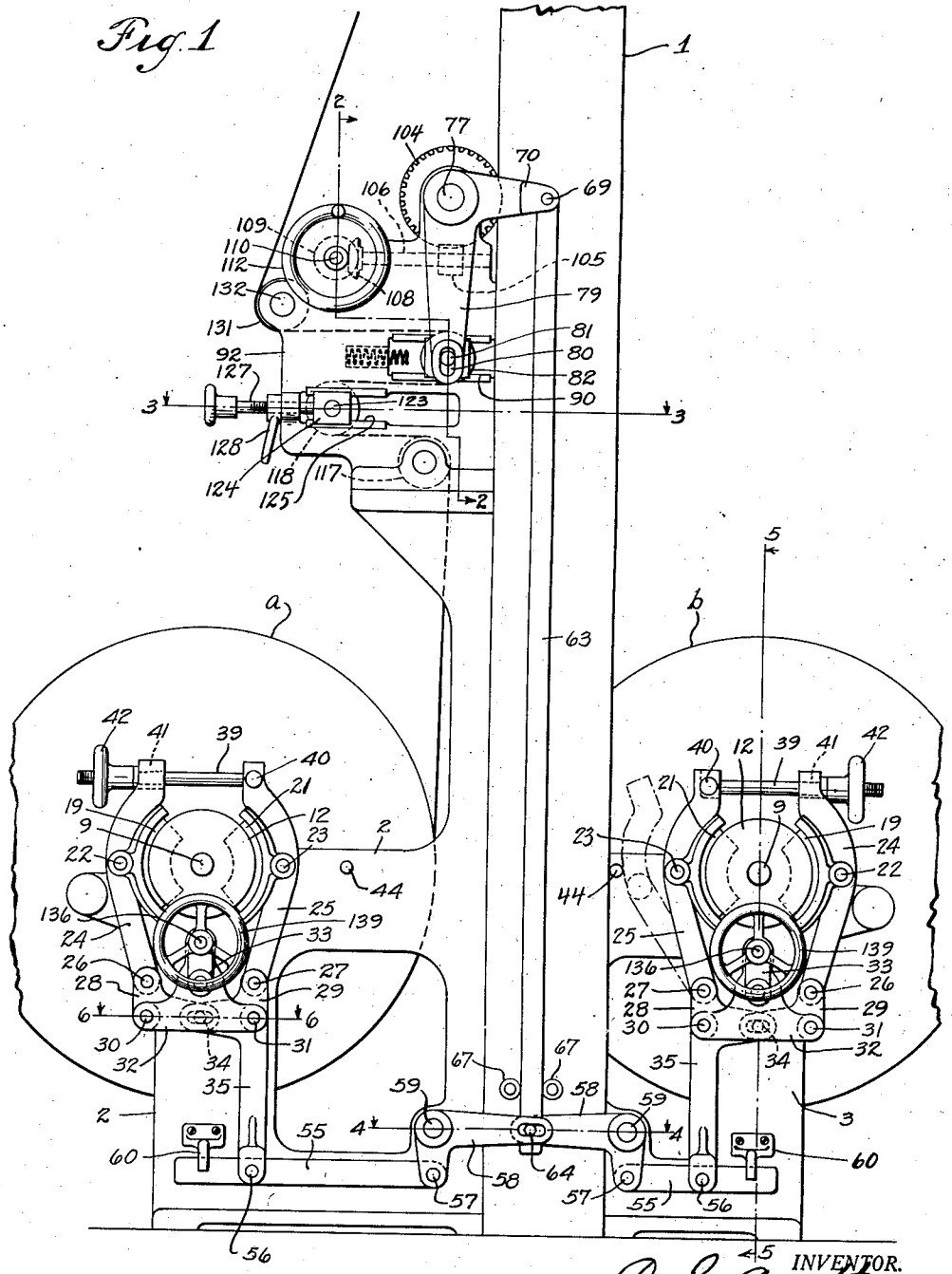
Nov. 22, 1932. C. S. CRAFTS 1,888,549

WEB TENSION CONTROLLING MECHANISM

Filed Aug. 28, 1928 6 Sheets-Sheet 1

Fig. 1



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WEB TENSION CONTROLLING MECHANISM

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Fig. 2

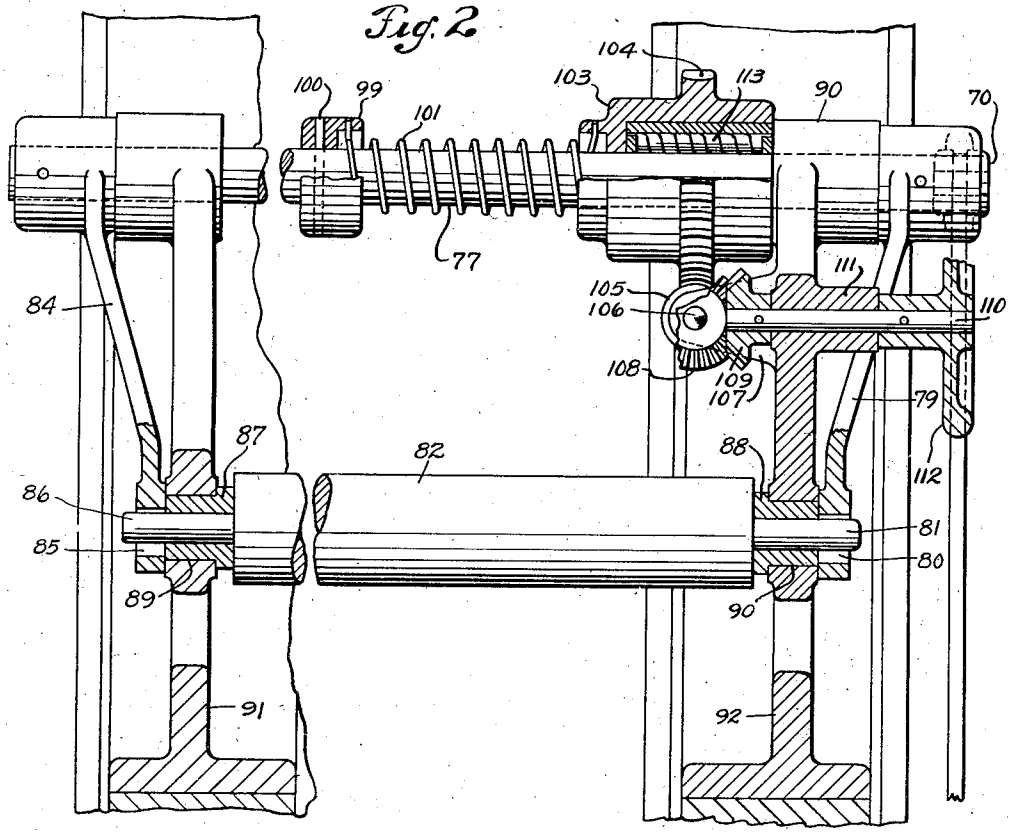


Fig. 3

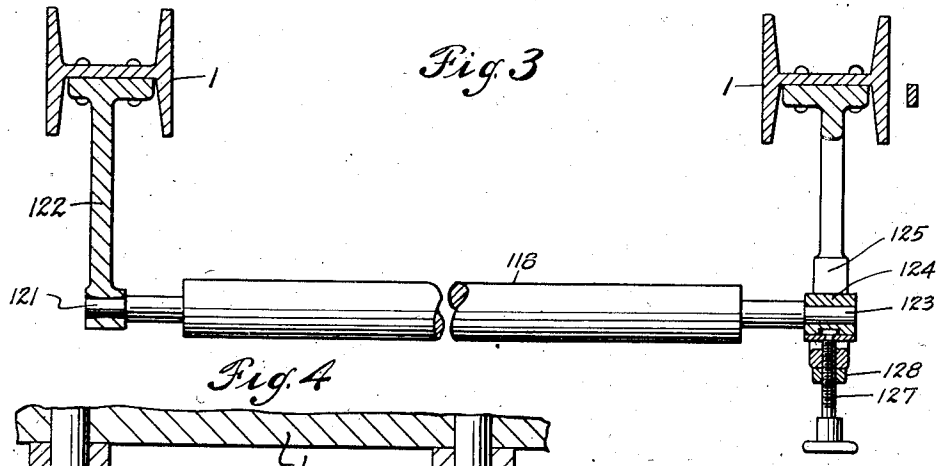
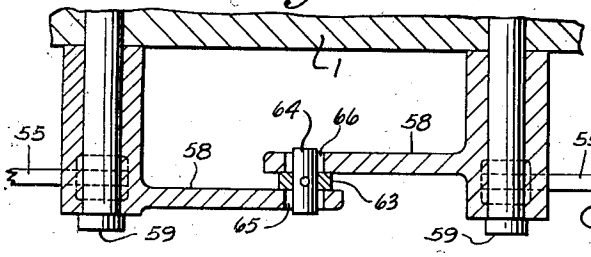


Fig. 4



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WEB TENSION CONTROLLING MECHANISM

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Fig. 5

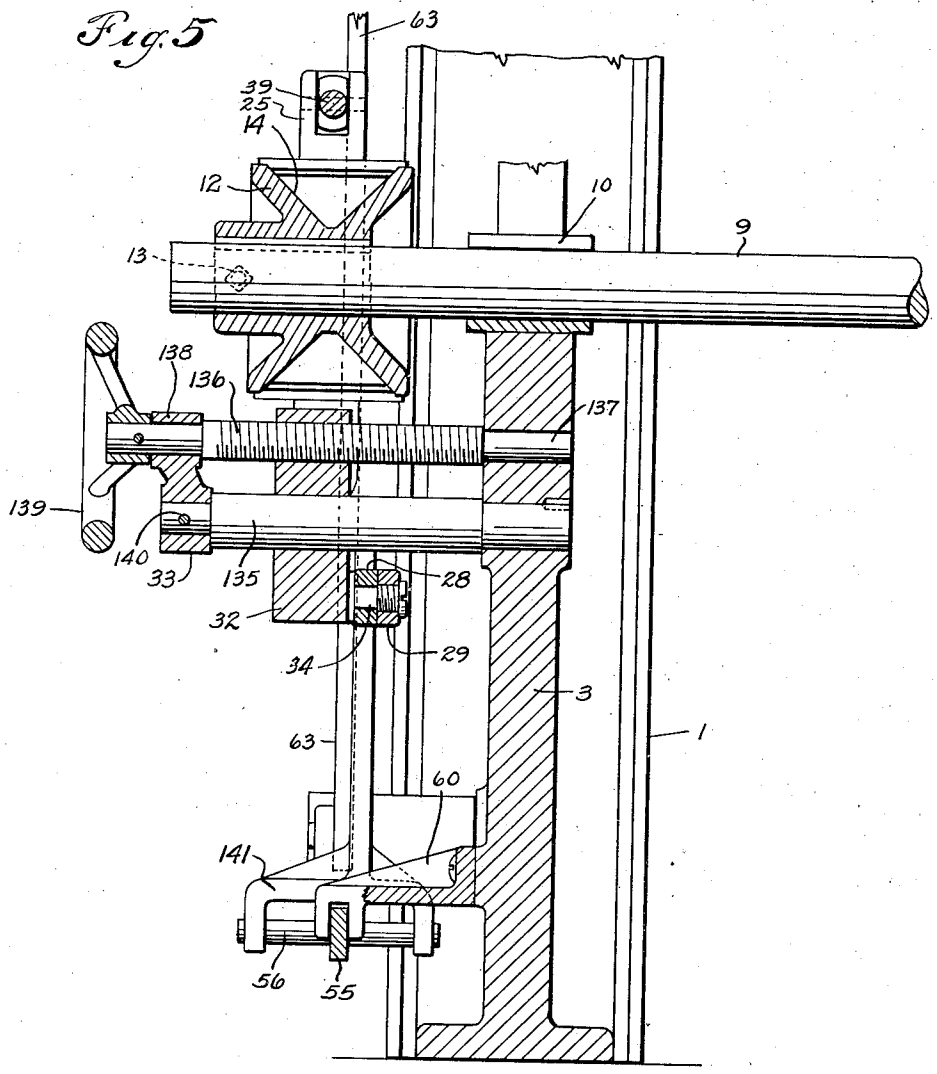
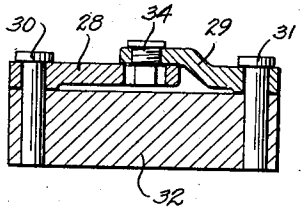


Fig. 6



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WEB TENSION CONTROLLING MECHANISM

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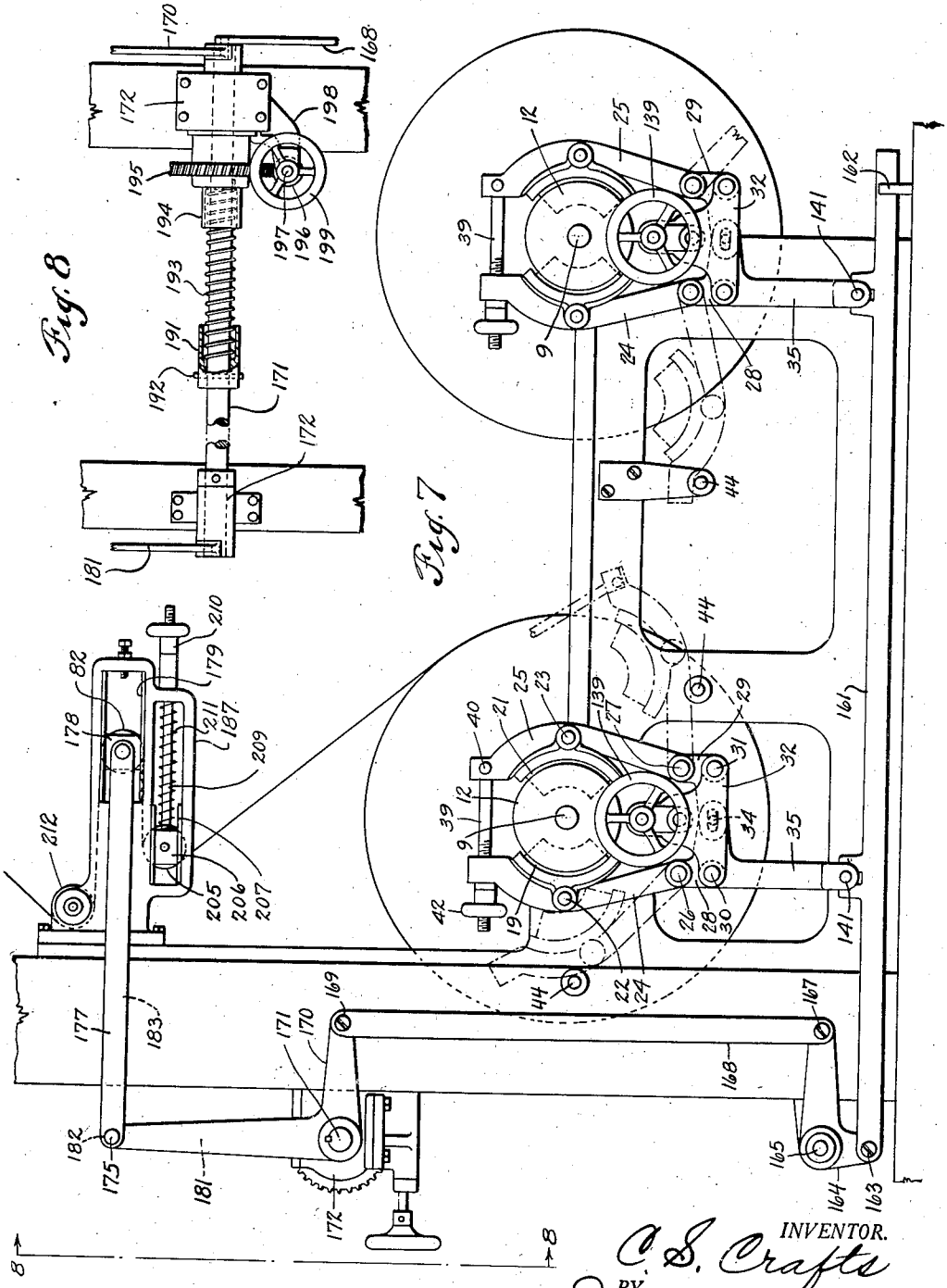

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WEB TENSION CONTROLLING MECHANISM

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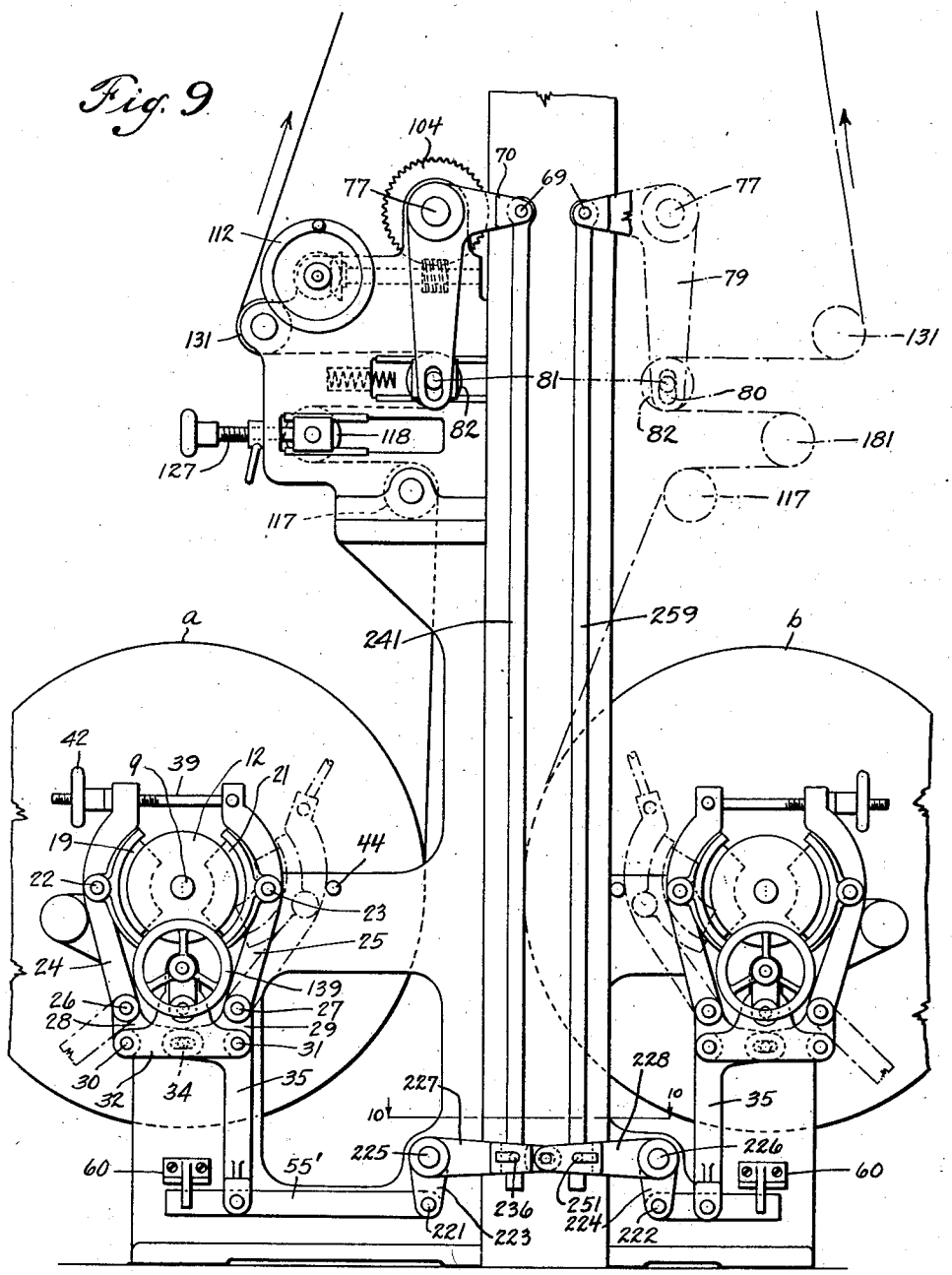
Fig. 9



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WEB TENSION CONTROLLING MECHANISM

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Fig. 11

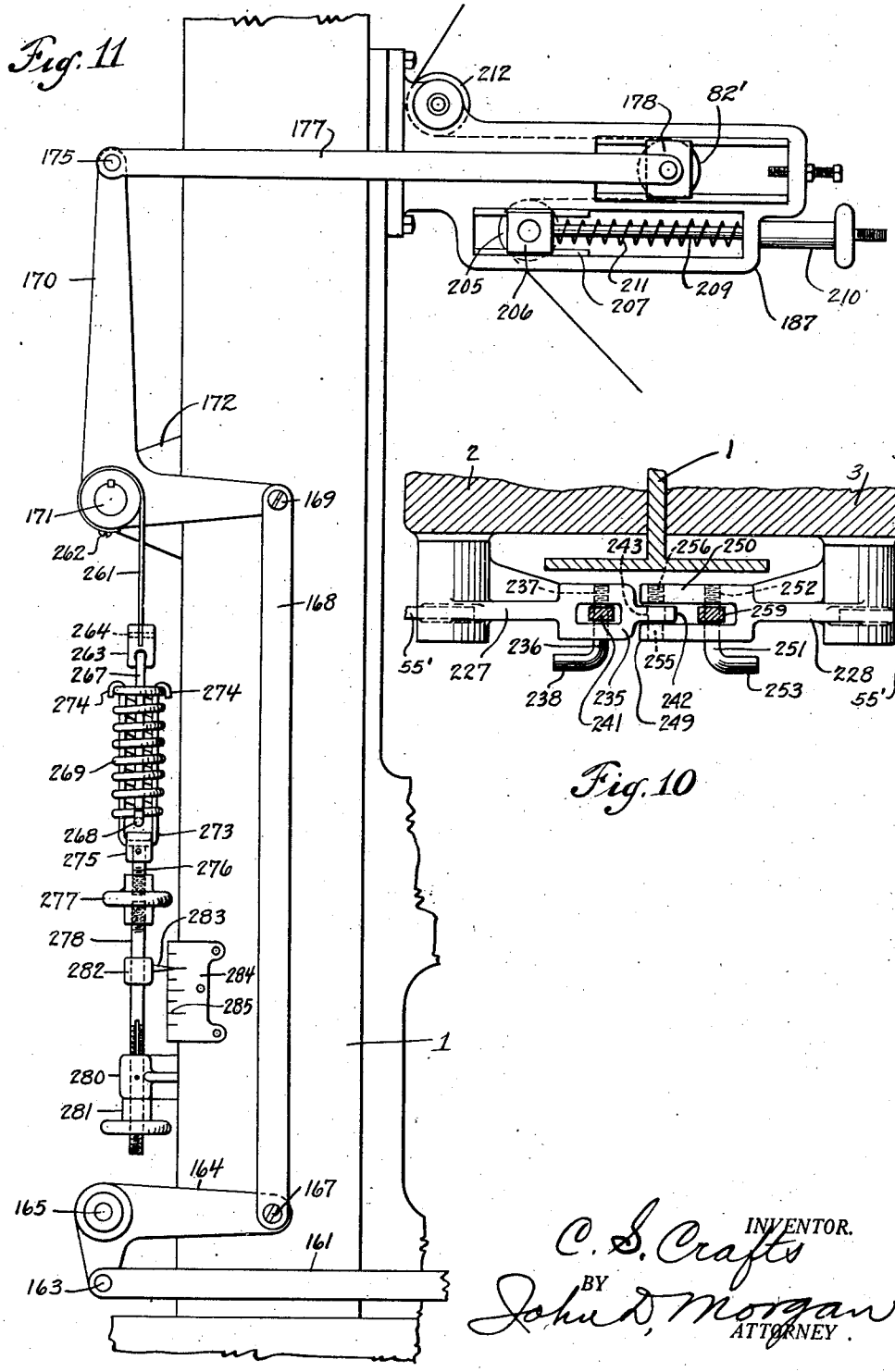

Fig. 10

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Patented Nov. 22, 1932 1,888,549

UNITED STATES PATENT OFFICE

CURTIS S. CRAFTS, OF OAK PARK, ILLINOIS, ASSIGNOR TO GOSS PRINTING PRESS COMPANY, A CORPORATION OF ILLINOIS

WEB TENSION CONTROLLING MECHANISM

Application filed August 28, 1928. Serial No. 302,460.

The invention relates to novel and useful improvements in mechanism for controlling the feed of a web from a supply roll, and more especially to such improvements in mechanism for supplying and regulating the supply of a web from one or more web supply rolls to a fast rotary printing press or like machine.

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.

Of the drawings:

Fig. 1 is a fragmentary elevation of a mechanism embodying the invention;

Fig. 2 is a fragmentary, transverse, vertical section, on an enlarged scale, taken substantially on line 2—2 of Fig. 1;

Fig. 3 is a horizontal section, taken on line 3—3 of Fig. 1;

Fig. 4 is a horizontal section, taken on line 4—4 of Fig. 1;

Fig. 5 is a fragmentary, vertical, transverse section, taken on line 5—5 of Fig. 1;

Fig. 6 is a detail horizontal section, taken on line 6—6 of Fig. 1;

Fig. 7 is a side elevation of a somewhat different embodiment of the invention;

Fig. 8 is a fragmentary, vertical, transverse view, taken on line 8—8 of Fig. 7;

Fig. 9 is a side elevation of a somewhat different embodiment of the invention;

Fig. 10 is an enlarged detail top plan of the alternative connections between the two brake mechanisms; and

Fig. 11 is a fragmentary detail of one form of the spring tension control.

The invention is directed to providing novel and improved mechanism for very adequately and accurately governing and regulating the feed of a web from a web roll to a printing press or other web using machine, under all the varying conditions of operation, by automatic control of brake mechanism action on the web roll by means which is governed by the tension of the running web.

In addition, the invention provides means of the kind described, whereby in various forms and arrangements of mounting of the web supply rolls, a plurality of roll supporting and braking mechanisms are provided, so that the lead end of a fresh web may be attached to a nearly exhausted web, by a "flying paster" or otherwise, without disturbing the control of the braking mechanism of either or any of the web rolls by a single web-engaging, brake-controlling mechanism. In connection with the capacities stated, means are provided for the rapid and easy removal of the exhausted rolls, shafts and brake pulleys, and the insertion of a fresh roll with its shaft and pulleys.

The invention is also directed to the optional or elective control from a single web-engaging, brake-regulating mechanism of one or a plurality of simultaneously running webs, and the web rolls and their respective braking mechanisms, whereby single full width webs, or a plurality of parti-width webs may be run simultaneously, thereby contributing to great facility and flexibility in running different size products, especially where requiring or utilizing narrow width webs. The invention provides further for quick and positive regulation or setting of the tension for the full width roll, or for the various narrow widths of rolls.

The foregoing and other objects are like-

wise embodied in conjunction with means for communicating the regulatory movements of a roller, or like device, held in spring tension engagement with the running web by direct and positive connections to one or more web roll brake mechanisms, and at the same time utilizing through the same connections the brake pressure thereby created to react so as to steady the movements of said web engaging roller due to variations in the tension of the running web.

With these and other objects in view in the present exemplary embodiment, a plurality of web roll brake mechanisms are provided in conjunction with a plurality of web-engaging, brake-controlling devices, with connections whereby one of the controlling devices may control a plurality of brake mechanisms or a single controlling device and a single brake-mechanism may operate together as a unit. Available for cooperation therewith are spring tension means which may be set at different degrees of tension for narrow-width rolls, as three-quarter, half and quarter width rolls.

Said embodiment includes also a structure and arrangement of brake mechanisms which are located below the journals for the web roll mandrels or shafts, and which open at the top, thereby facilitating and simplifying the removal of an exhausted roll with its shaft and brake pulley, and the insertion of a fresh roll, shaft and brake pulley, and the application of the brake to the latter.

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

Referring now in detail to the embodiment of the invention illustrated by way of example in the accompanying drawings, there is shown (Figs. 1–6) a mechanism wherein a plurality of web roll-supporting and web feed-regulating devices are connected to a single web-tension controlled feed regulating mechanism. In said embodied form, two web-supply rolls *a* and *b* are supported by their shaft ends at either side of the press, the rolls being also located at either side of a vertical frame standard 1 at either side of the press. Each of the vertical frame members 1 is provided with horizontally-extending brackets or side frame plates 2 and 3 each of these frame plates providing a journal support for the corresponding web-supplying roll.

The web roll supporting means, in so far as regards the broad aspects of the invention, may be of any suitable or known form. As embodied, the web roll is fixed on a shaft or mandrel 9, the roll and mandrel rotating together. The mandrel is journaled in bearings 10, at either side of the press, these bearings being open so that the mandrel of an exhausted roll can be lifted out and that of a full fresh roll substituted. Fixed to one end of the mandrel is a brake pulley 12, having a V-shaped peripheral groove 14, with which cooperate the arcuate, V-shaped shoes of the brake mechanism.

In the embodied form of brake mechanism, two arcuate, V-shaped shoes 19 and 21 are pivoted, respectively, at 22 and 23 to median or central portions of corresponding brake arms 24 and 25, the brake arms, respectively, being pivotally connected at 26 and 27 to the ends of corresponding arms of supporting and actuating bell-crank levers 28 and 29. Levers 28 and 29 are pivotally supported, respectively, at 30 and 31 by a supporting bracket 32. Bracket 32 not only serves as a support for the brake mechanism but is also laterally slidable to register the web roll with the plate cylinders. Accordingly the bracket is mounted upon a supporting and guiding rod 33, projecting laterally from the frame bracket 2 or 3. The other ends of the bell crank levers 28 and 29 are connected together by means of a pin and slot connection 34, whereby the two levers move together, under the control of the web-engaging brake-regulating roller, later to be described. To constitute a connection to said tension controlling means, bell-crank lever 29 has fixed thereto an additional arm 35 and there are connections from this arm to the web tension controlled, brake governing device later to be described.

At the opposite ends of the brake arms from the bell cranks 28 and 29, the arms are connected together by a rod 39, pivotally connected at 40 to the end of one brake arm, and lying in a slotted opening 41 in the end of the other brake arm 24. Rod 39 is screw-threaded at the outer end, and a nut or threaded hand-wheel 42 is screwed thereon, and abuts against the outer face of the arm 24. This mechanism holds these upper ends of the two brake arms in any desired position, the nut 42 serving to regulate the frictional effect of the brake shoes upon the pulley for any given movement of the regulating levers 28 and 29 at the other end of the brake arms 24 and 25. The brake arms may be laid open from the top by turning the pivoted rod 39 upwardly, and the brake arms are then free to rock backwardly about their respective pivot points 26 and 27. Supporting pins 44 are fixed to and project outwardly from the frame to support the brake arms in the open or roll-receiving position. Thus, an exhausted roll with its mandrel and brake pulley may be lifted out of its journals 10, and a fresh web supply roll with its mandrel and brake pulley be mounted in the bearings, and by rocking upwardly the brake arms 24 and 25, and moving screw rod 39 to the closed position, as shown in Fig. 1, the braking mechanism is in operative con-

nection with the new roll, the hand-wheel 42 serving to regulate the friction of the brake in the manner already described.

In accordance with certain features of the invention, the connections between the brake mechanisms and the web-engaging, tension-governed means, whereby the braking action is controlled, are direct, and positively connected so that the braking action is positively and accurately effected in conformity with the feeding requirements of the press or other web-supplied machine. Furthermore, the braking action, by reason of the positively connected intermediate parts, reacts to steady the action of the web-engaging tension roller or equivalent device. In the embodied form of said means shown in Figs. 1–6, a link 55 is pivotally connected at one end 56 to the lower end of the arm 35 of the brake controlling lever 29, the other end of said link 55 being pivotally connected at 57 to a bell-crank lever 58 which is pivotally supported at 59 upon the frame. A slotted guiding bracket 60 may be provided, the end of lever 55 working in the slot, which serves as a guide and also to prevent lateral strain or movement of this mechanism during transverse registration of the web roll, as will be later described.

In the embodiment exemplified in Figs. 1 to 6, both web roll braking mechanisms are connected to a single web-engaging tension-governed, brake-controlling roller. In said embodiment, accordingly, a connecting rod 63 is pivotally connected to the levers 58 of both braking mechanisms. For this purpose, rod 63, at its lower end, is provided with a pin 64 projecting from either side thereof. At one side pin 64 is in an elongated aperture 65 in the end of one of the two levers 58 and at the opposite side it is in an elongated aperture 66 in the other lever 58. Suitable guiding devices 67 are provided for the connecting rod 63. At its upper end 69, rod 63 is pivoted to one end of a bell-crank lever 70 (Figs. 1 and 2). The bell-crank lever 70 is fixed on a shaft 77, which shaft is journaled in either side frame of the press. Bell-crank lever 79 is provided at its other end with an elongated aperture 80, within which is one pintle 81 of the web-engaging, tension-governed roller 82. A roller is preferably employed for the web-engaging member, although other forms of such member may be employed if desired. Fixed to the opposite end of shaft 77 is a corresponding arm 84, and this arm also has an elongated opening 85 in the end thereof within which is the other pintle 86 of the roller 82. The pintles of the roller 82 are journaled in slidable boxes 87 and 88, which are slidably mounted, respectively, in guideways 89 and 90 formed in two bracket plates 91 and 92 which are fixed to and extend from the respective side frames 1 of the machine.

The embodied form of spring tension means acting upon the web-engaging roller 82 is constructed to maintain the spring tension practically uniform throughout the range of movement of the web-engaging roller 82. Cooperating with said spring tension means are manually regulable means for varying the spring tension of the roller 82 against the web, this means being capable of regulation while the web is running. In the embodied form, an internally-recessed hub 99 is fixed by a pin 100 on shaft 77. One end of a helical spring 101 is nested within and fixed to the recessed portion of hub 99. Spring 101 encircles the shaft 77, and is of sufficient length so that the coiling and uncoiling of the spring for even the widest range of movement of the roller 82 is relatively so small that the spring tension is not appreciably or materially changed. The other end of spring 101 is nested and fixed within a recess in one end of the hub 103 of a worm-wheel 104, which is loosely journaled on shaft 77.

In mesh with worm-wheel 104 is a worm 105, fixed on a shaft 106, which shaft is journaled in brackets 107, integral with and extending outwardly from the frame side bracket 92. Fixed on one end of shaft 106 is a bevel gear 108, and meshing therewith is a bevel gear 109, which is fixed on a shaft 110, journaled in a boss 111 formed on the side bracket 92 of the frame. Fixed to the exterior end of shaft 110 is a hand-wheel 112. The worm wheel 104 preferably has a roller bearing 113 between it and shaft 77, which conduces to easy operation of the mechanism. By turning the hand wheel 112, and therewith the worm 105, worm-wheel 104 is turned, and thereby the tension of the spring 101 which is exerted on the shaft 77 and therefrom upon the web-engaging roller 82, may be varied as desired irrespective of whether or not the web is running.

Web-directing means of any suitable form is provided, and as embodied the web is led over one or more guide rolls 117. One guide roller 118, is preferably variably positionable to compensate for differences in the tension transversely of the web. As embodied, one pintle 121 of this roller is journaled in a bracket 122, fixed to and extending outwardly from one of the side frames 1. This bearing is internally of curved or spool shape, as shown in Fig. 3, to permit angular movement of the roller bearing. The opposite pintle 123 of roller 118 is journaled in a slidable journal box 124, which is mounted in a guide 125 formed in the frame bracket 92. Connected to the outer side of the journal box 124 is a threaded rod 127, which is screw threaded into the metal at the end of guideway 125. A locking nut 128 is screw-threaded upon rod 127, to hold the roller 118 accurately and firmly in the desired position.

The web passes from the roll 118 over the tension regulating roller 82, and thence over suitable guide rollers, such as roller 131, journaled at 132, in the side bracket plates 91 and 92.

Means are provided for registering the web roll with the plates on the press cylinders by moving the web roll and its shaft longitudinally of its axis, thereby to bring the web roll into accurate registry with the press cylinders without disturbing its relation to the braking mechanism. In the embodied form of said means, the supporting bracket 32, (upon which, it will be recalled, the levers 28 and 29 are pivotally supported) is slidably mounted upon a supporting rod 135 (Figs. 1 and 5) which is fixed to, and extends outwardly from, the side frame of the press. A screw-threaded rod or shaft 136 is rotatably mounted at 137 in the press side frame, and is also journaled near its opposite end in a bracket 138, which is fixed at 140 to the outer end of the supporting rod 135. Screw-rod 136 is provided with a hand-wheel 139. By rotating hand-wheel 139 and therewith screw-rod 136, the brake-supporting bracket 32 will move along the rod 135 either toward or from the press frame, and by reason of the pivotal mounting upon said bracket of the levers 28 and 29, and the engagement of the brake shoes 19 and 21 with brake pulley 12, shaft 9 and its web supply roll will be correspondingly longitudinally moved, thereby bringing the web into desired register with the printing plates upon the press cylinder. To permit this lateral movement of the braking mechanism, the pivotal connection 56 (Figs. 1 and 5) for connecting rod 55, is formed as a pivot rod mounted in a yoke 141, formed in the lower part of the lever arm 35. The slotted bracket 60 holds the connecting rod 55 from lateral movement, as the lever arm 35 moves with the brake mechanism, and the pivot rod 56 slides in the aperture in the connecting rod 55.

Figs. 7 and 8 illustrate an exemplary embodiment of the invention, wherein it is adapted to two web supply rolls mounted on the same side of the vertically-disposed press supporting frame. The facility with which an exhausted roll with its mandrel and brake pulley may be removed and a fresh roll inserted in either of the sets of supporting bearings will be clear from said figures. The alternate use of both web roll supporting and controlling mechanisms also permits "flying pasters" to be made, whether arranged as shown in these or the preceding figures. The connections between the respective brake mechanisms and the web-engaging tension regulating roller in this embodiment, is of somewhat different form. In these figures, the lever arms corresponding to the lever arms 35 in the preceding figures are connected to a connecting rod or link 161, by yokes and pins 141 on the lever working in open ended slots in projections on the link. The link is supported and held against lateral displacement by slotted lugs 162. Connecting rod 161 is pivotally connected at its other end 163 to a bell-crank lever 164, which is pivoted upon the frame at 165. Pivotally connected to the other end of bell-crank lever 164 at 167 is a connecting rod 168, which rod is pivotally connected at its other end 169 to one end of a bell-crank lever 170, which bell crank lever is fixed on a shaft 171 journaled in bearings 172 on either side frame of the press.

The means for regulating the spring tension for the web-engaging, tension-regulating roller is mounted upon the shaft 171, as will be later described. The bell-crank lever 170 at its other end 175, is pivotally connected to one end of a link 177, which link at its opposite end is pivotally connected to a slidable journal box 178, in which is journaled one pintle of the web-engaging roller 82. Fixed to the opposite end of shaft 171 is an arm 181, which at its outer end 182 is pivotally connected to one end of a connecting rod 183. Rod 183 is pivoted at its other end to a sliding journal box 178, which is likewise slidable in the corresponding guideway 179 in the bracket 187 at the opposite side of the press.

In the form of spring tension means shown in Figs. 7 and 8 of the drawings, a hollow hub 191 is fixed on shaft 171 by means of a pin 192. One end of a helical spring 193 is nested within and fixed to the hollow hub 191, and the opposite end of said spring is nested within and fixed to the hollow hub 194 of a worm-wheel 195, the worm-wheel and its hub being journaled loosely on shaft 171. Meshing with the worm-wheel 195 is a worm 196, fixed on a shaft 197, which shaft is journaled in brackets 198 fixed on the press frame. A hand-wheel 199 is fixed on shaft 197. Thus, by turning hand-wheel 199, the worm 196 will turn the worm wheel 195 and its hub 194, and will change the tension exerted by spring 193 upon shaft 171, and this may be done while the press is running. The spring 193 is of sufficient length so that the spring tension action upon the web engaging roller 82 will be practically uniform throughout the entire range of movement of the roller.

Any suitable additional means may be provided for guiding the web, and preferably comprise a guide roller which is laterally adjustable to compensate for variations in tension laterally of the web. As embodied, a guide roller 205 is mounted in journal boxes 206, slidable in guideways 207 formed in the supporting brackets 187 at either side of the machine. Pivoted to the slidable journal boxes 206 are rods 209, which are longitudinally movable in recesses in the ends of the respective side brackets 187. A hand-nut 210 is screw-threaded upon the outer end of the respective rods 209, and a spring 211 is in

tension between the slidable journal box 206 and the end of the opening in the bracket 187. Thereby a variation of position and a regulation of spring tension is applicable to either end of the guide roller 205; the regulation of position and of spring tension at either end being independent of those at the other end. A suitable guide roller 212 is mounted in the brackets 187 at the other side of the tension regulating roller.

In Figs. 9 and 10 is disclosed an embodiment of a feature of the invention whereby two web-engaging tension-regulating mechanisms are provided in connection with two web-roll supporting and braking mechanisms, so that a single web-engaging roller may be employed to control either of the braking mechanisms and its web roll, which may be running to supply the press, while a fresh web roll is being supplied to the other mechanism, or both web-engaging tension regulating rollers may be simultaneously employed, one controlling one brake mechanism and the other controlling the other brake mechanism, when narrow-width web rolls are being run from both web supplying means through the press and are printed simultaneously.

The web-engaging tension regulating mechanism and the brake mechanisms shown in Fig. 9, are of substantially the same form as are shown in Figs. 1 to 6, and accordingly are shown in Fig. 9 only in their general features or outlines. The connecting links 55', in this embodiment, are connected at their respective ends 221 and 222 to corresponding arms 223 and 224 of a pair of bell-crank levers, pivotally supported, respectively, at 225 and 226 upon the machine frame 1 (Figs. 9 and 10). One of these bell-crank levers connects to one brake mechanism, and the other bell-crank lever connects to the other brake mechanism. The other arms 227 and 228, respectively, of these bell-cranks are designed so that they may be operated together or separately, as may be desired. With this in view, arm 227 has a closed yoked portion 235, which is recessed medianly of the yoke portion to receive a pivot pin 236, which is screw-threaded at 237 into one wall of the yoked portion of the lever 227, and is provided with a bent turning end 238. This serves as a pivot pin for the lower end of the connecting rod 241, which connects with the bell crank lever of the web-engaging tension-regulating roller, and corresponds to the connecting rod 63 shown in Fig. 1 of the drawings. The lever arm 227 terminates in a tail 242, extending beyond the closed yoke portion already described, and fitting within the forked end of the other bell-crank arm 228, and this tail end has an elongated slot 243 formed therein.

The lever 228 terminates in an open yoked portion, or forked end having arms 249 and 250, which embrace with free play the tail 242 of the lever arm 227. A pivot pin 251 rests in recesses formed in the arms 249 and 250 of the lever arm 228, and is screw-threaded at 252 into the yoke arm 250, and is provided with a bent turning end 253. Near the outer end of the arms 249 and 250 are apertures 255 and 256, the aperture 256 being screw-threaded to receive one of the screw-threaded pivot pins.

When the two web-engaging tension-regulating rollers are to operate the corresponding brake mechanisms separately, the mechanism is in the position of Fig. 10, the connecting rod 241 being pivotally connected by pin 236 to lever arm 227, and the corresponding connecting rod 259 being likewise pivotally connected by the pin 251 to the lever arm 228. There being then no connection between the tail 242 of lever 227 and the yoke arms 249 and 250 of the lever 228, the two mechanisms will operate independently of each other.

When it is desired to simultaneously control two narrow width rolls from either of the web-engaging tension regulating rollers, that is, to control both brake mechanisms from one web-engaging tension-regulating roller, say, for example, the left-hand tension regulating roller in Fig. 9, connecting rod 241 would be pivotally connected by pin 236 with lever arm 227. Pin 251, however, would be unscrewed from pivotal connection with the connecting rod 259, and would be inserted in aperture 255 in lever arm 249. It would thus project through the elongated slot 243 in the tail 242 of lever 227, and would be screw-threaded into the aperture 256 in the arm 250 of lever 228. Thus, when connecting rod 241 was moved either upwardly or downwardly in response to the movements of the web-engaging tension-regulating roller 82, both levers 227 and 228 would be moved correspondingly through their connection by the pivot pin in the apertures 255, 243 and 256, and both brake mechanisms would be controlled by the one web-engaging tension regulating roller 82.

In accordance with one feature of the invention means are provided for varying the spring tension on the brake regulating mechanism for different widths of web supply rolls, where this is found to be either desirable or necessary. An embodiment of such means is shown in Fig. 11 applied exemplarily to a compression spring. In said figure, a flexible strap 261 is fixed to shaft 171 at 262, the flexible strap passing about the shaft 171. The other end of this strap is fixed in a block 263 by means of a pin 264. Carried in an aperture passing through the block 263 is a U-shaped hook 267, both ends of which terminate in short spring-engaging hooks 268. Resting in the two spring-engaging hooks 268 is a helical spring 269, the spring encircling

the hook 267. A second U-shaped hook 273, is oppositely disposed within the spring 269, and its ends terminate in spring-engaging hooks 274, which extend over and rest upon the upper end of the spring 269. The median transverse reach of hook 269 passes through an aperture in a block 275. Fastened to and extending from the lower end of block 275 is a screw-threaded rod 276, which is threaded into one end of a hand-nut 277.

Screwed into the opposite end of the hand-nut is a screw rod 278, the lower end of the rod 278 being screw-threaded and extending loosely through an aperture in a bracket 280 fixed on the supporting frame pillar 1. A hand-nut 281 is screw-threaded on the lower end of the rod 278, and bears against the lower face of the bracket 280. Indicating means are preferably provided, and as embodied a collar 282 is fixed on the rod 278, and has a finger 283 extending laterally therefrom. A plate 284 is fixed to the frame pillar 1, and is preferably provided with a scale 285. This scale may be marked at the proper tension for a full roll, a three-quarter width roll, a half-width roll or a quarter width roll.

By turning the hand-wheel 281, the tension of the spring 269 as it affects the shaft 171 and the brake mechanism may be varied for these different widths as desired or required. The hand-nut 277 constitutes an auxiliary regulating means for further nicely varying the tension. In accordance with this feature of the invention corresponding means may be applied to the spring coiled about the shaft 171, in which case the tension varying means would be adapted for a torsion spring.

In operating the mechanism, it is customary to set the spring with respect to the tension on the web so that the web-engaging roller 82′ is substantially at a middle point in its range of travel, the spring, such as the spring 101 or 269, thereby balancing the web tension. Any variation of the tension in either direction produces a corresponding movement of the web-engaging roller 82′, and this movement is communicated to the brake mechanism to compensatingly increase or decrease the brake pressure, in order to bring the web-tension back to the predetermined normal or standard. By reason of the rigid and direct connections between the web-engaging roller 82′ and the brake mechanism, the brake pressure reacts directly and constantly to steady the web-engaging roller and to prevent any excessive and disturbing movement thereof.

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. A web supplying means including in combination a plurality of horizontally-disposed web roll supporting devices having roll shaft journals, brake mechanisms for said roll supporting devices, openable to permit free access to said journals from above, web-engaging means for controlling said brake mechanisms, said means being connected to the brake mechanism by positive connections transmitting the movements of the web engaging means and the brake mechanism to each other.

2. A web supplying means including in combination a plurality of horizontally-disposed web roll supporting devices having roll shaft journals, brake mechanisms for said roll supporting devices, openable to permit free access to said journals from above, web-engaging means for alternatively controlling said brake mechanisms, said means being connected to the brake mechanisms by positive connections transmitting the movements of the web engaging means and the brake mechanisms to each other.

3. A web supplying means including in combination a plurality of horizontally-disposed web roll supporting devices having roll shaft journals, brake mechanisms for said roll supporting devices, openable to permit free access to said journals from above, web-engaging means for controlling said brake mechanisms and connected to the lower end of the brake mechanisms, said means being connected to the brake mechanisms by positive connections transmitting the movements of the web engaging means and the brake mechanisms to each other.

4. A web supplying means including in combination a plurality of web roll supporting means, a plurality of brake mechanisms, a plurality of web-engaging brake controlling devices and connections whereby one of said controlling devices may concurrently operate a plurality of said brake mechanisms or separate controlling devices may operate separate brake mechanisms independently of each other.

5. A web supplying means including in combination a plurality of web roll supporting means, a plurality of brake mechanisms, a plurality of web-engaging brake controlling devices, connections from a web-engaging device to a brake mechanism, connections from another web-engaging device to another brake mechanism, and means for disconnecting one of the brake mechanisms from its web-engaging device and for connecting it to operate with another web-engaging device and its connected brake mechanism.

6. A web supplying means including in combination a plurality of web roll supporting means, a plurality of brake mechanisms therefor, a plurality of web-engaging brake controlling devices, positively connected link

and lever connections between said web-engaging devices and said brake mechanisms, and means for changing said positive connections whereby a single web-engaging device may control a plurality of brake mechanisms, or a plurality of web-engaging devices may each independently control a single brake mechanism.

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

CURTIS S. CRAFTS.