable of accurate adjustment, and connected with automatic mechanism for actuating such tension devices to maintain the web under proper tension; also to provide a tension-controlling mechanism arranged to operate in connection with any one of a plurality of rolls alternately, so that when a fresh roll is substituted for an old one the tension mechanism will immediately act upon the web from such fresh roll to maintain it under proper tension. A further object of our invention is to provide mechanism capable of acting to temporarily advance the web into the press when occasion requires and also to provide for automatically applying the proper tension to the web when the press is again properly under way. Our invention also contemplates certain other improvements in tension devices, all of which are more particularly hereinafter set forth and need not be particularly pointed out here. We accomplish these objects as illustrated in the drawings and as hereinafter described. That which we regard as new is set forth in the claims.

In the accompanying drawings, in which we have illustrated our improvements embodied in a web-perfecting newspaper printing press,—

Figure 1 is a diagrammatic view showing certain parts of a printing press in side elevation, the roller-holding boxes, for the sake of clearness, being shown in separated views, one of which is a side elevation and the other, just above it, a sectional view;

Figs. 2 and 3 are respectively continuations to the right of the parts shown in Fig. 1;

Fig. 4 is an enlarged detail, being a side view of a part of one of the roller-holding boxes;

Fig. 5 is a diagrammatic view of the same parts shown in Fig. 4, but showing the electrical connections on the other side of the boxes;

Fig. 6 is a top or plan view of the parts shown in Figs. 4 and 5;

Fig. 7 is an enlarged detail, being a diagrammatic view of the controller and its connections, shown in Fig. 3, for the purpose of more clearly showing the said connections;

Fig. 8 is an enlarged detail, being a diagrammatic view of the reversing switch shown in Fig. 1 enlarged for the purpose of more clearly showing the electrical connections between the various parts;

Fig. 9 is a detail, being a rear elevation showing the roll-spindle and motor and the mechanism for connecting and operating the same; and

Figs. 10 and 11 are, respectively, an end view and a side elevation showing the manner of mounting one of the solenoids to permit of the adjustment thereof.

Before describing specifically the embodiment of our invention illustrated, it may be well to explain that the accompanying drawings are the same as the drawings of our application for patent, Serial No. 686,477, filed March 27, 1912, for mechanism for renewing the web in a printing press, etc., patented July 10, 1917, No. 1,233,004, of which application this is a division, and it will be understood that while the improvements which form the subject-matter of the present application are peculiarly adapted for use in connection with the improvements of our said patent, nevertheless our present improvements may be embodied in other types of presses or analogous machines, and the claims hereinafter made are therefore to be construed accordingly.

Referring to the drawings,—

7 indicates a part of the frame of the press. 8 indicates a web-roll, the web of

which is drawn through the press by the printing-couples and other forwarding rollers hereinafter described in the direction indicated by the arrows. 9 indicates a motor, which is concentric with the roll-shaft 280 upon which the web-roll 8 is mounted and secured in the usual way. The roll-shaft 280 is journaled in suitable bearings, as 281, in the frame 7 of the press and is movable longitudinally of itself in said bearings. 282 indicates a friction clutch-member which is secured upon one end of the shaft 280, exterior to the framework of the press, and is provided with a circumferential groove 283. The motor 9 is mounted upon a carriage 284 which is suitably supported upon a bracket 285 of the framework so as to slide thereon in either direction and in the same direction as the roll-shaft 280. 286 indicates the shaft of the motor 9, which is in line with the shaft 280 and is provided with a member 287 rigidly secured to said shaft and provided with a circumferential groove 288. 289 indicates a second friction clutch-member adapted to coöperate with the friction clutch-member 282 and feathered upon the shaft 286 so as to slide thereon toward and away from the member 287. 290 indicates spiral springs which are placed between the member 287 and friction clutch-member 289 and tend to yieldingly hold member 287 and friction clutch-member 289 apart. The motor carriage 284 is provided with a rack-bar 291 which is engaged by a gear 292, mounted in the carriage 285 on a shaft 293. 294 indicates a beveled gear on the shaft 293, which engages with a beveled gear 295 fixed on the end of a shaft 296 which is journaled at one end in a suitable bearing, as 297, and at the other end in a sleeve 298, which is itself journaled in a hub 299 which is journaled in the framework 7. 300—301 indicate arms whose upper ends are adapted to engage grooves 283 and 288, respectively, and by means of collars 302—303 are mounted on a screw-threaded shaft 304 which is journaled at one end in the framework 7, and at the other end in a suitable bracket, as 305, mounted on the frame of the machine. This shaft may be turned by a hand-wheel, as 306, or by means of a hand-wheel 307 on shaft 308 mounted in bracket 309 and carrying at its upper end a gear 310, which meshes with the gear 311 on the shaft 304. The shaft 304 is screw-threaded so that by its rotation the arms 300—301 may be moved toward the left or right. When engaged with the grooves 283 and 288, such movement of the arms will move both the roll-shaft 280 and the motor 9 toward one side or the other so as to properly adjust the roll upon the machine without changing the tension of springs 290, as fully explained in Letters Patent No. 1,208,418, granted to us December 12, 1916. 312 indicates a cross-arm which connects arms 300 and 301 and which is connected with a rock-arm 313 feathered upon sleeve 298. The rocking of the sleeve 298, so as to move the arm 313 outward, will free the arms 300 and 301 from the grooves, permitting the motor to be moved independently of the roll-shaft. 314 indicates a lever which is secured to hub 299 and which is provided with rods 315—316 which are adapted to engage, respectively, with suitable notches on shaft 296 and sleeve 298, and are operated by the usual handles 317—318, respectively, so that the lever 314 may be operatively connected with or disconnected from said shaft and said sleeve. When the handle 318 is grasped and the lever 314 is drawn backward, the rod 316 engages sleeve 298 and causes the same to rotate, swinging out rock-arm 313 and freeing arms 300 and 301 from engagement with the clutch-members. When the handle 317 is grasped, rod 315 is caused to engage shaft 296 so that movement of lever 314 rotates said shaft, and through gears 293—295 rotates gear 292, which is in mesh with rack-bar 291. The motor is thus moved to the right, freeing the friction clutch-member 289 from the friction clutch-member 282 so that the roll-shaft can be removed from the bearings. The motor is connected with electrical circuits, hereinafter described, and is designed and constructed so that by the operation of devices hereinafter described, it may first be run in the same direction with the roll so as to assist in feeding the web into the press to the desired extent, and may then be automatically reversed so as to run in the opposite direction to that of the roll and operate as a suitable brake on the roll to insure proper tension of the web. The specific mechanism for mounting the motor and the roll-spindle forms the subject-matter of our application, Serial No. 686,476, filed March 27, 1912, patented December 12, 1916, No. 1,208,418, and therefore is not more fully described herein.

10 indicates a second roll and 11 a second motor, corresponding with the roll 8 and the motor 9, and mounted in the frame of the press and preferably below them. The roll and motor 10—11 are intended for use in place of the roll and motor 8—9 when the web from the roll 8 is exhausted, and as these parts are duplicates of each other, further description of the mounting thereof is unnecessary.

12 indicates a box suitably mounted in the frame of the machine in advance of the roll 8. 13 indicates a roller whose bearings 14 are slidingly mounted in the box 12 so as to be free to rise and fall therein. In Fig. 1 three different positions of this roller are shown, two of them in dotted lines. 15 indicates buffer-springs which are located in the bottom of the roller-boxes 12 and whose func-

tion is to ease the fall of the roller 13 when it is allowed to drop, as hereinafter described. The web of paper passing from the roll 8 passes underneath the roller 13, and its tension is sufficient to sustain the weight of the roller 13 and its connections, so that when the paper is pulled through the press and the diameter of the roll 8 diminishes, the roller 13 is gradually lifted in the boxes 12, as is indicated by dotted lines in Fig. 1. The roller bearing 14 supports at one side of the box 12 contact-arms 16 and 17 (see Fig. 4), and at the other side of said box contact-arms 18 and 19 (see Fig. 5), which are separated from each other and which are carried up and down by the movement of the roller 13. 19a—20 indicate contact strips upon one side of the roller-box 12, which are brought into electrical contact with one another by the arm 16 as the roller moves up in its box, and are of appropriate length so that the contact may be made at any suitable distance in the rise of the roller. 21 indicates an electrical contact-block upon one side of the box 12 which is adapted to be brought into electrical contact with contact 17 when the roller rises to the highest permissible distance in the box 12. 22 indicates a contact-bar upon the other side of the box 12 which is adapted to be brought into electrical contact with the bar 18 as the roller rises. 23 indicates contacts, on the same side of the box 12 as contact-bar 22, which are connected with one another by a series of resistances 24 and are adapted to be brought into electrical contact with the end of the contact-bar 18, whereby, when the roller is raised, contact-bar 22 is brought successively into electrical connection with the blocks 23, thereby introducing successively more resistance into the circuit, hereinafter described, as the roller rises. 25 indicates an electrical contact-block, located upon the same side of the box 12 as the contact-bar 22 and contact-blocks 23, which is adapted to be brought into electrical contact with contact-bar 19 when the roller reaches the extreme upper limit of its movement. Of course, it will be understood that each end of the roller 13 is mounted in such a box, one on each side of the web. It is necessary to provide only one box and one roller-bearing with the contacts described, and the box on the other side is like the box shown except that it has no contacts. From roller 13 the paper passes between boxes 26 which are suitably mounted in the frame of the machine upon each side of the web of paper. 27 indicates solenoids suitably mounted in any approved manner in the framework of the press above the boxes 26. The solenoids 27 are provided with cores 28 which, when the solenoids are excited, will rise in the solenoids. 29 indicates blocks which are slidingly mounted in the boxes 26 and connected with the cores 28. 30 indicates a wire knife which is stretched between the blocks 29 below the web of paper and is adapted, when the blocks are raised by the action of the solenoid, to sever the web of paper. From between the boxes 26 the web passes over tension roller 31 and thence downward between rollers 32—33, which are normally supported as will be hereinafter more fully described, and between and over a series of rollers 34, between the form and impression cylinders 35—36 of any well-known printing mechanism, which forward the web and print upon one side thereof. On its way to the cylinders the web passes under a roller 37 which is mounted in suitable bearings, as 38, in roller-boxes 39 mounted in any suitable manner in the frame of the press. This roller is free to rise and fall in said boxes, and the boxes are provided at the bottom with springs 40. The roller 37 is of such weight as to be supported by the tension of the web, so that as long as the web is running through the press the roller is held in its upper position in its boxes. The springs 40 are of such length and tension as to yield when the roller drops, as is hereinafter described, sufficiently to permit the roller by its momentum to make temporary contact between the contacts hereinafter described, but to immediately thereafter, by its tension raise the roller free from said contacts. 41—42 indicate electric contacts connected with circuits hereinafter described, and carried by the roller-bearing in one of the boxes 39. 43—44 indicate electric contacts connected with the circuits hereinafter described, and adapted to be brought into electric contact, respectively, with contacts 41 and 42 when the roller 37 drops. In other words, when the web is in any way broken, as hereinafter described, the roller 37 is free to drop, and falling, its bearings strike spring 40 causing it to yield sufficiently to bring contact 41 into electrical contact with contact 43, and contact 42 into electrical contact with contact 44, momentarily, by the momentum of the roller in falling. The tension of the spring, as pointed out above, however, is such as to immediately lift the roller sufficiently to separate said contacts, so that their engagement is only momentary. After passing between form and impression cylinders 35 and 36, the web is led around between form and impression cylinders 45—46, in the usual manner, around the usual guide rollers 47, under roller 48, upward over roller 49 and down over the usual former and folding mechanism 50. Roller 48 is mounted in roller-boxes 51 upon each side of the machine by means of suitable bearings 52 in suitable slots in the boxes 51, so as to rise and fall therein. The roller, normally, when no paper is there, will rest at the lower portion of the box, but when the press is in opera-

tion and the paper is running therethrough, the tension of the web is sufficient to lift the roller in the box. 53—54—55 indicate contacts which are carried on the roller-bearing at one side of the press and rise and fall therewith. 56—57—58 indicate contacts, which are secured to one of the boxes 51 in register with contacts 53—54—55. When the roller 48 is free to drop, contact 53 is brought into electrical contact with contact 56, contact 54 with contact 57, and contact 55 with contact 58. These contacts are respectively connected to electrical circuits, as hereinafter described. 59 indicates a resistance-box suitably mounted at any suitable portion of the press and having a resistance 60 more or less of which is cut into or out of electrical circuits hereinafter described, by the swinging of a lever 61 of the usual type mounted on said resistance-box. One end of the lever is in contact with the resistance-box in the well-known manner, and the other is connected by a link 62 with the bearing of the roller 48, whereby the up and down movement of the roller in its box causes a movement of the lever over its resistance, cutting more or less resistance in or out of the circuits hereinafter described. The weight of the roller is sufficient to operate the lever.

It will be understood, of course, that of the rolls 8 and 10 only one is in use at a time, the other roll being an extra or reserve roll. Coming then to roll 10, the paper from said roll passes off from the same in the direction indicated by the arrows in Figs. 1, 2 and 3, being drawn through the press when said roll is being printed from, in the usual manner by the operation of the printing mechanism and forwarding rollers. 63 indicates roll-boxes mounted upon each side of the machine exactly like roll-boxes 12. 64 indicates a roller mounted in suitable bearings, as 65, so as to slide up and down in a suitable slot in the box 63, exactly as does roller 13. 66 indicates springs mounted in the bottom of the roller box 63 for the same purpose as springs 15. The roller 64 on these springs is free to move, and is held up by the tension of the web, exactly as is roller 13, so that as the roll 10 diminishes the roller is lifted gradually in the boxes, three of the positions being shown, two in dotted lines, in Fig. 1. The roller bearing is provided, upon each side of one of the boxes, with contacts which rise and fall therewith, precisely like those described for roller 13 in box 12, which is operated by the paper from paper roll 8, and one box 63 is provided with contacts and resistances, exactly like box 12, above described, and operating in the same manner. In other words, Figs. 4 and 5 represent one box 12 for the upper roll of paper, and one box 63 for the lower roll of paper. The web of paper from roll 10 passes upward between boxes 67, mounted in any suitable manner in the framework upon each side of the web, and precisely like boxes 26, above described. 68 indicates solenoids mounted in the frame above boxes 67 and provided with cores 69 which are raised by the energizing of the solenoids, exactly as is the case with solenoids 27 above described. 70 indicates blocks slidingly mounted in boxes 67 and connected with cores 69, and provided with a wire knife 70^a stretched across between them below the paper, and adapted, when said blocks are raised by the operation of the solenoids, to sever the web. The web from roll 10, when being printed from, passes over tension roller 71, between rollers 32 and 33, and thence outward through the press, exactly as heretofore described in the case of the paper from roll 8, whose place the paper from roll 10 takes from rollers 32 and 33 on. Rollers 32 and 33 are provided, respectively, with pins, or with any other suitable devices for temporarily engaging the lead end of either of the webs. The roller 32 is mounted upon eccentric-bushings 76 by the turning of which said roller 32 may be lifted out of, or brought into, contact with roller 33. 77 indicates a rock-shaft suitably journaled in the framework of the press, and having arms 78 and 79. The arm 78 is connected by a link 80 with the eccentric-bushing 76, so that when the shaft 77 is rocked by the rock-arm 79, the eccentric-bushing will be partially rotated in one direction or the other, to raise or lower roller 32 into or out of frictional engagement with roller 33, so that the same may be pressed together and simultaneously rotated by the frictional engagement of the paper passing between them. They are also pressed together sufficiently to cause the pasting together of the lead end of the new roll to the nearly exhausted roll, in the manner hereinafter described. The rock-arm 79 is connected by links 81 and 82, respectively, with cores 83—84 of solenoids 85—86, whereby, by the energizing of either of said solenoids, its core is drawn into the solenoid, the arm 79 swung, and the eccentric-bushing 76 operated, to bring rollers 32 and 33 into contact, or separate them, as hereinafter described. The solenoids are connected with, and operate through, circuits hereinafter described.

The operation and management of the paper passing through the press will be hereinafter more fully described. For present purposes it is enough to say that when roll 8 is nearly exhausted, the lead end of paper from roll 10 is brought under roller 64, over knife 70^a, around spring roller 71, impaled upon the pins on roller 33, and pasted along its upper forward margin. Rollers 32 and 33

being separated, the passing of the web from roll 8 has no effect upon the web from roll 10. By the electrically operated mechanism hereinafter described when roll 8 has been reduced to such a diameter that the roller 13 reaches its top position, the solenoid 85 is caused to operate, swinging arm 79 to the left, rocking eccentric-bushing 76, and bring roller 32 down into frictional contact with the paper and pressing it against roller 33. This causes the pasted edge of the under roll to adhere to the surface of the paper of the upper roll, which, at that moment, by the knife 30 and mechanism hereinafter more fully described, is severed, and thereupon paper from roll 10 is fed through the press. Meanwhile at a suitable time a new roll is placed in position in place of roll 8, and the lead edge of its web carried forward, impaled upon the pins on roller 32, and pasted on its under side. The rollers 32 and 33 have been meanwhile separated, as hereinafter described, and consequently the passage of the paper from roll 10 through the press has no effect upon the paper from roll 8 until the size of roll 10 is so diminished that the roller 64 reaches its topmost position, at which time, in the manner hereinafter described, the solenoid 85 is again energized, bringing rollers 32 and 33 again into frictional engagement, and causing the pasted lead edge of roll 8 to adhere to the nearly exhausted roll 10, which is at the same moment severed by the action of the knife 70[a] hereinafter described. The press thereupon prints upon the paper of roll 8, which takes the place of the paper from exhausted roll 10. So on the two rolls alternate through the press. In either case, whether paper from roll 10 is pasted to the nearly exhausted paper from roll 8, or whether the paper from new roll 8 is pasted to the nearly exhausted paper from roll 10, the operation of solenoid 85 to bring the rolls together is only temporary, lasting just long enough to paste the two webs together. As soon as this is accomplished the rollers are separated in the manner hereinafter more fully described, by the deënergizing of solenoid 85, the energizing of solenoid 86, and the return of lever 79 to the normal position shown in the drawings, with the backward rotation of eccentric-bushing 76 and the separation of rollers 32 and 33.

It will be obvious that this substitution of the paper from a new roll for that of an exhausted roll cannot be as well accomplished, at least practically, if the press is running at full speed, and it, therefore, becomes practically desirable, in connection with the matters above described, to provide mechanism which will automatically slow down the press when the old roll is sufficiently exhausted and it is desired to insert a new roll, and to maintain this slow speed until the webs are securely pasted together and the new roll is running into the press. We have, therefore, provided mechanism by which this is automatically accomplished, that is to say, by which the press is automatically slowed down when the old roll is substantially exhausted, and is maintained at the slow down speed until the new roll of paper is taken into the press, whereupon the press is again run at high speed. As was said above, our device relates to presses driven by electric motors. 90 indicates a motor of any suitable type, which is adapted, by any well-known means, to drive the press. 91 diagrammatically indicates the field and 92 the armature circuit of the motor. By means of a suitable controller 93, and a switch 94, the motor is connected with main circuit wires 95—96. The form of controller which we prefer to use is diagrammatically illustrated in Figs. 3 and 7, and will be hereinafter more fully described. In the form of controller which we have shown, 97 indicates a contact arm pivoted at a suitable point, as 98. 99—100 indicate arch-shaped contact-bars that are brought into electrical connection with each other by contact-block 101, at the end of contact-arm 97, which block, as said contact-arm is swung, presses upon contact-arches 99 and 100 and connects the same with each other electrically. 102 indicates a contact-arch having resistance-blocks 103 of the usual form. The contact-arch 102 is adapted, when the lever 97 is swung, to be brought into electrical contact with the block 104 on said arm, to introduce current into the shunt field, and the resistance-blocks 103 are adapted to cut resistance in series, in the well-known manner, into the shunt field by means of the block 104. 105 indicates armature resistance contacts of the usual type, placed in the armature circuit 92, and adapted to be brought into electrical contact with the block 106 on contact-arm 97 as the same is swung in the well-known manner. 107 and 108 indicate solenoids mounted in the controller frame 93, and provided with cores 109—110 which are drawn into their respective solenoids when the same are energized. The cores 109 and 110 are connected, respectively, by links 111—112, with the lower arm of contact-lever 97, so that the same is swung back and forth by the energizing of one or the other of said solenoids. 113—114—115 are solenoids mounted upon the frame of the controller, and provided, respectively, with cores 116—117—118, which have attached to them, respectively, switches 119—120—121, the solenoids operating in the usual way when energized, to lift their cores, which are adapted, respectively, to make electrical contacts between contacts 121[a]—122—123—124—125—126. These switches are normally closed, and are opened only when the sole-

noids are energized to raise the cores, as hereinafter described. 127—128 indicate contacts near solenoid 114, and adapted to be closed or bridged electrically by switch 120 when the core 117 is raised into solenoid 114. 129 indicates a resistance normally in series with solenoid 115. 130 indicates a solenoid having a core or stop 131, which, when solenoid 130 is not energized, normally projects above it in the path of contact-arm 97, and which, when the solenoid 130 is energized, is drawn into the solenoid out of the path of the contact-arm 97. The solenoid 130 is preferably made adjustable on the frame, so that its core 131, when projected, may be placed at any desired point in the pathway of contact-arm 97, to interrupt its movement at that point. This may conveniently be accomplished as illustrated in Figs. 10 and 11, in which we have illustrated the solenoid as being held by brackets 130^a having slots 130^b through which pass bolts 130^c secured in a suitable board 130^d or other support. By loosening the bolts 130^c, the solenoid may readily be shifted so as to place the core 131 at the desired point. 132—133—134 indicate, respectively, "on", "off" and "stop" push-buttons of any well-known type, normally open and adapted, when closed, to complete electrical circuits as hereinafter described.

136 indicates a wire extending from the negative side of the switch 94 to a wire 137. 138 indicates a wire which passes to the "on" button 132 from the wire 137, and leads to, and connects with, the solenoid 107, and then passes from the solenoid to wire 139, which is connected by wire 140 to the positive side of the switch. When the switch 94 is closed and the "on" button is pushed in so as to make the connection through wire 138, the current passes through solenoid 107, energizing the same, and causing it to draw into it the core 109. By any suitable retarding mechanism, which is not shown as it forms no part of our present invention, the core 109 is caused to move slowly into the solenoid. This causes the upper end of contact-arm 97 to move to the right, connecting arch-bars 99 and 100 by the contact 101. The upper arch-bar 99 is connected by a wire 141 with negative wire 137, and when the block 101 connects arch-bars 99 and 100 electrically, the current passes across from 99, through block 101, to arch-bar 100, to which is connected circuit wire 142. The current then passes through circuit wire 142, across switch 126, which is normally closed, to solenoid 114, and thence down to the positive wire 139, energizing solenoid 114, which draws the core into it, and by means of the switch on the end of the core, electrically connects contacts 127—128. Contact 127 is connected by wire 143 to the negative wire 137. Contact 128 is connected by circuit wire 144 to contact-arm 97, which, having been swung over as above described, brings contact-block 106 into electrical connection with armature resistance contacts 105, and block 104 into connection with arch-bar 102 and resistance blocks 103, from the latter of which the current goes by wire 145 to the shunt field 91, and thence back to positive wire 139. The current also will pass from contact-arm 97, through block 106, through the armature resistance contacts 105 and thence by wire 146 to the motor armature 92, and thence by wire 145 back to the positive 139. The motor will thus be started slowly, its speed depending upon the amount of resistance 105 in circuit. The "on" push-button is normally immediately released, so as to throw the arm 97 only a short distance, and maintain the motor for a time at slow speed. When it is desired to increase the speed the "on" button 132 is given another push, which moves the arm 97 farther to the right, cutting out more of the resistance and increasing the speed of the motor, the operation being repeated until all of the resistance 105 is cut out of the armature circuit, and resistance 103 is inserted into the shunt field circuit, when the motor will be running at full speed. In order to accomplish this the core 131 of the solenoid 130 must be pulled out of the way of contact-arm 97 whenever the "on" button is pressed, to allow said arm to pass it. 147 indicates a wire which is connected with the wire 138 near solenoid 107, and after connecting with solenoid 130, passes back to the positive wire 139. Whenever the "on" button is pushed in, current passes from wire 138 by means of wire 147, through solenoid 130, and back to positive wire 139, energizing solenoid 130, and drawing the core 131 inward out of the way of contact-arm 97. Whenever the "on" button is released, of course, the circuit is broken, and the core 131 is caused to spring back into position by any suitable mechanism.

148 indicates a wire which passes from negative wire 137 to "off" button 133, thence to solenoid 108, thence to wire 145 and back to positive wire 139. Whenever the "off" button 133 is pushed in to close the circuit through wire 148, the solenoid 108 is energized, and its core 110 is drawn inward, swinging contact-arm 97 to the left and moving its upper end across contact-arches 99—100, resistance-blocks 103 and contact-arch 102, and armature resistance contacts 105, until, if the button is pressed long enough, the arm 97 is moved so far that its contact blocks disengage said arches and resistance blocks, cutting off electrical contact with the motor, and stopping the same. At the same time, the connection between arches 99 and 100 being broken, the solenoid 114 is also cut off

from the circuit and deënergizes, allowing core 117 to drop, cutting off electrical contact between contact blocks 127 and 128. If, however, the "off" button 133 is only momentarily pushed, the contact-arm 97 is only swung part way, and resistance is thereby cut in and the motor slowed down. This slowing down movement of the arm 97 may, of course, be continued until the motor is stopped in the manner described. To do this, however, the block 131 of solenoid 130 must be got out of the way. 150 indicates a wire which connects contact block 122 with wire 148. 151 indicates a wire which connects block 121ª with solenoid 130. When the switch 119 is closed, which is its normal condition, after passing through solenoid 130, the current passes by wire 147 to positive wire 139. Thus whenever the "off" button is pushed, the core 131 of the solenoid 130 is drawn into the solenoid out of the way of contact-arm 97, permitting its movement as above described.

As above described, the solenoid 115 has in series with it resistance 129, which is effective to prevent the raising of the core 118 when the resistance is in series with the solenoid, but does not prevent said solenoid from holding up its core when it has been raised by the cutting out of the resistance, as hereinafter described. When the block 101 is in operative position, the circuit is as follows: from negative wire 137 by wire 141, arch-arms 99 and 100, and wire 142, to wire 152, through resistance 129, through solenoid 115, and through wire 153 back to positive 139. 154 indicates a wire which extends from one of the contacts of "stop" button 134 to wire 152 at one side of resistance 129. Wire 155 connects with the other contact of button 134, and with the other side of the resistance 129. Consequently when the button 134 is pressed in, wires 154 and 155 are connected thereby, and the current then passes from wire 142 to wire 152 through wire 154, to push-button 134, to wire 155, and thence upward and through the solenoid 115, cutting out the resistance 129, and thence back to positive. When the core 118 is drawn up, the switch 121 is moved away from the contacts 125—126, and the circuit through wire 142 is broken, which deënergizes coil 114, and allows its core 117 to drop, opening the circuit between contacts 127 and 128, and breaking the circuit through contact-arm 97 to the motor. When this core 117 falls it completes the circuit between contacts 123 and 124. 156 is a wire connecting contact 123 with wire 148, which passes to solenoid 108 as above described. The dropping, therefore, of core 117 causes the energizing of solenoid 108, pulling in the core 110, with the result above described. At the same time current passes through wire 148, across contacts 121ª—122 by switch 119, to wire 151, which energizes solenoid 130, and pulls its core 131 out of the way of the arm 97, in the manner above described.

It will be obvious from the above description that the pressing of the "on" button will cause the motor to operate, starting the press and pulling the paper through it; also that the pushing of the "off" button will slow down the press, and ultimately stop it, together with the web, which is in all cases pulled through the press in the usual manner, by its engagement with the printing couples and the usual forwarding rollers. It is also obvious that by pushing the "stop" button 134 the press may be immediately stopped.

As the roll of paper 8 diminishes in diameter the path of the paper gradually rises, lifting with it roll 13 in the frame 12 and carrying up the contacts 16—17—18—19, which are attached to the roller-bearing above described. When the size of the roll has so diminished that it becomes necessary to insert a new roll of paper into the press, and the roller 13 has been lifted to a point near the top of its boxes, the contact-arm 16 engages contacts 19ª and 20, connecting the same electrically. Contact 20 is connected to circuit wire 161 and contact 19ª to circuit wire 160, which wires also are connected, respectively, to the corresponding contacts on the lower box 63. By means of wire 162 the wire 161 is connected to negative wire 137, and thence, by wire 136, through the switch to negative main 95. The wire 160 is connected by wire 163, and wire 164 to wire 148, and through coil 108 and wire 148, to the positive wire 139, as best shown in Figs. 1, 2 and 3. The electrical bridging, therefore, of blocks 19ª and 20 causes current to pass through the circuit wires above described, energizing coil 108, swinging the upper end of contact-arm 97 to the left, and thus slowing down the motor 90. In this case, however, the block 131 stands in the path of the arm 97, limiting its motion. At the same time, current passes from wire 163 to solenoid 113, and thence by wire 164ª to positive wire 139. This energizes solenoid 113, and raising the core 116, breaks the circuit between contacts 122 and 121ª, thereby preventing current from flowing through solenoid 130. The core 131 will accordingly remain in its projected position, and the arm 97 can, therefore, move backward only until it comes in contact with said core, which, as has been said above, is adjustably placed in the path of the said arm. The motor, therefore, will not be stopped, but will only be slowed down, and continue to run at a low speed. In other words, the bridging of contacts 19ª and 20 by arm 16 on the rising of the roller, will only result in a slowing down of the

motor and not in a stoppage thereof, and this occurs when the roll 8 has diminished to the point at which it is necessary to run a new roll into the press. Before this point has been reached, as has been described above, the lead edge of the paper from roll 10 will have been brought up and secured to the securing devices, such as pins, on roller 33, which, being an idler roller and moved only by the friction of the paper, simply suspends the paper from roll 10 thereon until roll 32 is brought into frictional contact with it. Paste is then applied to the upper surface of the lead edge of the paper from roll 10, and the paper is ready to be pasted to the paper from roll 8 when the proper point is reached, the press having been slowed down to suitable speed as has been described above. As the roller 13 comes to the top of its movement by the substantial exhausting of the paper on roll 8 as above described, contact 19 is brought into electrical contact with contact 25. Contact 25 of the upper box 12 is connected to circuit wire 165, and contact 19 to circuit wire 166. Wire 165 connects with wire 167, which leads through one side of switch 168, to wire 169, above middle solenoid 114 to contact 128, thence across the contact 128, when the solenoid is energized and the switch closed, to 127, and thence by wire 143 to negative wire 137. Wire 166 leads from contact 19 to solenoid 85, through solenoid 85, thence by wire 166 to the positive side of switch 168, and thence by wire 169^a to the positive wire 139, as is shown in Fig. 3. The bridging of contacts 19 and 25, and the closing of this circuit, will energize solenoid 85, drawing inward its core 83, rocking the arm 79 to the left, and by means of arms 78 and link 80, rotating eccentric-bushing 76, and moving roller 32 downward into frictional contact with the paper and roller 33. Thereby, as explained above, the pasted lead edge of the paper from roll 10 is pasted to the under side of the paper from roll 8, and the two begin to move forward through the press together, thereby carrying the new paper from roll 10 through the press in place of the paper from roll 8.

It is obvious that as soon as the pasting is done, and the paper from the new roll begins running into the press, the paper from the old roll must be severed behind the paste line. Referring to Figs. 1 and 8, 170 indicates a reversing switch, which, when the paper from roll 8 is being used, will be in the position shown in dotted lines in Fig. 1. The operation of this reversing switch effects other purposes which will be hereinafter described. 171—172—173—174 indicate contact-points, and when the lever 170 is in the position shown in dotted lines in Fig. 1, the contacts 173 and 174 are electrically connected by a block 175 on the end of said lever. Referring to Fig. 2, 176—177 indicate switches which are located at one end of core 83, which are adapted, respectively, to electrically connect contacts 178 and 179, and contacts 180 and 182, and operate to close said contacts when said core is moved inward into the solenoid 85. Contact 174 (see Fig. 1) is connected by wire 183 with circuit wire 167, which, as above described, leads to the negative side of switch 168. Contact 173 is connected by wire 184 to contact 179. When the switch 176 is closed, contacts 178 and 179 are connected, and the current is led from 178, by circuit wire 185, which connects through solenoid 27, and wire 185, to wire 166, which, as above described, connects with the positive side of the circuit. When solenoid 85 is energized, as described above, so as to draw core 83 into it, the switch 176 makes connection between contacts 178 and 179, and the current thereby flows through solenoid 27, energizing the same, drawing up its core, and causing knife 30 to rise and sever the paper of roll 8 behind the line at which it is pasted to the paper from roll 10, as above described. The printing press thereupon prints from roll 10. The roll-spindle, and what is left of roll 8, may then be removed and a new roll substituted therefor, to be run into the press when the roll 10 is substantially exhausted.

When the coils 27 are energized, as above described, raising their cores, switch 186 is operated to make electrical connection between contacts 187 and 188. Contact 188 is connected by wire 189 to wire 167, which, as explained above, is connected with the negative side of the main circuit. Contact 187 is connected by wire 190 with solenoid 86, and thence to wire 166, which, as explained above, leads to the positive side of the main circuit. The movement, therefore, which causes the severing of the paper, causes the closing of switch 186, and energizes solenoid 86, which, by drawing its core inward, moves the arm 79 to the right, and rotates the eccentric-bushing 76 in the opposite direction, immediately separating rollers 32 and 33. The severing of the paper from web 8, described above, of course, relieves its tension, and roller 12 thereupon drops to its original position, which breaks the circuit, and deënergizes solenoid 85, permitting solenoid 86 to act. Inasmuch as the deënergizing of solenoid 85, and the outward movement of its core, breaks the circuit in wire 185, the solenoids 27 are deënergized, permitting the knife to fall back to its original position, thus opening the switch 186, and deënergizing solenoid 86, leaving solenoid 85 free to act at the next operation. The paper from roll 10 will now be running through the press, and a new roll 8 may be put in place. With the exception that it is

connected by different circuit wires, which will be hereinafter described, it will be understood that the diminishing of the diameter of the paper on roll 10 acts in precisely the same way as the diminishing of the paper on roll 8, above described, so that when said roll 10 is practically exhausted, the motor is automatically slowed and the speed of the press reduced to permit the pasting of the lead edge of the new roll 8 to the practically exhaustion roll 10. The consumption of roll 10 operates to lift roller 64 in its box 63, and to cause current to flow through wires 160 and 161 to wires 162 and 163, to slow down the press in exactly the same way as in case of roll 8.

The construction by which the lead edge of the new roll 8 is pasted to the paper from roll 10 when the same is substantially exhausted is as follows: Contact 19, on the contact-arm carried by the lower roller bearing is brought into electrical contact with contact 25 when the roller 64 reaches the top. Contact 19 of the lower roller 64 is connected by wire 191, to coil 85 and by wire 166 to the positive side of the main circuit. Contact 25 on box 63 is connected by wire 192 and wire 167 with the negative side of the main circuit. The rising of the roller 64, therefore, to its top position, energizes solenoid 85, and closes together rollers 32 and 33, in precisely the manner described above, thus forcing together the pasted edge of the web from the new roll 8 and the paper from roll 10. The roll 8 is prepared for this operation in the manner described, except that the paste is applied to its under surface.

193 indicates a reversing switch, which, when roll 10 is running through the press, is in the position shown in dotted lines in Fig. 2. A contact-block 194 on the end of the switch operates, when the switch is in a certain position, to electrically connect contacts 195 and 196. The manner in which the switch 193 is moved to such position, which is indicated by dotted lines, will be described hereinafter. Contact 195 is connected by wire 197 with wire 192, and then to wire 167 which, as described above, is connected with the negative side of the main circuit. Contact 196 is connected by wire 198 to contact 180, and when the switch 177 is closed by the energizing of the solenoid 85, as above described, it connects with solenoids 68 and by wire 166 with the main circuit. The energizing of the solenoid 85, which brings together rollers 32 and 33, as above described, closes switch 177 and energizes solenoids 68, raising their cores, and lifting the knife 70^a to sever the paper from the web 10 behind the pasted joint. 199 indicates a switch which is located in the upper end of one of the solenoids 68, and is lifted by the upward movement of the core of said solenoid to electrically connect contacts 200 and 201. Contact 201 is connected by wire 202 with wire 167, which, as described above, connects with the negative side of the main circuit. Contact 200 is connected by wire 203 with solenoid 86, and thence to wire 190, whose connection with the main circuit has been described above. The passing of the current through the solenoid 86 operates, as described above, to separate rollers 32 and 33. Just as was the case with roller 13, above described, the severing of the web releases its tension, roller 64 drops and the solenoids are deënergized as above described. We now have the paper from the new web roll 8 running through the press, and the exhausted roll 10 may be removed and a new roll substituted, the operation being repeated from time to time as may be desired.

The reversing switch 170 carries upon it not only the contact block 175, for the purpose above described, but also contact-blocks 205—206, which respectively operate, when the switch lever is swung to a certain extent, to electrically connect arch-bars 207—208, and arch-bars 209—210, and when the lever is swung still farther, to connect contacts 171—172 and contacts 213—214. The reversing lever 170 is operated by the core 215 of a solenoid 216, and is connected in any suitable manner with the lever at one side of its pivotal point, so that the energizing of the core tends to rock the lever out of the position shown in solid lines, and into the position shown in dotted lines in Fig. 1. 217 indicates a solenoid having a core 218, which carries a switch 219 on its lower end. 220 indicates a resistance adapted to be placed in series with solenoid 217, and to operate, when so connected, to prevent said solenoid from raising its core 218, but allowing enough current to flow through said solenoid to hold the core up after it has been raised. When the core is down in its normal position, the switch 219 makes contact between contacts 221 and 222. 223—224 indicate contacts which are adapted to be closed by the switch 219 when the solenoid 217 is energized sufficiently to raise its core.

225—226 indicate wires which are connected with the shunt field, and 227—228 wires which are connected with the armature of motor 9. Wire 226 connects with the positive side of switch 168. Wire 225 connects with wire 166, which connects, as above described, with the positive side of switch 168. Wire 227 connects with arch-bar 209 on the reversing switch, and also with contact 171 through wire 237. Wire 228 is connected with the lowest resistance block 23 on the roller-box 12, as is best shown in Fig. 5, thence through one or more of the resistances, as hereinafter described, and through sliding contact 18, to contact-

bar 22, and thence by wire 229 to resistance 60 (see Fig. 3). When solenoid 114 is energized, it completes the circuit to the switch 168, as above described. The negative wire 167 (see Fig. 1) is connected by wire 230 with block 221, and the switch 219 being normally closed, is connected through it to block 222, thence to wire 231, through solenoid 216, and by wire 232 to the positive side of switch 168. This energizing of the solenoid 216 lifts plunger or core 215, swinging the switch 170 in a contra-clockwise direction, and connecting arch-bars 207—208 by block 205, and arch-bars 209—210 by block 206. The circuit through the armature of motor 9 is thereby completed as follows:—Arch-bar 208 is connected by wire 233 with negative wire 167, and arch-bar 208 is connected by wire 234 to the lever 61 (see Fig. 3). Depending upon the position of the lever, therefore, the current passes through more or less of the resistance 60, to wire 229, to sliding contact-bar 22, thence by means of sliding contact 18 to one or the other of the contacts 23, according to the position of the roller, thence through more or less of resistances 24, by wire 228 to one side of the armature, and from it by wire 227 to arch-bar 209, across block 206 to arch-bar 210, thence by wire 235 to wire 232, and thence to the positive side of the switch 168. The field already having been charged, as above described, the circuit is completed and the motor runs in a contra-clockwise direction,—that is to say, in the same direction as the roll 8 which is being unwound,—thereby assisting the paper in its progress into the press. It will be understood, of course, that by any suitable retarding mechanism, which need not be described, as such devices are well known, the core 215 in solenoid 216 is caused to move slowly, at a regulated speed. As the core 215 continues to lift, the arm 170 is swung farther around until block 205 connects contacts 171 and 172, and block 206 connects contacts 213 and 214. Contact 172 is connected by wire 233 with wire 167, and with the negative side of switch 168. Contact 171 is connected by wire 237 to wire 227, which leads to one side of the armature of motor 9, thence through the armature, by wire 228, through the resistance 24, by sliding contact 18 to contact-bar 22, and thence to wire 229, the course of which has been above described. It will be obvious that this reverses the direction of the current through the armature and the brake motor 9 thereupon turns in a clockwise direction, against the rotation of the roll 8. It will also be obvious that as the roll of paper diminishes in size, roller 13 will be lifted, more and more resistance will be cut into the armature circuit, and the speed of the motor 9 thereby diminished. This is necessary because it is necessary to diminish the braking of the web roll as its size diminishes. As the web roll diminishes in size, since it is rotated by the pull of the press on the web, the leverage diminishes, and consequently a greater pull on the web is required. It is also obvious, therefore, that to maintain a proper tension the braking power should be correspondingly diminished, and this is done by slowing down the braking motor 9.

238 indicates a wire leading from negative wire 167 to resistance 220, which, as has been said above, is in series with solenoid 217, the circuit continuing by wire 239, to contact 240, and across switch 241 to contact 242. The switch 241, which is operated as hereinafter described, is normally closed, and contact 242 is connected by wire 243 to wire 166, and to the positive side of the main circuit. When the roller 13 reaches the topmost limit of its movement, due to the diminution of the paper roll, contact 17 and contact 21 are brought into electrical connection. (See Fig. 4). Contact 17 has attached to it circuit wire 244, and contact 21 has attached to it wire 245. Wire 244 connects with wire 238 above the series resistance 220, and wire 245 connects to solenoid 217 below resistance 220. It thus results that when contacts 17 and 21 are connected, the circuit through solenoid 217 is from negative wire 167 through wires 238 and 244 to the contacts 17 and 21, thence by wire 245 to solenoid 217, thence by wire 239 to contact 240, across switch 241 to contact 242, by wire 243 to wire 166 and the positive side of the main circuit. This cuts out resistance 220 and fully energizes solenoid 217, which lifts its core, breaking contact of switch 219 with contacts 221 and 222, and consequently breaking the circuit through and deënergizing solenoid 216, so that its core drops, rotating arm 170 and stopping the braking motor 9. Roll 8 may then be removed.

The tension on roll 10 is regulated by motor 11 in precisely the same way, through the medium of the reversing switch lever 193, which is operated by solenoids 246 and 247 in the same manner that solenoids 216 and 217 operate reversing lever 170. The parts are substantially duplicates, and detailed description thereof is believed to be unnecessary. The arch-bars and contacts are connected by appropriate wires in substantially the same manner as the corresponding arch-bars and contacts in reversing mechanism 170, and operate in the same way. Solenoid 246 is energized by appropriate circuit connections, as follows: When the roller 13 reaches its topmost position, solenoid 217 is energized so as to lift switch 219, and connect contacts 223 and 224, as has been described. Contact 223, by means of wire 248, is connected to wire 167

which connects with the negative side of the circuit, and contact 224 is connected by wire 249 to solenoid 246, which in turn is connected by wire 250 to wire 243, which is connected to wire 166 leading to the positive side of the main circuit. This energizes solenoid 246 and turns lever 193 into the position shown in dotted lines. It thereby brings it first over the arch-contacts corresponding with those above described in connection with arm 170, and the motor runs in the same direction as the paper until the lever reaches the position shown in dotted lines, when the rotation of the motor 11 is reversed and it acts as a brake. The paper from roll 10 thereupon runs through the press until when it is substantially exhausted, the end of the web from a new roll 8 is pasted to it, as above described.

The diminishing of the diameter of the paper on roll 10 as the paper runs through the press, causes the rising of roller 64 in its box, which brings into play contact mechanism similar to that above described in connection with roller 13 and box 12, and effects precisely the same results as on the paper from roll 8. When roller 64 is caused to reach the top limit of its movement by the corresponding diminution of the roll 10, the solenoid 247 is energized by the cutting out of resistance 251, lifting switch 241, breaking the contact between blocks 240 and 242, and consequently the circuit through solenoid 217, which thereupon drops its core, deënergizing solenoid 246, and the lever 193 thereupon automatically resumes the position shown in solid lines in Fig. 2, and the motor 11 stops. Meanwhile, as described above, a new roll 8 will have been placed in position, ready for attachment to roll 10, and will have been automatically substituted for the latter roll, in the manner hereinbefore explained. These operations may be continued, alternating from one roll to another, as long as may be desired.

As has been described above, and as is shown in Fig. 3, circuits are connected with resistance 60, and with arm 61 which is operated by the height of roller 48. As has been explained, this roller 48 is sustained by the tension of the paper, and will rise or fall from its normal position as the tension incidentally increases or diminishes during the operation of the press. If the tension for any reason increases beyond the normal point, the roller rises, swinging downward the left-hand end of arm 61, and cutting more of resistance 60 into the circuit, which causes the operating braking motor 9 or 11, as the case may be, to run at less speed and consequently to have less braking power, thereby relieving the excessive tension. If, on the other hand, the tension relaxes below normal, the roller 48 drops and swings the lever 61 so as to cut out some of the resistance 60, thereby increasing the speed of the braking motor, increasing its braking power. 252 and 253 indicate wires connecting the arm 61 and resistance 60 with the motor 11. We thus provide for regulating the action of the braking motors by the tension of the web either in advance of, or beyond the printing couples.

As long as the paper is running through the press, roller 48 will never drop to the extreme limit of its movement, as it will be sustained by the tension on the paper. If, however, a break in the paper should occur anywhere after passing the printing couple 45—46, the tension on the paper is, of course, at once released, which allows roller 48 to drop to its lowest position. This causes contact 53 to make contact with contact 56, contact 54 to make contact with contact 57, and contact 55 to make contact with contact 58. These contacts are only diagrammatically illustrated in Fig. 3, but are preferably of the same form as the contacts used on the box 12, and shown in Figs. 4 and 5. Contact 53 is connected by wire 254 to wire 154, and contact 56 is connected by wire 255 to wire 155. The dropping of the roller 48, therefore, establishes electrical connection between contacts 53 and 56, and consequently makes connection between wires 154 and 155, short circuits resistance 129, and causes solenoid 115 to be energized and raise its core. This breaks the connection of switch 121 between contacts 125 and 126, which deënergizes solenoid 114 causing it to drop its plunger, breaking the contact between contacts 127 and 128 and stopping the main driving motor. As the press does not stop instantly, in order to prevent the web from getting tangled up with the press, it is desirable to immediately sever the paper in advance of the printing couples. This is effected by bringing contacts 54 and 57 together by the dropping of the roller 48. Assuming, therefore, for purposes of description, that it is roll 8 which is running through the press when the break occurs, it will be remembered that when so running reversing switch 170 is in the position shown in dotted lines in Fig. 1. Contact 54 is connected by wire 256 to contact 173, and contact 57, by wire 257, is connected at point 258 (see Fig. 2) to wire 185 of solenoid 27, and through said solenoid, by wire 185, to the positive side of the main circuit, as above described. The circuit, therefore, is from negative wire 167, by wire 183, to contact 174, across contact-block 175 to contact 173, thence by wire 256 to contact-block 54, through contact 57, by wire 257 to wire 185 of solenoid 27, and then to the positive side of the main circuit, thus completing the circuit, energizing the solenoid 27 and causing the knife 30 to sever the paper on roll 8.

Contacts 55 and 58, by wires 257ª and 258ª, respectively, are connected in the same manner, through the contacts of reversing switch mechanism 193, to solenoid 68, energizing the same, and causing the rising of the knife to sever the paper when roll 10 is being used. It will, therefore, be obvious that, whichever roll is being used, a break in the paper after passing the printing couples, will cause the roller 48 to drop and the paper to be severed in advance of the first printing couple.

In case a break in the paper occurs before it reaches the first printing couple 35—36, the press is automatically stopped by the falling of the roller 37. As above described, this roller 37 is held up by the tension of the paper, and when the paper breaks, the tension being destroyed, the roller 37 drops, causing contacts 41 and 43, and contacts 42 and 44, to be brought into electrical contact. This contact is only temporary because springs 40 are of sufficient length and tension to hold roller 37 normally high enough to keep the contacts from being made, but when roller 37 drops there is sufficient momentum to cause the compression of the spring 40 and bring the contacts together. 259 indicates a wire which, through wire 254, connects contact 41 with wire 154, (see Fig. 3), and 260 indicates a wire which connects contact 43 with wire 255 and through it with wire 155. The falling of the roller so as to bring these two contacts together, therefore, operates to stop the press, as they are connected to the same wires as wires 254 and 255, which operate to stop the press when roller 48 falls to its limit by a breakage of the web beyond the printing couples, as above described. As the braking motors 9 and 10 ordinarily receive their current through the same circuit as the main motor, in order that brake motor 9 or 11, as the case may be, shall, in case the web breaks, continue running in a direction opposite to the rotation of the roll, to wind the roll up and pull the broken paper back out of the press, the following instrumentalities are provided: 261 (Fig. 2) indicates a solenoid provided with a core 262 which carries switch 263. 265—266 indicate contacts which are closed by the upward movement of switch 263. 269 indicates a resistance adapted to be connected in series with solenoid 261, and operating when so connected, to reduce the power of said solenoid sufficiently so that it will not operate to raise the core, but will hold the core up, after it has been lifted. The solenoid is made effective for lifting its core by short circuiting said resistance, the connections being as follows: 270 indicates a wire which leads from the negative side of switch 168 to resistance 269, thence to coil 261, thence by wire 271 to switch 272, and thence by wire 273 to the positive side of switch 168 and the main positive circuit. 274 indicates a wire which is connected with wire 270 above the resistance 269, and connects with contact 42. 275 indicates a wire which leads from contact 44 to coil 261. By this arrangement, when the contacts 42 and 44 are brought together, resistance 269 is cut out, so that coil 261 is energized sufficiently to lift its core 252 and make contact between contacts 265 and 266. This circuit remains energized until it is broken by disconnecting the hand switch 272, which, of course, deenergizes solenoid 261 and permits switch 263 to drop. Contact 266 is connected by wire 276 to wire 169 and thence to the negative side of switch 168. Contact 265 is connected by wires 277 to the negative side of the main switch 94 and thence to the negative side of the circuit. The raising of the core of the solenoid 261, therefore, completes the circuit through contacts 265 and 266, and thus the supply circuit to motors 9 and 11 is from the negative side of switch 94, through the contacts 265 and 266, by wire 276 to the negative side of switch 168, the positive connection remaining as before. Consequently the stopping of the press motor does not affect the motors 9 and 11, and whichever one has been running continues to run in the same direction until the switch 272 is opened. The opening of this switch, of course, breaks the circuit and deenergizes solenoid 261, permitting its core to drop, and breaking the circuit so that the brake motor stops.

We have shown our invention diagrammatically, illustrating the same as used in connection with one deck of a printing press, but it will be understood that we do not confine ourselves to the application of this mechanism to a single deck press, or to only one deck of a press, as it is obvious that it may be used in a plural decked press adapted to print simultaneously from two or more webs, by simply duplicating as far as necessary the mechanism above described, with the exception of the motor and controller.

The operation of the apparatus described has been incidentally explained, but it may be well to summarize the general features of the operation. A web from one of the rolls, as 8, being placed in the press, and the switch 94 closed, the motor is started slowly by pressing the "on" button 132, and is driven at a low rate of speed until the paper is threaded through the press. By the further operation of the "on" button, the speed of the driving motor is increased, in the manner described, until the press is printing at full speed. In starting the mechanism the braking motor is at first run in the same direction as the roll, to assist in threading the paper, but as soon as the paper is led the necessary distance into the press, the rotation of the

braking motor is reversed so that it then operates as a brake to control the rotation of the web roll. As the size of the roll diminishes, the bearing roller, as 13, is gradually lifted as the paper rises, so that more and more resistance is cut into the armature circuit of the braking motor, causing said motor to rotate with progressively diminishing speed, thus lessening its braking effect in proportion to the decrease in the diameter of the paper roll. As said bearing roller approaches the top of its box, by the diminution of the roll to a predetermined point, coil 108 is energized by the electrical connection of contacts 19 and 20 through contact arm 16, which causes the swinging of the controller-bar 97, in the manner above described, so as to cut more and more resistance into the circuit of the press driving motor, thus causing it to slow down and slowing down the speed of the press. The controller-bar 97 cannot, however, move far enough to stop the press since its movement is limited by the stop or core 131, which is in position to intercept it when it reaches a predetermined point corresponding with the speed to which the press is to be slowed down when a new web roll is to be joined to the old one. In the meanwhile, at a suitable time before the exhaustion of the roll that has been in use, a new paper roll, as 10, is placed in position, and its lead edge is brought up and secured upon the impaling devices of the lower roller 33, which up to this point is separated from the roller 32, and paste is applied to the upper surface of the new web near its leading edge. When the roll which is being used is substantially exhausted, the rising of the roller 13 to its topmost position caused thereby, causes roller 32 to be lowered into frictional contact with roller 33, pressing the pasted edge of the under roll against the paper from the upper roll and causing its adherence thereto. At the same time the upper web is severed by the action of the knife 30, as above described, and the paper from the new roll is led into the press by its adherence to the paper of the old roll. The severing knife thereupon automatically drops, and rollers 32 and 33 are separated. By pressing the "on" button, the controller may then be swung in the other direction, cutting out more and more resistance, until the driving motor is again running at full speed. When the new roll starts into the press its motor, as 11, is at first driven in the same direction as the roll, to assist in forwarding the roll, and prevent strain upon the pasted portion, but after a suitable interval, the direction of rotation of the braking motor is reversed so that it acts as a brake. The proper tension on the web beyond the printing couples is maintained by the operation of roller 48, lever or switch-arm 61 and resistance 59, as described above. If the tension on the web is too great, the lever is swung so as to cut more resistance into the circuit of the brake motor, which thereupon decreases its speed, diminishing its braking effect and compensating for and reducing the excessive tension. If the tension for any reason becomes too lax, the roller 48 drops, swinging the lever 61 so as to cut out more of the resistance 60, thus speeding the brake motor and increasing its braking effect. When the press is printing from the second roll, precisely the same results ensue as when printing from the first roll. When the second roll is nearly exhausted, the driving motor is slowed down by the rising of the web and the roller which bears upon it. The lead edge of a new roll 8 is secured to the upper roller 32, and paste applied, and the rollers are brought together to attach the new web to the old one in the manner above described, the paper from the exhausted roll 10 being severed back of the paste line, and the new roll led through the press as before.

In case either of the webs should break back of the printing couples, the breaking of the web causes the falling of roller 37, and the consequent breaking of the driving motor circuit and the stoppage of the press. In case the web breaks after leaving the printing couples, the breakage of the web causes the falling of roller 48, and the consequent breaking of the driving motor circuit and the stoppage of the press.

The press can, of course, at any time be slowed down by the use of the "off" button 133 and the controllers above described, speeded up again by the use of the "on" button 132, or immediately stopped by the use of the "stop" button 134.

While the tension mechanism described is designed primarily for use in connection with printing presses it may also be used for any other purpose for which it is adapted, and the claims hereinafter made are to be construed accordingly.

What we claim as our invention, and desire to secure by Letters Patent, is,—

1. In a rotary web press, in combination, a roll-spindle adapted to hold a web roll, a motor, friction clutch members forming a driving connection between said motor and said roll-spindle, and means for driving said motor in either direction.

2. In a web printing-press, in combination, a roll-spindle adapted to support a web roll, a motor, friction clutch members forming a driving connection between said motor and said roll-spindle, means for driving said motor in either direction, and means controlled by the tension of the web for automatically varying the speed of said motor.

3. In a web printing-press, in combination a roll-spindle adapted to support a web

roll, a motor having its axis concentric with the axis of said web roll, and friction clutch members forming a driving connection between said motor and said roll-spindle.

4. In a web press, in combination, a roll-spindle adapted to hold a roll of paper to be printed by said press, a friction clutch-member on said roll-spindle, a coöperative friction clutch-member, a motor for driving said second clutch-member and adapted to run in either direction, means operated by the movement of said roll of paper through the press to drive said motor in such a direction as to cause said second friction clutch-member to travel in the same direction as the clutch-member on said roll-spindle, and mechanism adapted, when said web has traveled a predetermined distance, to automatically reverse said motor and cause the second clutch-member to rotate in an opposite direction to said first friction clutch-member.

5. In a web printing press, in combination, a roll-spindle adapted to support a web roll, a motor, friction clutch members forming a driving connection between said motor and said roll-spindle, means for driving said motor to operate as a brake on said roll-spindle, and means operated by the varying of the tension on said web as it passes through the press to vary the speed of said motor.

6. In a web printing press, in combination, a roll-spindle adapted to support a web roll, an electric motor, friction clutch members forming a driving connection between said electric motor and said roll-spindle, means for driving said motor to operate as a brake on said roll-spindle, a resistance in circuit with said motor, and means operated by the varying tension of said web to vary said resistance.

7. In a web printing press, in combination, a roll-spindle adapted to support a web roll, an electric motor, friction clutch members forming a driving connection between said motor and said roll-spindle, means for driving said motor to operate as a brake on said roll-spindle, a resistance in series with said motor, a roller supported by the tension of the web and adapted to rise or fall as said tension varies, and means operated by the rising or falling of said roller to vary said resistance in said motor circuit.

8. In a web press, in combination, a roll-spindle adapted to hold a roll of paper to be printed by said press, a friction clutch-member on said roll-spindle, a coöperative friction clutch-member, a motor for driving said second clutch-member and adapted to be run in either direction, means operated by the movement of said roll of paper through the press to drive said motor in such a direction as to cause said second friction clutch-member to travel in the same direction as the clutch-member on said roll-spindle, mechanism adapted to automatically reverse said motor and cause the second clutch-member to rotate in an opposite direction to said first friction clutch-member, and mechanism operated by the diminishing in diameter of said roll to progressively retard said motor as said roll diminishes in diameter.

9. In a rotary web press, in combination, a roll-spindle adapted to hold a web roll, a motor, friction clutch members forming a driving connection between said motor and said roll-spindle, means for driving said motor in either direction, and mechanism operated by the diminution in diameter of the said roll of paper for varying the speed of said motor to vary the tension on the web.

10. In a rotary web press, in combination, a roll-spindle adapted to hold a web roll, a motor, friction clutch members forming a driving connection between said motor and said roll-spindle, electrically-operated means for driving said motor in either direction to control the tension on the web, a resistance in the circuit of said motor, and electric means operated by the diminution of the diameter of said roll to gradually vary the resistance in said motor circuit.

11. In a rotary web press, in combination, a roll-spindle adapted to hold a web roll, a motor, a friction clutch-member on said roll-spindle, a coacting friction clutch-member driven by said motor either in the same direction or in the opposite direction to the clutch-member on said roll-spindle, a resistance in series with said motor, and electric mechanism operated by the diminishing in diameter of the roll on said spindle to progressively cut in more of said resistance as the roll on said spindle diminishes.

12. In a rotary web press, in combination, a roll-spindle adapted to hold a roll of paper, a motor, a friction clutch-member on said roll-spindle, a coacting friction clutch-member driven by said motor in the opposite direction to the clutch-member on said roll-spindle, a resistance in series with said motor, a roller supported by the tension of the web from said paper roll and lifted thereby gradually as the diameter of said paper roll diminishes, and contacts between said roller and said resistance adapted, as said roller is lifted, to progressively cut in more of said resistance and slow down said motor and the friction clutch connected therewith, progressively as the diameter of the paper on said roll diminishes.

13. In a rotary web press, in combination, a roll-spindle adapted to hold a roll of paper, a motor, friction clutch members between said motor and said roll-spindle, an electrical circuit for said motor, a reversing switch connected with said electrical circuit, whereby the said motor may be

driven in either direction, and electrical means adapted automatically at first to drive said motor in the same direction with said roll to assist in forwarding the same into the press, and then to operate said reversing switch, and reverse the direction of the motor and cause the same to operate as a brake upon said roll-spindle.

14. In a web printing press, a roll-spindle adapted to hold a web roll, a motor, friction clutch members forming a driving connection between said motor and said roll-spindle, a roller supported by the tension of the paper after leaving the said roll and adapted to be lifted thereby as said roll diminishes in diameter, electrical circuits connected with said motor, a resistance in said circuit, and electric mechanism operated by the rising of said roller to progressively vary the resistance in said motor circuit as the paper roll diminishes in size.

15. In a rotary web press, a web roll, a motor, and connections whereby said motor may operate either to advance the web into the press or as a brake to place the web under tension.

16. In a rotary web press, a web roll, a motor, connections whereby said motor may operate either to advance the web into the press or as a brake to place the web under tension, and means for automatically controlling the operation of the motor.

17. A web printing press, comprising printing mechanism, a web roll, a motor, and connections whereby said motor may be operated to advance the web into the press.

18. A web printing press, comprising printing mechanism, a web roll, a motor, connections whereby said motor may be operated to advance the web into the press, and electrically-operated controlling means for said motor.

19. In a rotary web press, a web roll, a motor, connections whereby said motor may operate either to advance the web into the press or as a brake to place the web under tension, and electrically-operated controlling means for said motor.

20. In a rotary web press, a web roll, a motor, friction clutch members between the motor and the web roll, and means whereby said motor may be employed either to advance the web into the press or as a brake to maintain the web under tension.

21. In a rotary web press, in combination, a roll-spindle adapted to hold a roll of paper, a motor, friction clutch members between said motor and said roll-spindle and means for operating said motor in either a forward or a reverse direction.

22. In a rotary web press, in combination, a roll-spindle adapted to hold a roll of paper, a motor, friction clutch members between said motor and said roll-spindle, means for operating said motor in either a forward or a reverse direction, and means for automatically controlling the direction of said motor.

23. A web printing-press, comprising reversible rotary means acting upon the web roll for controlling the tension upon the web, and means for automatically regulating the action of said rotary means.

24. A web printing-press, comprising electrically-operated reversible rotary means acting upon the web roll for controlling the tension upon the web, and means for automatically regulating the action of said rotary means.

25. A web printing-press, comprising rotary means acting upon the web roll for controlling the tension upon the web, means for automatically regulating the action of said rotary means, and means for reversely operating said rotary means to advance the web.

26. A web printing-press, comprising electrically-operated rotary means acting upon the web roll for controlling the tension upon the web, means for automatically regulating the action of said rotary means, and means for reversely operating said rotary means to advance the web.

27. A web printing-press, comprising a reversible brake motor having means acting upon the web roll for controlling the tension upon the web.

28. A web printing-press, comprising a brake motor having means acting upon the web roll for controlling the tension upon the web, and means for reversing the rotation of said motor to advance the web.

29. A web printing-press, comprising a reversible motor having means acting upon the web roll for controlling the tension upon the web, and means automatically operated by variation in the diameter of the web roll for regulating the operation of the motor.

30. A web printing-press, comprising a reversible motor having means acting upon the web roll for controlling the tension upon the web, and electrically-operated means automatically operated by variation in the diameter of the web roll for regulating the operation of said motor.

31. A web printing-press, comprising a reversible motor having means acting upon the web roll for controlling the tension upon the web, and electrically-operated means automatically operated by variation in the diameter of the web roll for regulating the speed of the motor.

32. A web printing-press, comprising a brake motor having means acting upon the web roll for controlling the tension upon the web, electrically-operated means for rotating said motor to unwind the web roll, and means for automatically reversing the rotation of said motor.

33. A web printing-press, comprising a

brake motor having means acting upon the web roll for controlling the tension upon the web, electrically-operated means for rotating said motor to unwind the web roll, means for automatically reversing the rotation of said motor, and electrically-operated means controlled by the tension upon the web for regulating the braking effect of said motor upon the web roll.

34. A web printing-press, comprising means for supporting a plurality of web rolls, a plurality of electrically-operated means associated with said web roll respectively for controlling the tension upon the webs from said rolls, and means for automatically actuating the tension-controlling means of whichever web is in use.

35. A web printing-press, comprising means for supporting a plurality of web rolls, a plurality of brake mechanisms associated with said web rolls respectively for controlling the rotation of said web rolls to regulate the tension upon their webs, and means adapted to be operatively connected with either of said brake mechanisms for automatically controlling the operation thereof.

36. A web printing-press, comprising means for supporting a plurality of web rolls whereby said press may print upon the web from either of said rolls successively, a plurality of brake mechanisms associated with said web rolls respectively for controlling the rotation of said web rolls, means operated by the tension of the web for regulating the action of said brake mechanisms, and electrically-operated means for automatically connecting said brake-regulating means to connect the same with the brake mechanism of the fresh web roll when the latter is brought into use.

37. A web printing-press, comprising means for supporting a plurality of web rolls, a plurality of brake motors associated with said web rolls respectively for controlling the rotation of said web rolls, to regulate the tension upon their webs, and means adapted to be operatively connected with either of said brake motors for automatically controlling the operation thereof.

38. A web printing-press, comprising means for supporting a plurality of web rolls whereby said press may print upon the web from either of said rolls successively, a plurality of brake motors associated with said web rolls respectively for controlling the rotation of said web rolls, means operated by the tension of the web for regulating the action of said brake motors, and electrically-operated means for automatically connecting said brake-regulating means to connect the same with the brake motor of the fresh web roll when the latter is brought into use.

39. In a rotary web press, in combination, a roll-spindle adapted to hold a roll of paper, a motor, friction clutch members forming a driving connection between said motor and said roll-spindle, means for driving said motor so as to operate as a brake upon said roll-spindle, and means for reversing the direction of rotation of said motor.

40. In a web printing-press, in combination, a roll-spindle adapted to support a roll of paper, a motor, friction clutch members forming a driving connection between said motor and said roll-spindle, means for driving said motor to operate as a brake on said roll-spindle, means for automatically varying the speed of said motor, and means for reversing the direction of rotation of said motor.

41. In a printing press or the like, the combination of a series of shafts adapted to support rolls of material which successively supply a web to the same devices operating thereon, mechanism for retarding or permitting the acceleration of rotation of each of said shafts, and means responsive to the variations in the tension of said web for causing the operation of said mechanism.

42. In a printing press, the combination of a series of shafts adapted to support rolls of paper which successively and continuously supply a web to the same set of printing couples, mechanism for retarding or permitting the acceleration of rotation of each of said shafts, and means interposed between the said mechanism and the web and operating in response to variations in the tension of said web to cause the operation of said mechanism and the retardation or acceleration of said shafts.

43. In a web tension regulating mechanism for printing presses or the like, the combination of a series of shafts adapted to carry rolls of material which successively and continuously supply a web to the same devices, mechanism for retarding or permitting the acceleration of each of said shafts when the roll of material supported thereby is feeding, and means common to said series of shafts and interposed between the said mechanism and the web for causing the operation of said mechanism to retard or permit acceleration of the shaft carrying the feeding roll as the tension of the web supply therefrom rises above or falls below normal.

44. In a web tension regulating mechanism for printing presses and the like, the combination of a series of shafts adapted to support rolls of paper which successively supply a web to the same set of printing couples or like devices, of braking means operative on said shafts for retarding or permitting the acceleration of rotation of each of the web supply roll shafts, a driving mechanism associated with the braking

means, and means responsive to the variations in the tension of the web for causing the operation of the braking means by the driving mechanism when the tension of the web falls below or rises above normal.

45. In a web tension regulating mechanism for a printing press or the like, the combination of a series of shafts adapted to support rolls of paper, a braking device associated with each of said shafts and adapted to retard or permit the acceleration of rotation of the same, driving means associated with each of said braking devices, a member movable in response to variations in the tension of said web, and a device rendered operable by said movable member when the tension of the web is above or below normal, said device when operative causing the actuation of the braking devices by the driving means to retard or permit the increase of the acceleration of the supply roll shaft.

46. In a tension regulating mechanism for printing presses and the like, the combination of a shaft adapted to support a roll of paper from which a web is supplied, brake mechanism for retarding or permitting the acceleration of the roll shaft, an electric motor for operating said brake mechanism, means for controlling the operation of the brake mechanism by the motor and comprising a member carrying switch contacts connected to the electric motor and a member carrying a switching device adapted to connect certain of said contacts, and responsive to variations in the tension of the web for operating said switching device to connect certain of said contacts in response to variations in the tension of the web above or below normal to operate the electric motor and actuate said brake mechanism.

47. A web printing-press, comprising printing mechanism, and electrically-operated means at both sides of the printing mechanism for regulating the tension upon the web.

48. A web printing-press, comprising printing mechanism, means acting on the web roll for controlling the tension upon the web, and means at both sides of the printing mechanism for regulating the action of said tension-controlling means.

49. A web printing-press, comprising printing mechanism, means acting on the web roll for controlling the tension upon the web, and electrically-operated means at both sides of the printing mechanism for regulating the action of said tension-controlling means.

50. A web printing-press, comprising printing mechanism, brake mechanism acting upon the web roll to control the tension upon the web, and means at both sides of the printing mechanism for regulating the action of said brake mechanism.

51. A web printing-press, comprising printing mechanism, electrically-operated brake mechanism acting upon the web roll to control the tension upon the web, and means at both sides of the printing mechanism for regulating the action of said brake mechanism.

52. A web printing-press, comprising printing mechanism, rotary brake mechanism acting upon the web roll to control the tension upon the web, and means at both sides of the printing mechanism for regulating the action of said brake mechanism.

53. A web printing-press, comprising printing mechanism, electrically-operated rotary brake mechanism acting upon the web roll to control the tension upon the web, and means at both sides of the printing mechanism for regulating the action of said brake mechanism.

54. A web printing-press, comprising printing mechanism, a motor having means acting upon the web roll for controlling the tension upon the web, and means at both sides of the printing mechanism for regulating the speed of said motor.

55. A web printing-press, comprising printing and delivering mechanism, reversible rotary means acting upon the web roll for controlling the tension upon the web, and means between the printing mechanism and the delivery mechanism for automatically regulating the action of said rotary means.

56. A web printing-press, comprising printing and delivery mechanism, reversible rotary brake mechanism acting upon the web roll for controlling the tension upon the web, and means between the printing mechanism and the delivery mechanism for automatically regulating the action of said rotary brake mechanism.

57. A web printing-press, comprising printing and delivery mechanism, electrically-operated reversible rotary brake mechanism acting upon the web roll for controlling the tension upon the web, and means between the printing mechanism and the delivery mechanism for automatically regulating the action of said rotary brake mechanism.

58. A web printing-press, comprising printing mechanism, means for driving said printing mechanism, rotary means acting upon the web roll for controlling the tension upon the web, and means for automatically stopping the printing mechanism without stopping said rotary means.

59. A web printing-press, comprising printing mechanism, means for driving said printing mechanism, rotary brake mechanism acting upon the web roll for controlling the tension upon the web, and means for automatically stopping the printing mechanism without stopping said brake mechanism.

60. A web printing-press, comprising print-

ing mechanism, an electric motor for operating the same, rotary brake mechanism acting upon the web roll for controlling the tension upon the web, and means for automatically stopping the press motor without stopping the brake mechanism.

61. A web printing-press, comprising printing mechanism, an electric motor for operating the same, rotary brake mechanism acting upon the web roll for controlling the tension upon the web, and means actuated by relaxation of the tension upon the web for stopping the press motor without stopping the brake mechanism.

62. A web printing-press, comprising printing mechanism, an electric motor for operating the same, brake mechanism acting upon the web roll for controlling the tension upon the web, friction clutch mechanism between said brake mechanism and the web roll, and means for automatically stopping the press motor without stopping the brake mechanism.

63. A web printing-press, comprising printing mechanism, an electric motor for operating the same, rotary brake mechanism acting upon the web roll for controlling the tension upon the web, means actuated by relaxation of the tension upon the web for stopping the press motor without stopping the brake mechanism, and means for driving the brake mechanism to unwind the web roll.

64. A web printing-press, comprising printing mechanism, an electric motor for operating the same, rotary brake mechanism acting upon the web roll for controlling the tension upon the web, friction clutch mechanism between said brake mechanism and the web roll, means for automatically stopping the press motor without stopping the brake mechanism, and means for driving the brake mechanism to unwind the web roll.

65. A web printing-press, comprising printing mechanism, an electric motor for operating the same, rotary brake mechanism acting upon the web roll for controlling the tension upon the web, friction clutch mechanism between said brake mechanism and the web roll, means for automatically stopping the press motor without stopping the brake mechanism, means for driving the brake mechanism to unwind the web roll, and means for automatically reversing the direction of rotation of the brake mechanism.

66. A web printing-press, comprising printing mechanism, a motor for driving said printing mechanism, means for supporting a plurality of web rolls, rotary brake mechanisms operating relatively in connection with the different web rolls for controlling the tension upon the webs therefrom, means for automatically operating either of said rotary brake mechanisms when the web roll associated therewith is put in service, and means for automatically stopping the press motor without stopping the rotary brake mechanism in service.

67. A web printing-press, comprising printing mechanism, a motor for driving said printing mechanism, means for supporting a plurality of web rolls, rotary brake mechanisms operating respectively in connection with the different web rolls for controlling the tension upon the webs therefrom, means for automatically operating either of said rotary brake mechanisms when the web roll associated therewith is put in service, means for automatically stopping the press motor without stopping the rotary brake mechanism in service, and means operated by the tension upon the web for controlling the speed of said rotary brake mechanisms.

68. A web printing-press, comprising printing mechanism, a motor for driving said printing mechanism, means for supporting a plurality of web rolls, rotary brake mechanisms operating respectively in connection with the different web rolls for controlling the tension upon the webs therefrom, means for automatically operating either of said rotary brake mechanisms when the web roll associated therewith is put in service, means for automatically stopping the press motor without stopping the rotary brake mechanism in service, means controlled by the tension upon the web in service for regulating the speed of the rotary brake mechanism operating in connection therewith, and means for reversing the direction of rotation of said brake mechanisms.

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