Aug. 30, 1932. C. J. RICHTER 1,875,153

WEB ROLL BRAKE MECHANISM

Filed Dec. 6, 1927 4 Sheets-Sheet 1

Fig 1

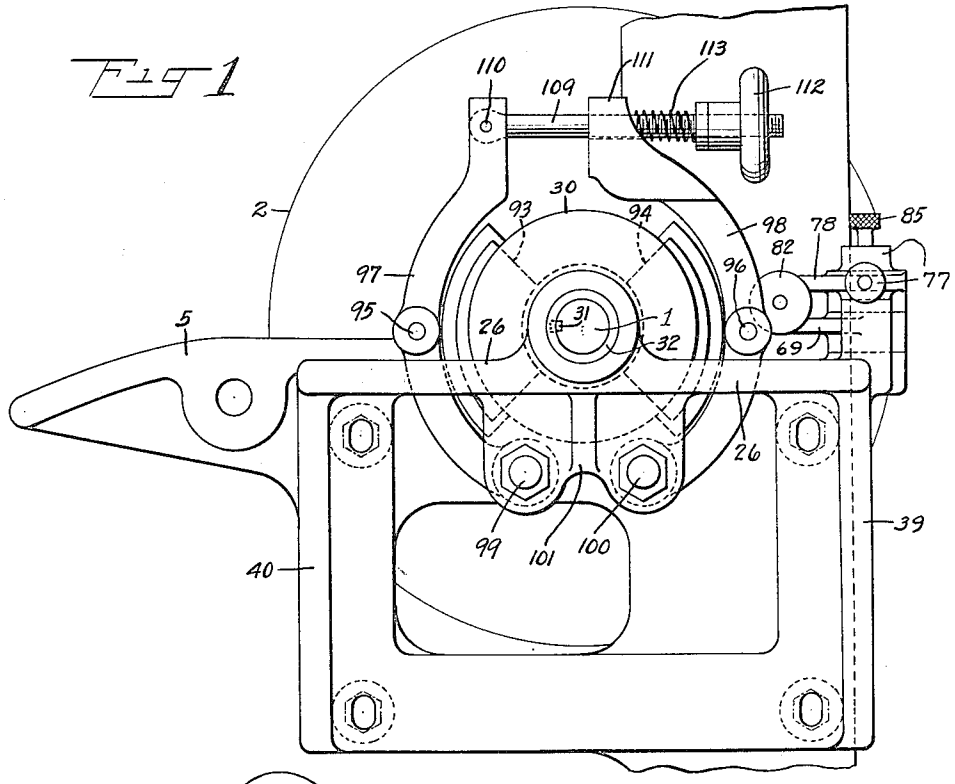
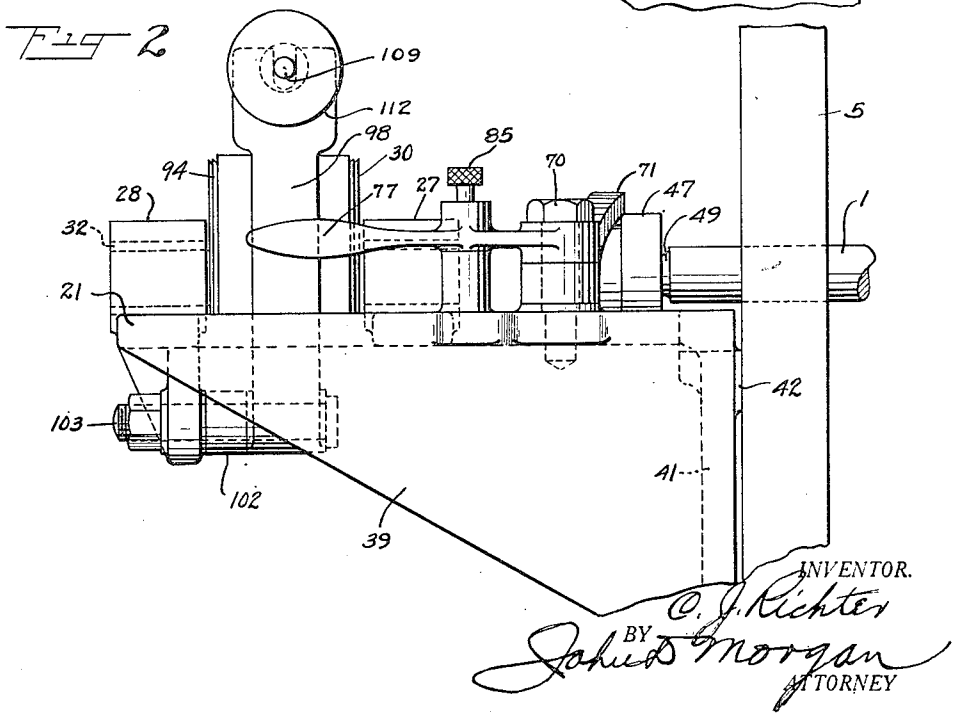


Fig 2



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WEB ROLL BRAKE MECHANISM

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Fig 3

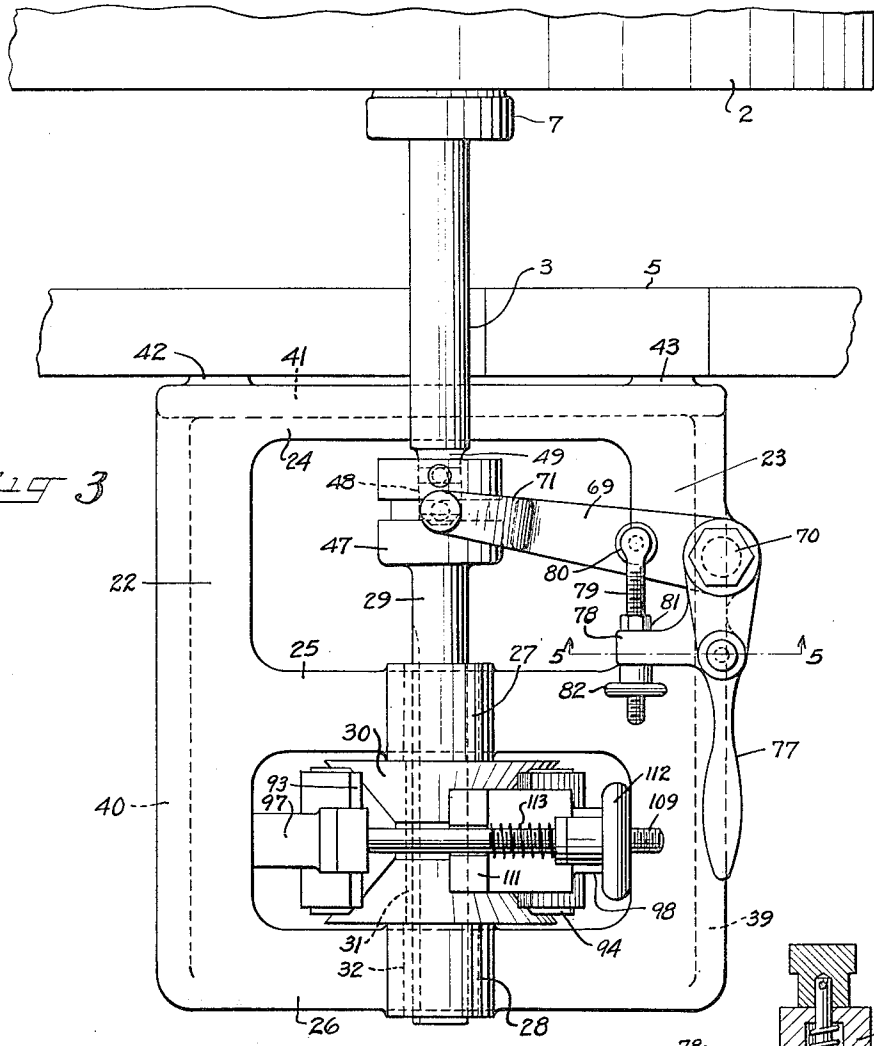


Fig 4

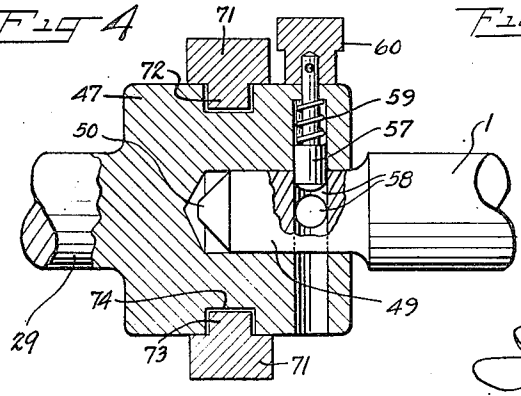
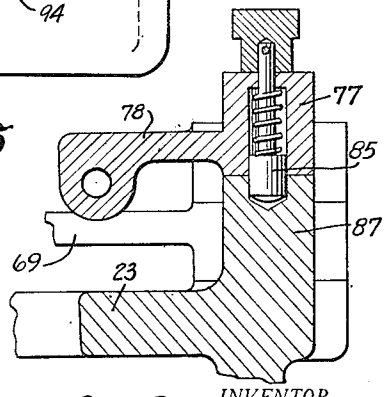


Fig 5



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WEB ROLL BRAKE MECHANISM

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Fig 6

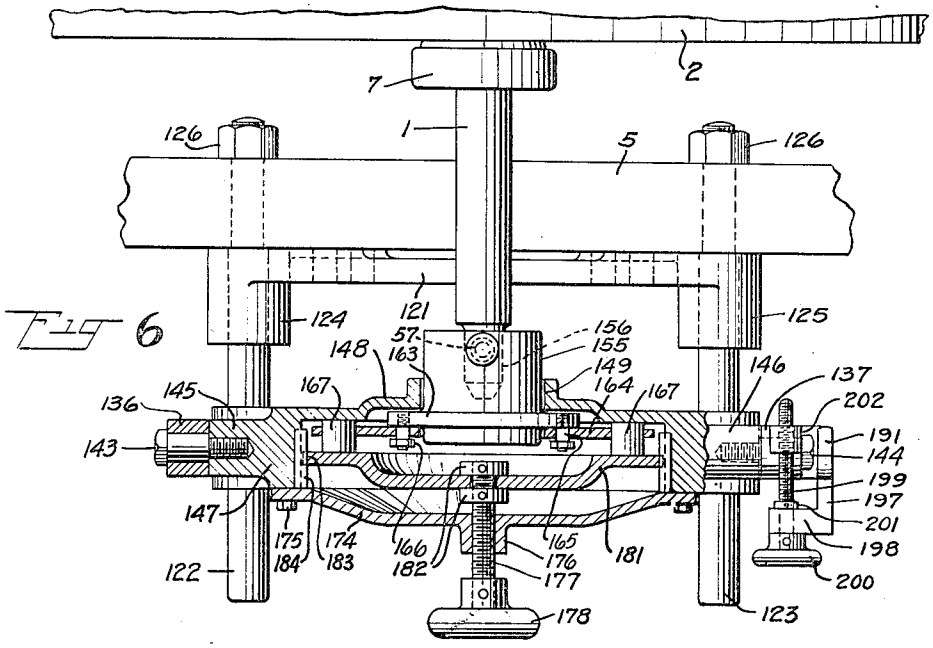
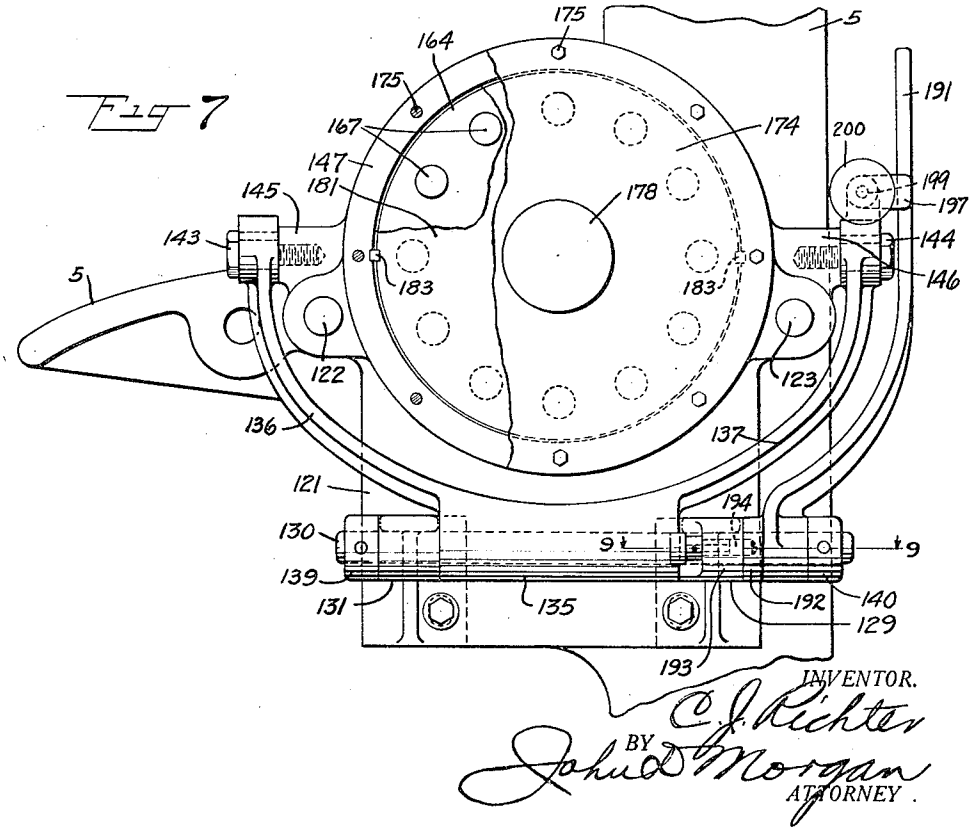


Fig 7



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WEB ROLL BRAKE MECHANISM

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Fig 8

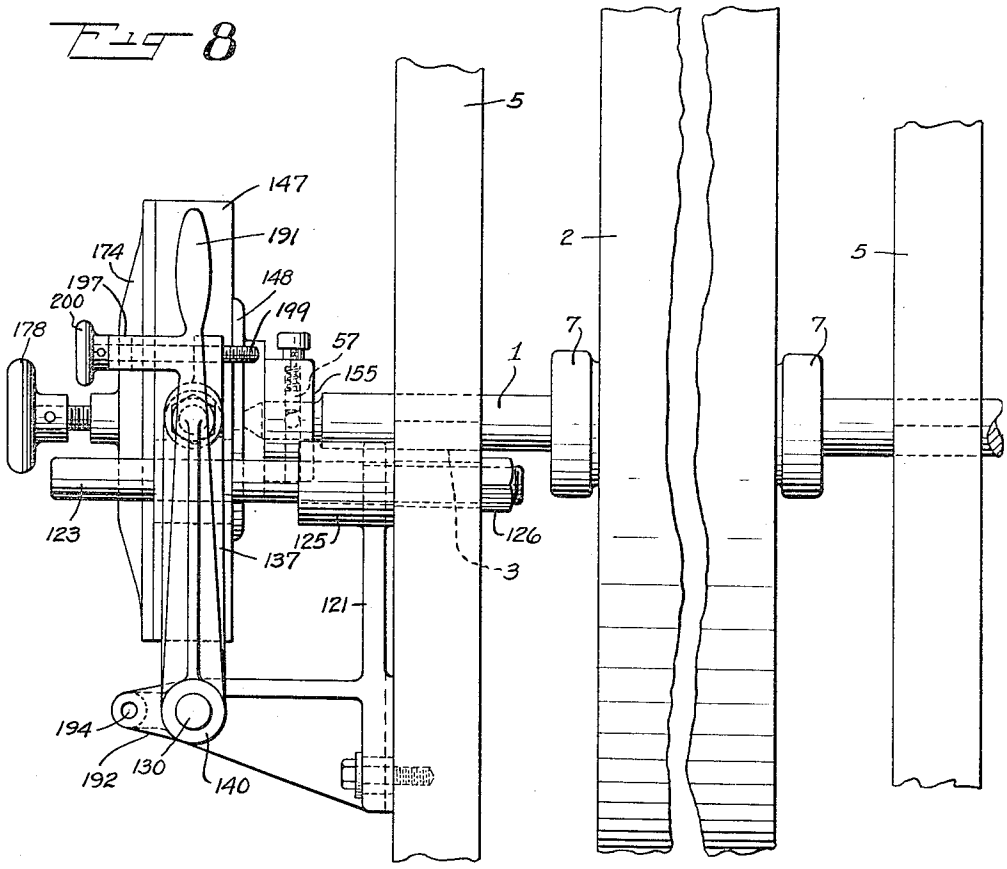
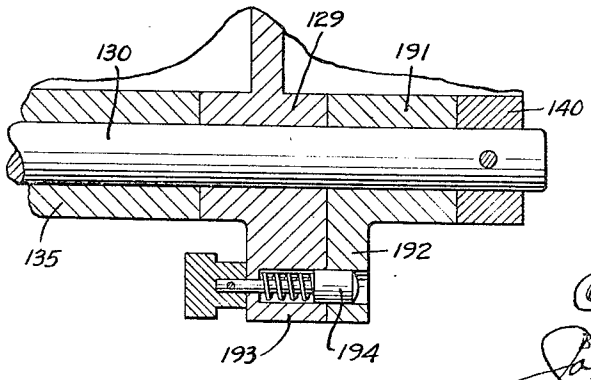


Fig 9



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Patented Aug. 30, 1932 1,875,153

UNITED STATES PATENT OFFICE

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WEB ROLL BRAKE MECHANISM

Application filed December 6, 1927. Serial No. 238,080.

The invention relates to novel and useful improvements in brake mechanisms, and in certain of its aspects the invention relates more especially to improvements in brake mechanisms for controlling the feed from web supply rolls from which a web or the like is drawn off and into printing presses and other web utilizing machines.

Objects and advantages of the invention will be set forth in part hereinafter and in part will be obvious herefrom, or may be learned by practice with the invention, the same being realized and attained by means of the instrumentalities and combinations pointed out in the appended claims.

The invention consists in the novel parts, constructions, arrangements, combinations and improvements herein shown and described.

The accompanying drawings, referred to herein and constituting a part hereof, illustrate one embodiment of the invention, and together with the description, serve to explain the principles of the invention.

The invention pertains to improvements in braking mechanisms for regulating the tension on rotated shafts, such as web supply roll shafts, from which roll the web is drawn by a printing press or other web-consuming or utilizing machine. The invention is directed to providing a novel mechanism wherein there is a permanent mechanical mounting and relation, and an improved and superior interaction, of the elements of the brake mechanism; wherein the entire brake mechanism, as an integral device, is mounted in permanent position on the machine frame, independently of the shafts of the successive web rolls, such brake mechanism being connectible to and disconnectible from the shafts of the successive supply rolls. At the same time there is provided variable positioning or like accommodation in the connection to successive web roll shafts to compensate for untrue roll shafts, or other incidental irregularities, and also means to compensate for wear in the supply roll shaft bearings.

The invention is further directed to providing such an integral brake mechanism which is attachable to and detachable from the shafts of the successive supply rolls easily and quickly, while maintaining unimpaired the action of the brake mechanism and its control over the supply roll, and while providing the accommodation to varying conditions of the successive supply rolls and their shafts as already indicated.

The preferred embodiment of my invention comprises an integral brake mechanism, with coacting braking members mounted in permanent relation, one rotating with the regulated shaft and the other frictionally engaging the rotating member with variable pressure, and a temporary connection with the shafts of the successive supply rolls, said connections being capacitated to compensate for aberrations or other variations in the successive roll shafts, while leaving the braking elements in their permanent and uniform condition. Further, the brake mechanism has means operating after connection to the roll shaft to longitudinally register the roll shaft, and the brake mechanism also has means for compensating for wear in the bearings of the roll shaft.

As so embodied, an integral and complete brake mechanism is mounted in its own frame, with the pulley, disc or other rotating member, and the shoe, disc or other friction exerting member in permanent relation to each other, and with a brake shaft rotating with said rotary member, and connectible to and disconnectible from the web supply roll shaft, while permitting free play between the web roll shaft and the rotating member. The invention is shown embodied also in a disc brake mechanism with such mechanical changes as are necessary or convenient in applying the principles of the invention to that type of brake mechanism.

It will be understood that the foregoing general description and the appended detailed description as well are exemplary and explanatory of the invention, but are not restrictive thereof.

In the drawings:

Fig. 1 is a view in end elevation of one form of my invention,

Fig. 2 is a side elevation of the same,

Fig. 3 is a top plan view of the device shown in Figs. 1 and 2,

Fig. 4 is a view partly in section of the connection between the brake shaft and the web roll spindle,

Fig. 5 is a sectional view taken on line 5—5 of Fig. 3,

Fig. 6 is a top plan view, certain parts being shown in section of another form of my invention,

Fig. 7 is a view in end elevation of Fig. 6, certain parts being broken away,

Fig. 8 is a side elevation of the device shown in Fig. 6, and

Fig. 9 is a sectional view taken on line 9—9 of Fig. 7.

Referring now by way of example to the embodiment of the invention illustrated in the accompanying drawings, it is shown exemplarily applied to both a pulley brake and also to a disc brake. In Figs. 1 to 5 is shown an embodiment of the invention applied to a braking mechanism utilizing the grooved pulley and brake shoes of a general type in common use. As embodied, the shaft or mandrel 1 of a web supply roll 2 is mounted in bearings formed on the side frames of the printing press or other web consuming machine. The web roll is held in place upon its shaft by suitable means such as the clamping cones. The shaft 1 is inserted in the roll and the roll fixed thereto primarily, the roll being then mounted in its bearings on the press frame, all the foregoing being common practice in the art.

The embodied form of integral brake mechanism comprises a horizontally-disposed supporting frame 21, attached to and extending outwardly from the side of the press frame. This frame 21 has longitudinal members 22 and 23, and cross members 24, 25 and 26. Journaled at 27 in the cross frame 25 and at 28 in the cross frame 26 is a brake shaft 29, which shaft is longitudinally movable to temporarily connect it to the shafts of the successive full or replenishing web supplying rolls, and to disconnect it from the shaft of the exhausted roll. A brake pulley 30 is mounted on brake shaft 29 to rotate therewith and to apply the regulating frictional action to the roll. The brake pulley 30 is mounted in the space between the cross frames 25 and 26, which maintain it in longitudinal position, and a spline 31 is employed between the pulley and shaft to permit the longitudinal movement of brake shaft 29 relatively to the brake pulley. A bushing 32 is employed in the bearing 28 to permit the insertion of the shaft with its spline. The brake mechanism frame comprises also underneath side webs 39 and 40, and a rear plate 41, which abuts against the outer side of the press frame 5, suitable facing bosses 43 and 42 being employed if desired. Bolt holes are formed through the bosses and through the press frame, and those in the bosses or frame may be somewhat elongated, thereby permitting up and down adjustment of the brake mechanism to compensate for wear in the bearings for the web roll shaft.

For the purpose of connecting and disconnecting the brake shaft with the successive web roll shafts, a connection is provided whereby the two shafts rotate together, but considerable play is permitted to compensate for light bends or other aberrations in the successive web roll shafts. In the embodied form, the inner end of brake shaft 29 is provided with an enlarged head 47, having a squared opening 48 in the inner end thereof, the respective roll shafts 1 having a correspondingly squared end 49 and a beveled head 50, constituting a loose fit within the socket 48 in the end of the brake shaft. To fasten the two shafts to rotate together, there is provided a spring plunger pin 57, mounted in a recess within the head 47 of the brake shaft, this pin being adapted to enter corresponding holes 58 formed in the end of the web roll shaft 1. Spring pin 57 is acted on by a compression spring 59, and is fastened to an external head 60, whereby the pin may be withdrawn during the connection of the two shafts, and will then snap into place to unite them, and again may be withdrawn when the two shafts are disconnected.

In the embodied form or means for longitudinally moving the brake shaft 29, a lever arm 69 is pivotally mounted upon the frame of the brake mechanism at 70, the forward end of the lever forming a yoke 71, the ends of the yoke arms having pins 72 and 73 which project into an annular groove 74, formed in the head 47, whereby the brake shaft may rotate freely but is moved longitudinally by the lever arm 69. An actuating handle or lever arm is provided, for manually moving the brake shaft 29, and having also means for locking it in operative position. Preferably connected thereto are means for effecting the final registration of the web roll with respect to the plate cylinders of the press, or other conditions or requirements of the web consuming or utilizing machine, by a final accurate longitudinal positioning of the web roll shaft 1.

As embodied, a lever arm and handle 77 is pivoted on the pin 70, and has an arm 78 extending laterally therefrom. A screw-threaded rod 79 is pivotally connected at 80 to lever arm 69 and extends through an aperture in the lug 78 of the lever handle 77. A lock nut 81 is threaded on the rod on the inside of the arm 78, and a hand-nut 82 is threaded on the rod outside of the arm 78. For the purpose of holding or locking the shafts in operative position, a spring pin 85 is mounted in a lug 86 formed on the lever handle 77, this pin being adapted to snap into a recess in a lug 87 formed on the side frame 23 of the brake

mechanism frame. The mechanism is thus locked in operative position by the pin 85 and by the spring pin 57. If the nuts 81 and 82 be thereafter turned, the web supply roll may be moved longitudinally in either direction very accurately to secure the necessary registry with the web-utilizing machine. To move the shaft 29 longitudinally either to connect to or to disconnect from a web-roll shaft, spring pins 57 and 85 are retracted, and lever handle 77 is moved to retract the brake shaft to disconnect the two shafts and to move it again forwardly to connect the brake shaft to the shaft of the next succeeding web roll.

The embodied form of friction exerting means cooperating with the pulley 30 comprises two arcuate shoes 93 and 94, which may be of known or other suitable form, and these are pivotally connected at 95 and 96 to arcuate arms 97 and 98. These arms are pivotally connected, respectively, at 99 and 100 to a downwardly-projecting flange or bracket 101, formed at the outer and underside of the brake mechanism frame. This bracket is provided with spacing bosses 102, and bolts 103 passing through the bosses and the arms constitute the pivotal supports for the arcuate brake arms. The embodied means for connecting and disconnecting the brake arms, and applying regulable resilient pressure thereto, comprises a rod 109, pivotally connected at 110 to an outward extension of the brake shoe arm 97, and fitting into a slot in a similar outward extension 111 of the brake shoe arm 98. The outer end of rod 109 is screw threaded and a hand nut 112 is screwed thereon and a tension spring 113 may be used in the usual manner. The mechanism as exemplified embodies only a hand control for varying the braking friction on the web supply roll, but any known or other suitable automatic tension means, usually web controlled, may be employed if desired.

In Figs. 6 to 9 is illustrated an exemplary embodiment of a disc brake embodying the principles of the invention. In this exemplary form, the brake mechanism frame comprises a plate 121, abutting against the side-frame 5 of the press, and supported upon two parallel, horizontally-projecting rods 122 and 123, which pass through the press frame 5, and through bosses 124 and 125 formed on the frame plate 121. The plate 121 will also be preferably bolted to the press frame. The rods are secured in position by suitable means, such as nuts 126 screwed onto the ends thereof within the press frame 5.

In this embodiment, the brake mechanism is movably mounted as an entirety, to bring the brake shaft, or corresponding member, into and out of operative connection with the shafts 1 of the successive web replenishing rolls. To effect this, as embodied, the brake mechanism is guided and reciprocably supported on the rods 122 and 123, through a short path. Means for effecting this movement are provided, and cooperating therewith means for locking the brake mechanism in operative position with the roll shaft. In the embodied form, two spaced-apart brackets 129 and 131 project horizontally outwardly from the bottom part of the frame plate 121, and at their outer ends are enlarged and transversely apertured to receive a shaft 130. Between brackets 129 and 131 is pivotally mounted the moving means for the brake mechanism, comprising a central apertured part 135, and integral therewith and extending upwardly therefrom, two diverging arcuate arms 136 and 137. Shaft 130 passes through the apertures in the brackets 129 and 131 and in the boss 135, and is secured in place by end collars 139 and 140, and an actuating handle is also fixed on the shaft as later described. At their outer ends the actuating arms 136 and 137 are pivotally connected to the brake mechanism at either side. Accordingly there are provided shouldered and headed tap bolts 143 and 144, screw-threaded into outwardly-extending bosses 145 and 146 formed respectively at the opposite sides of the brake casing 147. The smooth parts of the bolts pass through enlarged apertures in the upper parts of arms 136 and 137, which provide sufficient play for the straight movement of the brake mechanism on guides 122 and 123 and the rocking of the actuating arms.

The brake casing 147 has an annular peripheral wall (on which the bosses 145 and 146 are formed, extending outwardly therefrom as already described) and also an inwardly-extending, rear casing wall 148 having a central aperture 149, through which aperture extends the connection for the web roll shaft. As embodied, a hub 155 extends outwardly through the aperture 149, with sufficient free space around it to allow for any side play of the roll shaft. Hub 155 is provided with a recess 156, to take the squared end of the web roll shaft 1, and this temporary connection between the member 155 and the web roll shaft may comprise a spring pin 57, and may be otherwise also the same as that already described in connection with the brake pulley form of device. Fixed to the hub 155 within the casing is a radially-projecting, annular flange 163, and connected thereto, so as to rotate therewith but having lateral play relatively thereto, is a flat, annular brake disc 164, such connection being shown as stud bolts 165 fixed in the supporting flange 163, and passing through apertures in the brake disc 164, the disc being secured in place by nuts 166.

The friction-creating element may be of any desired form, and is shown as a series of wooden pins 167 carried in an annular series in the disc 164, and projecting therefrom at either side, although any other form

of friction element may be employed as desired.

The front of the brake casing comprises a convex cover 174, fixed to the outer flat face of the casing 147 by suitable means, such as tap bolts 175. In the embodied form of friction-exerting means cooperating with the rotating friction disc, this cover 174 has a central boss 176, which has an internal screw-threaded aperture into which is threaded a screw rod 177, having a hand wheel 178. At its inner end the screw rod 177 has fixed thereto a convex disc 181, held in place thereon by suitable collars 182, the outer angular portion of the disc 181 being formed to present a flat friction surface to the wooden pins 167, which are mounted in the rotatable, but loosely mounted braking disc 164. To prevent rotation of the friction disc 181, it is formed with recesses 183 in its periphery into which project keys 184 fixed to the inner annular face of the brake casing 147. The disc 181 is thereby held against rotation, and the screw rod 177 may be turned either way to determine and regulate the degree of friction exerted between the disc 181, the friction lugs 167 of the disc 164, and the corresponding friction face of the rear plate 148 of the casing.

Suitable hand operated means are provided for sliding the brake mechanism between connecting and disconnecting positions with the successive roll shafts 1. As embodied, a hand-lever 191 is fixed to shaft 130, on the outer side of bracket 129, and within the retaining collar 140. By means of this handle 191, the frame comprising the arms 136 and 137 may be rocked about shaft 130, and thereby the entire brake mechanism be slid along its guiding rods 122 and 123 to effect the connection and disconnection of the brake mechanism and web roll shaft. Means are provided for locking the mechanism in the operative or connected position, and as embodied, there is an extension 192 on the lower part of the lever 191 and a corresponding extension 193 on the bracket 129. A spring pin 194 is mounted in the bracket, and is adapted to enter a recess in the extension 192 of lever 191, to lock the parts in operative position.

The embodied form of means for effecting the accurate registration of the web roll relatively to the web using mechanism by variably longitudinally positioning the web roll shaft, comprises a screw-threaded connection between the handle 191 and the pivoted supporting arms 136 and 137 for the brake mechanism. As embodied, there is fixed to and extending rearwardly from the lever 191 an angled bracket 197, having an inward extension 198, which is internally apertured to receive a rotatable rod 199, having a hand wheel 200. A collar 201 serves to hold the rod in position. The end of rod 199 is screw-threaded into a lug 202, formed on an upward extension of the arm 137. Thus, when lever arm 191 and the bracket 129 are locked together by spring pin 194, and the brake hub 155 and the web roll shaft 1 are locked together by the spring pin 57, by turning the hand wheel 200 the requisite fine, longitudinal registering of the web roll may be effected. By releasing the spring pin 57, and the spring pin 194 the brake mechanism may be slid either forwardly or backwardly to connect it with or disconnect it from the web roll shaft.

By my present invention, the brake mechanism is an integral device, with the operating parts thereof in permanent relation to each other, and the entire brake mechanism is a permanent integral unit independent of the supply roll shaft, and as such may be adjusted for wear of the roll spindle bearings, and has means to compensate for bends or other aberrations in the successive web roll shafts. One great advantage realized by my invention, is that the same pulley and brake shoes are used together, and will always run true together. When the shoes are once worn in, they will continuously make perfect contact with the pulley. This desirable result in effecting the difficult operation of controlling the tension of the web drawn from the heavy, rapidly rotating roll cannot be accomplished when different pulleys on different shafts are used at random, as is done in the present practice, for the reason that no two pulleys will come just alike or will rotate around exactly the same center.

By my invention, the web roll may be brought quickly, accurately, and certainly to register or alinement with the plates of the printing press or other parts or requirements of the web-using machine. I also eliminate the weight of the brake pulleys on the web roll shaft, permit the use of shorter web roll shafts, and avoid the necessity of handling hot brake pulleys as is frequently the case in the present practice of shifting pulleys from one web roll shaft to another, and avoid all the trouble, delay, and annoyance of fixing the brake pulleys on the web roll shaft. The work of correlating and connecting the web roll shaft and the brake mechanism is both facilitated and simplified, as it avoids the successive and recurrent mounting of the brake pulleys on the roll spindle, and the difficult and exacting task of bringing the pulley into operative relation with the separate and mechanically unrelated brake shoes, and thereafter registering the web roll.

It will be understood that the brake mechanism of my invention is not limited in its broader aspects or more general application to the web supply rolls of a printing press, but in certain of its features it will be found

of special applicability and advantage in connection with the rapidly recurring replacements of the heavy web rolls for fast rotary presses, and in effecting the very sensitive and varying brake action necessary to maintain the tension of the rapidly drawn-off web during the running of the press.

The invention in its broader aspects is not limited to the specific mechanisms shown and described but departures may be made therefrom within the scope of the accompanying claims without departing from the principles of the invention and without sacrificing its chief advantages.

What I claim is:—

1. An integral or self-contained web roll braking mechanism including in combination a brake supporting frame mounted at one end of a web roll shaft rotatably journalled in a web roll support, said frame being mounted as a unit on said web roll support and detachable therefrom, a pair of braking members in permanent braking relation to each other, a short shaft on which one of the braking members is mounted and means for coupling and uncoupling the short shaft to the web roll shaft.

2. An integral or self-contained web roll braking mechanism including in combination a brake supporting frame mounted at one end of a web roll shaft rotatably journalled in a web roll support, said frame being mounted as a unit on said web roll support and detachable therefrom, a pair of braking members in permanent braking relation to each other mounted in the frame, means for quickly coupling and uncoupling the braking members to the web roll shaft and means carried by the frame for axially moving the web roll.

3. An integral or self-contained web roll braking mechanism including in combination a brake supporting frame mounted at one end of a web roll shaft rotatably journalled in a web roll support, said frame being mounted as a unit on said web roll support and detachable therefrom, a pair of braking members in permanent braking relation to each other, a short shaft slidably journalled in the frame and carrying one of the braking members, means for coupling the short shaft to the web roll shaft and means for axially moving the short shaft and web roll.

4. An integral or self-contained web roll braking mechanism including in combination a brake supporting frame mounted at one end of a web roll shaft rotatably journalled in a web roll support, said frame being mounted as a unit on said web roll support and detachable therefrom, a pair of braking members in permanent braking relation to each other, a short shaft slidably journalled in the frame and carrying one of the braking members, means for quickly coupling the short shaft to the web roll shaft, means for axially moving the shaft and web roll, and means for holding the shafts against undesired axial movement.

5. An integral or self-contained web roll braking mechanism including in combination a brake supporting frame mounted at one end of a web roll shaft rotatably journalled in a web roll support, said frame being mounted as a unit on said web roll support and detachable therefrom, coacting braking members mounted thereon in permanent braking relation, means for slidably mounting said braking members for axial movement and a pivoted lever for moving said braking members and web roll axially.

6. An integral or self-contained web roll braking mechanism including in combination a brake supporting frame mounted at one end of a web roll shaft rotatably journalled in a web roll support, said frame being mounted as a unit on said web roll support and detachable therefrom, coacting braking members thereon in braking relation, one of said braking members being slidable axially and held against rotation, means for temporarily connecting said braking members with the web roll shaft, a pivoted lever connected with the axially movable braking member for moving it axially and means for holding the braking member against axial movement.

In testimony whereof, I have signed my name to this specification.

CHARLES J. RICHTER.