

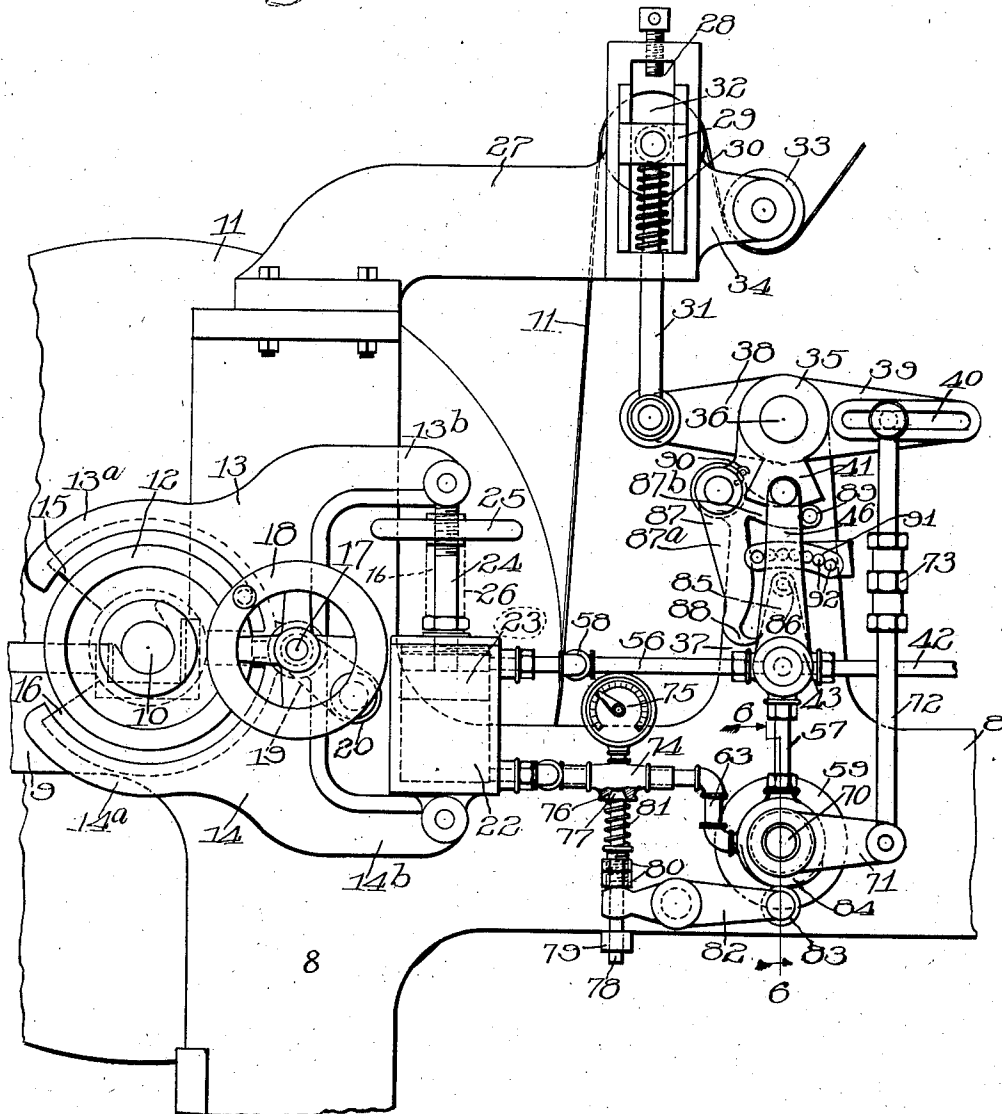
S. G. GOSS.
 PAPER ROLL BRAKING MECHANISM FOR PRINTING PRESSES.
 APPLICATION FILED MAY 20, 1909.

954,089.

Patented Apr. 5, 1910.

3 SHEETS—SHEET 1.

Fig. 1.



Witnesses:

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G. D. Marus Jr.

Inventor:

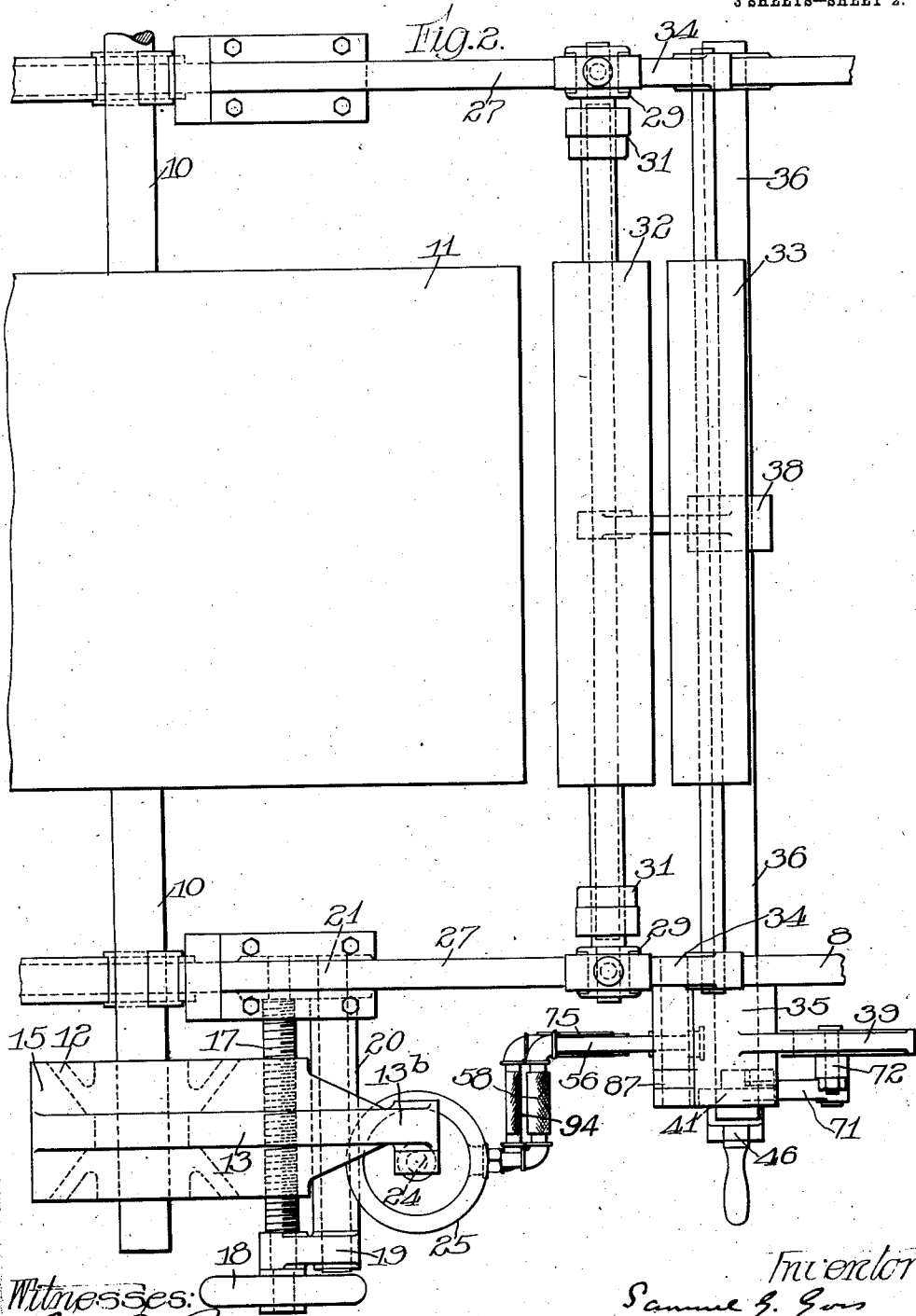
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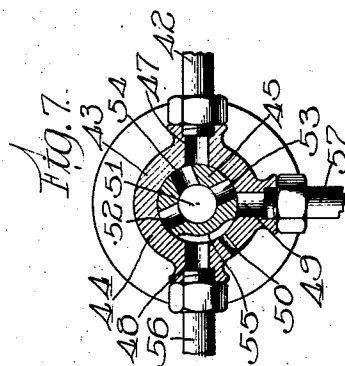
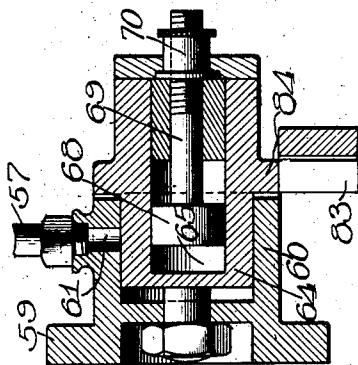
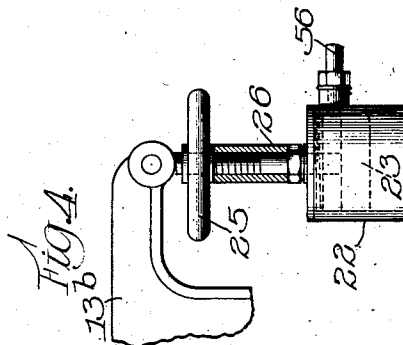
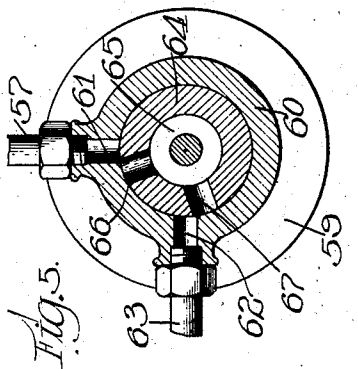
Witnesses:
Ed. D. Terry
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PAPER ROLL BRAKING MECHANISM FOR PRINTING PRESSES.

954,089.

3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

SAMUEL G. GOSS, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE GOSS PRINTING PRESS COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

PAPER-ROLL-BRAKING MECHANISM FOR PRINTING-PRESSES.

954,089.

Specification of Letters Patent.

Patented Apr. 5, 1910.

Application filed May 20, 1909. Serial No. 497,289.

To all whom it may concern:

Be it known that I, SAMUEL G. GOSS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Paper-Roll-Braking Mechanism for Printing-Presses, of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to improvements in mechanism for applying a brake to paper roll spindles in printing presses for printing upon a web or continuous strip of paper, and its object is to provide new and improved mechanism by means of which the brake on the tension roll may be automatically regulated by the tension of the paper. As is well-known, the web rolls of printing presses of this character consist of a great length of paper wound in a roll and carried by a spindle which is placed in the press and the paper is drawn from the roll by the operation of the rotary printing couples of the press when the press is in operation. In all such cases, it has been customary in some way or other to apply a brake to the paper roll mechanism in order to give to the web a proper tension when passing through the press, and this tension of course may vary from time to time in accordance with the attendant circumstances, and the tension of the web itself may vary from time to time.

The object of my invention, therefore, is to supply a new and improved braking mechanism in which the paper may be kept at a constant tension by means operating upon the brake and controlled by the tension upon the web, so that the varying tension of the web operates to tighten or loosen the brake according as the tension may become loose or greater.

More particularly still my invention relates to pneumatically operated mechanism for working the brake and controlled in its turn in its operation by the tension of the web.

My invention has also for a further object to provide a mechanism connected with the pneumatically-operated brake and operating in case of a break of the web to automatically set the brake and stop the rotation of the web roll of paper.

I accomplish these objects by the means illustrated in the drawings and hereinafter specifically described.

That which I believe to be new will be set forth in the claims.

In the drawings:—Figure 1 is a side elevation of a portion of a printing press frame, showing my mechanism. Fig. 2 is a top or plan view of the same. Fig. 3 is a detail, being an end view, seen from the right, of the mechanism shown in the lower right-hand corner of Fig. 1. Fig. 4 is a detail, being a view of a portion of the air-cylinder and connections with one end of the brake, showing the device by which the brake may be set or released by hand, if desired. Fig. 5 is a vertical cross section of the upper valve operated by devices controlled by the web tension. Fig. 6 is a section on line 6—6 of Fig. 1. Fig. 7 is a cross section of the upper hand-operated valve for admitting a supply of compressed air to the braking mechanism.

8 indicates a part of a frame of an ordinary rotary perfecting printing press which carries of course the usual printing couples (not shown). 9 indicates a bracket on said frame 8 which supports in the ordinary manner the spindle 10 of a web roll 11.

12 indicates a brake pulley on the outer end of the spindle 10 and secured thereto in any appropriate manner.

13—14 indicate levers provided respectively with arms 13^a—13^b and 14^a—14^b. The arms 13^a and 14^a are curved and are provided with brake shoes 15—16 which are set therein and are adapted to engage the periphery of the brake pulley 12. As is best shown in dotted lines in Fig. 2, the periphery of the brake roll 12 is preferably V-shaped, and the brake members 15—16 are similarly shaped to engage the V-shaped peripheral groove in the brake roll 12, in such a manner that when the arms 13^a—14^a are forced together in the manner hereinafter described, the brake members 15—16 may be caused to bear upon the V-shaped periphery of the brake roll 12 and operate to brake the roll spindle 10.

17 indicates a screw having a hand-wheel 18 secured upon its outer end. The screw 17 is journaled at its inner end in a suitable

bearing in the framework 8 and at its outer end in a bearing 19 which is mounted upon a stud 20 supported at the part 21 extending outward from the frame. The screw 17 passes through suitable screw-threaded openings near the pivotal points of said brake levers 13—14 so that they may have a swinging motion thereon but so that by the turning of the screw in one direction or the other, by the hand wheel 18, the brake members may be adjusted toward or from the frame 8 to adjust the roll of paper endwise.

22 indicates an air cylinder which is pivotally supported upon the outer end of the arm 14^b of the brake lever 14. 23 indicates an air-tight piston moving in said cylinder, and having a piston-rod 24 which passes outward through suitable packing through the upper end of the air-cylinder 22 and at its other end is pivotally connected with the outer end of the arm 13^b of the brake lever 13. It will be obvious that when the piston 23 is moved in one direction or the other by the means hereinafter described, the arms 13^b and 14^b will be moved toward or away from each other, separating the brakes from the brake roll when the arms 13^b and 14^b are moved toward each other and moving them into engagement with the brake roll when the arms 13^b and 14^b are separated from each other.

The upper end of the piston rod 24 is screw-threaded and upon the screw-threaded portion is mounted a hand-wheel 25 which is provided with a correspondingly screw-threaded opening which the screw-threaded portion of the piston rod 24 engages.

26 (see Fig. 4, shown also in dotted lines in Fig. 1) indicates a removable sleeve which may be placed around the piston rod 24 and between the hand-wheel 25 and the upper end of air-cylinder 22 whereby, by the operation of the hand-wheel alone, in case of necessity, the arms 13^b and 14^b may be forced apart and the brakes tightened therefore by hand.

27 indicates brackets mounted upon the frame 8 each having a vertical slot 28 at its outer end.

29 indicates slide blocks which are mounted in the slots 28 so as to move vertically therein.

30 indicates spiral springs which are seated in the slots 28 and whose upper ends bear upon the lower surfaces of the slide blocks 29. The lower ends of the springs bear upon the lower ends of the slots 29. In the drawings, only one of these slots on the brackets 27 is illustrated,—namely the one upon the side of the press upon which the pneumatically-operated mechanism is mounted.

So far as the bracket, slot, slide block and spring are concerned, the parts on the op-

posite side of the machine are like the parts 65 shown in Fig. 1, but not having connected with them the operative parts hereinafter described, and the mounting is like the mounting of the ordinary tension roller in presses of this kind and needs, it is believed, no further illustration or description.

31 indicates a rod which is slidingly mounted in the bracket 27 upon the side of the press upon which the operative mechanism is mounted so as to move freely longitudinally of itself therein, the upper end of the rod being connected with the slide block 29 on that side of the press.

32 indicates a roller which is journaled in the slide blocks 29, and over which the web 11 passes.

33 indicates a roller mounted in brackets 34 projecting outward from the brackets 27 and below and partially around which the web 11 passes. It will be obvious that any tension upon the web will tend to pull the roller 32 down against the action of the springs 30, which, in their turn, will tend to force the slide blocks and hence the roller 32 upward whenever the tension is taken from the web 11, and which operate to constantly force the roller 32 upward against the downward pressure exerted by the tension of the web.

35 indicates a hub which is journaled on the shaft 36 carried upon the upper end of a bracket 37 extending upward from the frame 8. 38 indicates an arm preferably formed integrally with said hub and pivotally connected at its outer end with the lower end of the rod 31. 39 indicates an arm formed integrally with said hub and provided with a slot 40 at its outer end.

41 indicates a segment extending downward from and preferably formed integrally with the hub 35. The outer surface of the segment 41 is a circular arc drawn about the center of the shaft 36.

42 indicates a pipe leading from and communicating with any suitable source of compressed air supply (not shown).

43 indicates a valve which is mounted upon the end of the pipe 42. The detailed construction of this valve is shown in Fig. 7, in which 44 indicates the valve casing, containing a tubular valve 45, upon the outer end of the valve stem of which is mounted a hand-lever 46 shown in Fig. 1. The valve casing 44 is provided with openings 47—48 diametrically opposite one another, opening 49 disposed at right angles to the openings 48—47, and with a discharge opening 50. The valve proper 45 is provided with a central opening 51 and with diametrically opposite openings 52—53 which connect the central opening 51 with the outer periphery of the valve. The valve 45 is also provided with an opening 54 which is at right angles with the line of the open-

ings 52—53. The openings 52—53 are so disposed that by rotating the valve they may be brought into registry with the openings 47—48 so as to afford a passage for the air from the opening 47 through the valve into the opening 48. The openings 53 and 54 are so disposed that they may be brought simultaneously into partial or complete registry with the openings 49—47, respectively. The valve 45 is also provided with a recess 55 which is adapted to connect openings 48 and 50 with one another, or openings 49 and 50 with one another.

56—57 are pipes screwed into the casing 44 and connected respectively with the openings 48 and 49. The pipe 56, by means of a flexible piping 58 is connected with the top of the cylinder 22 above the piston 23. The pipe 57 connects with a valve 59. The details of the valve 59 are shown in Figs. 5 and 6. 60 indicates a valve casing which is provided with openings 61—62 preferably arranged at an angle of ninety degrees from one another. The pipe 57 is screwed into and opens into the opening 61 and a pipe 63 screws into and opens into the opening 62. 64 indicates the valve or rotary plug which fits into the bore of the casing 59 and is provided with the central opening 65 and with two openings 66—67 located ninety degrees apart or at right angles to one another so that they may be brought simultaneously into partial or complete registry with the openings 61—62, respectively, and which lead from the central opening 65 to the exterior of the valve or plug 64.

In order that the supply of air which may be admitted to the openings 66—67 may be varied, I provide a piston 68 which fits air-tight into the central boring 65 of the valve or rotary plug. The piston 68 is movable longitudinally in said opening, and, by means of a piston rod 69, which is screw-threaded at its end, and a thumb-nut 70 thereon, the piston 68 may be adjusted longitudinally of the central boring 65 so as to shut off more or less of the openings 66—67 therein.

71 indicates an arm which is secured to or formed integrally with the valve or rotary plug 64.

72 indicates a link provided with a turn-buckle 73 which is pivotally connected at its lower end with the arm 71 and at its upper end with the slot 40 in the arm 39, whereby, by the rocking of the collar 35, the valve 64 may be rotated in the casing so as to move the openings 66—67 simultaneously into or out of register with the openings 61—62.

74 indicates a coupling which is mounted upon the pipe 63 and which is provided with an ordinary pressure gage 75. The lower side of the coupling 74 (see Fig. 1) is pro-

vided with a conical opening 76 into which fits a conical valve 77 on the upper end of a rod 78 which is slidingly supported on the framework 8, by a suitable bearing, as 79.

80 indicates a collar secured upon a threaded portion of the rod 78.

81 indicates a spiral spring seated upon the collar 80 and bearing at its upper end upon the under side of the coupling 74 and tending normally to force the rod 78 downward so as to open a passage through the opening 76.

82 indicates a lever which is pivotally mounted upon the frame and one end of which bears upon the under side of the collar 80. The other end is provided with a roller 83 which bears upon a cam 84 formed integrally with or secured to the stem of the valve or rotary plug 64. The spring 81 therefore tends to constantly keep the roller in engagement with the surface of the cam 84. The cam is so shaped, as is shown in Fig. 1, that when the arm 71 is rocked upward, the roller 83 will travel along the surface of the cam which bears toward the center of the cam, and will be permitted therefore to move slightly upward thus permitting the spring 81 to move the stem 78 downward and open the opening 76 to permit the escape of air. When the parts are in the position shown in Fig. 1, the roller is on the circular portion of the surface of the cam 84 and the valve 77 is closed, and the cam surface is so shaped that when the arm 71 is rocked downward in Fig. 1 the parts will be kept closed.

85 indicates an arm which is secured upon and preferably formed integrally with the hub of the lever 46 and is provided at its upper end with a roller 86 which projects inward therefrom.

87 indicates a bellcrank lever having arms 87^a—87^b. The arm 87^a is adapted when swung to the right in Fig. 1 in the manner hereinafter described to engage the roller 86 on arm 85, and move it to the right in Fig. 1, rotating the valve 45 correspondingly, as more fully described hereinafter, and is provided at its lower end with a hook 88, which, as the swinging of the arm continues, will engage the roller 86 and prevent further motion. The other arm 87^b of the bellcrank lever 87 is provided at its outer end with a roller 89 which is adapted to bear upon the curved surface of the segment 41, and is held in constant engagement pressing against the same by the spring 90 on the hub of the bellcrank lever and mounted in the well-known manner. The spring tends to rock the bellcrank lever to the right in Fig. 1, to hold the roller 89 in constant engagement with the curved surface of the segment 41, and when the roller is freed from engagement by a sufficient movement to the right

of the segment 41 by the operation herein-
after described, operates to rock the bell-
crank lever 87 so as to throw the arm 87^a
into contact with the roller 86 as above
described.

91 indicates a curved rack which is sup-
ported on the bracket 37 behind the hand-
lever 46 and is provided with a number of
openings 92 which are adapted to be en-
gaged by a pin 93 in the lever 46 so as to re-
movably set it at any desired position.

By means of a flexible pipe 94, the coup-
ling 74 is connected with the lower end of
the air-cylinder 22 below the piston 23 so
that when the valves are suitably opened as
hereinafter described, compressed air pass-
ing through the valve into the pipe 63 may
enter the cylinder below the piston. The
purpose of the flexible pipes 94 and 58 is to
permit the lateral movement of the brake
mechanism and cylinder toward and away
from the frame of the press, as above de-
scribed.

The operation of the above-described de-
vices is as follows:—In the drawings the
several parts are in the positions in which
they are when the web is running through
the press under normal conditions. As is
best shown in Fig. 1, under these conditions,
the roller 32 with the slide blocks 29 is in
approximately the position shown in said fig-
ure, and the valves are in the positions shown
in the several detail figures of the valves.
The valve 43 and its several openings are in
the positions shown in Fig. 7, in which, as
will be seen by reference to that figure, the
openings 54 and 47 are in partial register,
and the openings 53 and 49 are in partial
register. The recess 55 connects the open-
ing 48 with the opening 50 into the air.
The compressed air therefore passing from
the pipe 42 passes through openings 47, 54,
53 and 49 into pipe 57 from which it passes
to the valve 59. This valve 59 is in the po-
sition shown in Fig. 5, in which the open-
ings 61 and 66 are in partial register and the
openings 67 and 62 are in partial register so
as to permit the air to pass through the
valve into the pipe 63. The conical valve
77 is closed. The air passes therefore into
the bottom of the cylinder 22, and, forcing
the piston upward and the cylinder corre-
spondingly downward, spreads the arms 13^b
and 14^b, bringing together the brake jaws
13^a and 14^a and braking the paper roll suf-
ficiently to give it a proper tension. The
pressure above the piston is of course re-
lieved by the fact that the air is free to pass
from the pipe 56 through opening 48 in the
valve 43 and by means of the recess 55 out
through the discharge port or opening 50,
thus having atmospheric pressure only above
the piston. The amount of pressure which
is given to the piston and consequently the

normal tension which it is desired to put
upon the web may be varied by moving the
handle 46 so as to correspondingly turn the
valve plug 45 in valve 43 so as to bring the
openings 54—47 and openings 53—49 more
or less into register permitting more or less
supply of compressed air to pass into the
pipe 57. If now for any reason the tension
upon the web becomes too great, the pull
upon the web will cause the slide blocks 29
to descend, which, forcing down the rod 31
and arm 38, will correspondingly raise the
arm 39. This will lift the arm 71 of the
valve 59, and, moving the valve plug 64 (see
Fig. 5) in a contra-clockwise direction, will
diminish, or if need be entirely shut-off the
registration between the openings 61 and 66
and the openings 62 and 67, thereby dimin-
ishing the pressure below the piston and re-
laxing the braking power thereby relieving
the tension. This same contra-clockwise
movement of the valve will rotate the cam
84 in the same direction, and the roller 83,
riding down the inclined cam, will rock the
arm 82 up and consequently allow the spring
81 to force the rod 71 downward opening
the valve 77 and permitting the air to es-
cape below the piston. As soon as this ten-
sion upon the web is relaxed below the nor-
mal desired tension, the effect will be to re-
lieve the downward pressure upon the slide-
blocks 29, whereupon the springs will cause
them to rise, lifting the connecting rod 31
and arm 38, depressing the arm 39 thereby
rotating the valve plug 64 clockwise, which
will cause a greater degree of registration
between the openings 61 and 66 and the
openings 62 and 67, causing a greater amount
of air to pass into the cylinder below the
piston and thereby increasing the tension
upon the web. It will thus be seen that
while the press is running and the web is
running constantly, after having been once
set at the normal desired tension, the appa-
ratus is self-regulating as to the tension
upon the web and the tension will be kept
constant.

If at any time there should be a sudden
break of the web, the downward pressure
upon the slide-blocks 29 will of course be
instantly taken away. This will cause the
blocks 29 to fly quickly upward to the full
limit of their movement under the pressure
of the springs, which will rock the arm
38 up instantly, will throw the arm 39 down,
and will instantly rotate the valve 64 clock-
wise opening the valve 64 completely,—
that is to say, will cause the openings 61—66
and 62—67 to come into complete registry
and allow a full flow of air below the pis-
ton. At the same time the segment 41 will
pass beyond the roll 89 which will permit
the arm 87^b of the bellcrank lever 87 to be
rocked instantly upward under the influence

of the spring 90, swinging the arm 87^a quickly to the right in Fig. 1. This will cause the arm 87^a to engage the roll 86 on the lever 85 and will rock the valve plug 45 of valve 43 instantly clockwise, bringing the openings 47—54 and 53—49 into complete registry for a moment of time, allowing a full supply of compressed air to pass into the lower valve 59. This will cause an instant full power of the brake to be put upon the paper roll, instantly causing it to stop its further rotation under its own momentum. This is a short and quick action. As the lever 87^a moves still farther in its rapid movement to the right, it urges the arm 85 still farther to the right, closing valve 43 against the further admission of air through the pipe 42. As this movement continues, the hook 88 engages the roller 86 and the parts are locked against further movement. The paper roll is thus instantly braked in case of breakage of the web.

In case at any time it is desired to spread the brakes so as to entirely relieve their pressure and spread them from the brake pulley, the lever 46 is swung to the left. This rotates the plug 45 in valve 43 counterclockwise, and brings the openings 47—53 and 48—52 into register, which degree of registration is of course dependent upon the amount of movement given to the arm 46 in swinging to the left. This causes the air to flow from the pipe 42 directly across the valve 43 into the pipe 56, above the piston, tending to move the piston down and the cylinder up and rock the brake arms apart. This counterclockwise motion of the valve plug 45 has of course at once brought the openings 47—54 and 53—49 out of register and the same movement will have brought the recess 55 in such a position as to connect the opening 49 into which pipe 57 opens with the discharge port or opening 50. This same movement, if for any reason this should be done while the press is moving and the web is being pulled through the press, will of course relax the tension on the web, which will cause the slide blocks 29 to be moved upward, and, therefore, through the above-described connections, the valve 64 will be rotated clockwise, which brings the openings 62—67 and 61—66 into more complete registry according to the upward movement of the slide blocks, which permits the air to escape more readily from the bottom of the cylinder through the various pipings, up through the valve 60, up through the pipe 57, and out through the discharge port 50. It will not, however, be at all usual to swing the hand-lever 46 to the left while the machinery is in motion. For instance, when the press stops, the motion is slowed down gradually and the tension upon the web will be preserved during

the slowing down and while the press remains stopped, and therefore it will not be necessary, when the press is stopped for any ordinary reason other than the breakage of the web to operate the hand-lever to shut off the supply of air below the piston when the press is stopped temporarily and in the ordinary course of its running for other reasons than for placing a new roll of paper in place of the old one when the old roll has been practically exhausted.

When it is desired to place a new roll of paper and spindle in place of the old roll which has been substantially used up, the press is of course brought to a stop with what is left of the old web still at its normal tension. Before this old web is severed to remove the former spindle and insert a new spindle, the hand-lever 46 will be moved to the left enough to rotate the valve 43 counterclockwise a sufficient amount to close the passage from the pipe 42 into the pipe 57, thus shutting off the air-pressure below the piston. The web may then be broken across, which will of course at once relieve the tension and the slide blocks will move up, but no effect will be produced below the piston because the compressed air supply has been shut off. The hand-lever being moved farther to the left, will still keep the openings connecting the pipes 42 and 57 closed, but will turn the valve plug 45 a sufficient amount to let the compressed air pass through the openings 47, 53, 52, 48 into the pipe 56 above the piston, which will force it down moving the cylinder correspondingly up and separating the brake jaws, the air below the piston passing out into the atmosphere as above described. The old roll with its spindle may be then removed, the new roll substituted, and its lead end joined to the tail end of the former roll in the usual manner, and the parts being restored to the normal condition when the press is set in operation, the desired tension will again be provided and automatically maintained as above set forth.

In case it is desired to put an extra amount of brake upon the roll, the arm 46 is moved to the right. This limited movement of the valve plug 45 in clockwise direction will of course admit more air into the lower valve 59 and hence below the cylinder in a manner which will be readily understood from what has been said above without further description.

The pressure gage 75, with the safety valve 77, operates also to automatically regulate any difference that may occur between a pressure in excess of what is needed in the supply pipe 42 and the cylinder 22. The pressure gage 75 indicates the pressure in the pipe, and the safety valve may be set to the desired pressure, which is indicated

by the pressure gage, in order that too great a pressure of air may not be admitted to the cylinder.

As has been said above, the threaded rod 78 is provided with two nuts 80. The lower nut bears against the lever 82, as above described. The upper nut, bearing upon the spring 81, may be adjusted so as to regulate the pressure of the spring so that it will require more or less of a pressure to open the conical valve 77. For instance, supposing that fifty pounds of air pressure should for any reason be supplied through the supply pipe 42 and only forty pounds pressure were required in the cylinder 22,—the upper nut 80 on the rod 78 would be moved to regulate the tension of the spring 81 so that as long as only forty pounds pressure was in the cylinder 22 the valve would remain closed, but should a pressure in excess of forty pounds be admitted to the cylinder the safety valve would open and allow the excess pressure to escape. Should a greater amount of pressure than the forty pounds be required in the cylinder, the upper nut would be moved upward, tightening the spring 81 so that the safety valve would open at a higher pressure.

What I claim as my invention and desire to secure by Letters Patent is:—

1. The combination with a roll-spindle adapted to carry a web-roll and brake mechanism for said roll-spindle, of brake-operating mechanism adapted to be operated by compressed air, means for supplying compressed air to said brake-operating mechanism, and mechanism automatically operated by the tension of the web to control the supply of compressed air to said brake-operating mechanism.

2. The combination with a roll-spindle, a web-roll thereon and brake mechanism for said roll-spindle, of a cylinder and piston connected, respectively, with the members of said brake mechanism, means for supplying compressed air to said cylinder to operate said brake mechanism, and means automati-

cally operated by the tension of the web to control the supply of air to said cylinder.

3. The combination with a roll spindle adapted to carry a web roll and brake mechanism for said roll spindle, of pneumatic brake operating mechanism, a pipe adapted to convey compressed air, connections between said pipe and said pneumatic brake operating mechanism, valves in said connections, and means operated by the tension upon said web to automatically operate said valves to supply a greater or less amount of compressed air to said brake operating mechanism.

4. The combination with a roll spindle, a web roll thereon, and braking mechanism for said roll spindle, of a cylinder and piston connected respectively with the members of said brake mechanism, a pipe adapted to convey compressed air, connections between said pipe and said cylinder, valves in said connections, and mechanism operated by the tension upon said web to operate said valves and control the movement of said piston and cylinder.

5. The combination with a roll spindle, a web roll thereon, brake mechanism for said roll spindle, and pneumatic brake operating mechanism, of piping adapted to supply compressed air to said pneumatic brake operating mechanism, valve mechanism in said piping adapted by its movement to control the supply of air to said pneumatic brake operating mechanism, mechanism connected with said valves and operated by the tension upon the web to automatically operate said valves and control said brake operating mechanism to preserve a constant tension upon said web, and mechanism adapted upon the breaking of said web to automatically increase the supply of air to said pneumatic brake operating mechanism and forcibly apply said brake to said roll spindle.

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