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W. F. HUCK
ROLLSTANDS FOR CARRYING WEB ROLLS
HAVING DIFFERENT AXIAL WIDTHS
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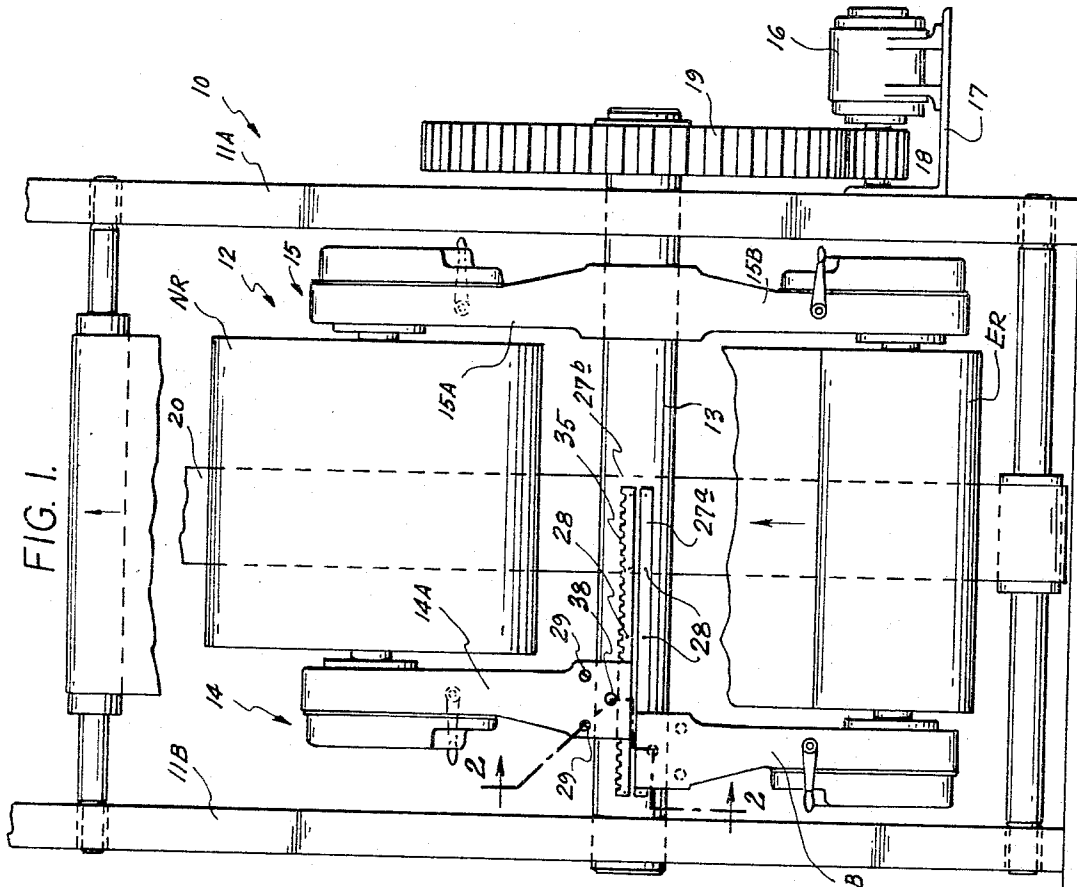


FIG. 2.

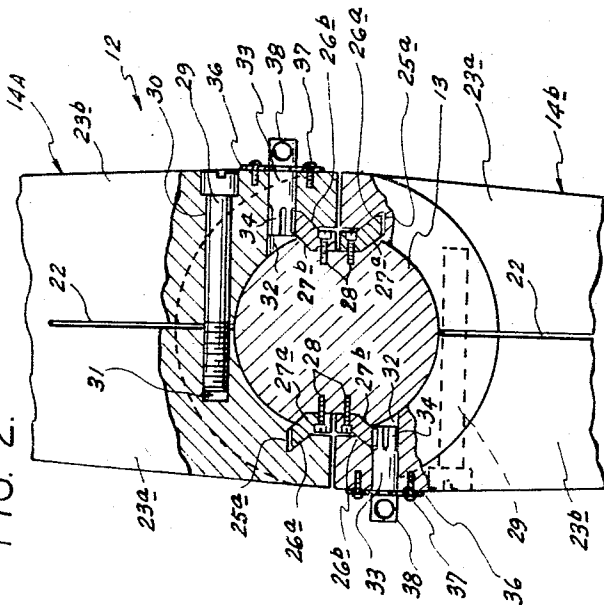
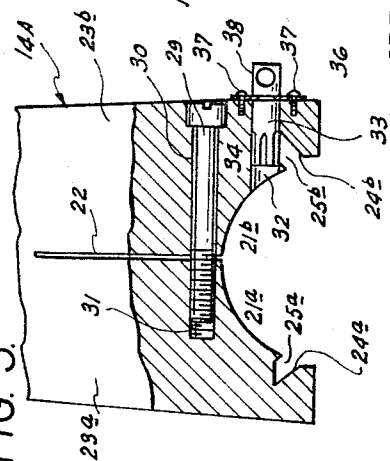


FIG. 3.



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ROLLSTANDS FOR CARRYING WEB ROLLS HAVING DIFFERENT AXIAL WIDTHS

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9 Claims. (Cl. 242-64)

This invention relates generally to rollstands either for supplying a web to a printing press or other web processing machine from one web supply roll after another or for taking-up or rewinding the processed web on one roll after another.

Existing rollstands of the described type usually include a reel having two unitary spiders mounted on a turnable support shaft to form two or more angularly displaced pairs of parallel, spaced arms for carrying between their outer ends the rolls which are to be successively unwound or rewound. Although the spiders are adjustable axially relative to each other, it is apparent that such adjustment simultaneously varies the spacing between all of the pairs of arms so that the rolls carried by the rollstand, at any one time, must all be of the same axial width. The foregoing arrangement has been sufficient in association with the usual publication printing presses or other web processing machines in which a web of standard or constant width is processed for a lengthy period of time.

However, when relatively frequent changes are made in the width of the web being processed, the above described existing rollstands are disadvantageous in that a replacement roll, which differs in axial width from the preceding unwinding or rewinding roll, cannot be loaded or placed in the rollstand until the preceding roll has been removed. Thus, the replacement roll cannot be loaded while the printing press or other web processing machine continues to run, and a lengthy press down-time is required for change-over from one roll width to another.

Accordingly, it is an object of this invention to provide an unwinding or rewinding rollstand which is capable of simultaneously carrying a plurality of rolls having different axial widths so that a replacement roll, which differs in axial width from the preceding unwinding or rewinding roll, can be loaded in the rollstand while the web is being unwound from, or rewound on such preceding roll, thereby to reduce the press down-time required for change-over from one web width to another, or even to permit continuous running of the press, as when the rollstand is of an automatic splicing type.

Another object is to provide a rollstand reel having a plurality of angularly displaced pairs of parallel, spaced arms, with the spacing of at least one of the pairs of arms being adjustable independently of another pair of arms so that, during the unwinding or rewinding of a roll carried by one pair of arms, another pair of arms can be adjusted to receive a replacement roll of different axial width.

A further object is to provide a reel of the described character suitable for a splicing rollstand by which a web is continuously delivered from successive web supply rolls having different axial widths.

A still further object is to provide a rollstand reel which is adjustable, as described above, and which is constructed and arranged to adequately and securely support large and heavy web rolls.

In accordance with an aspect of this invention, a rollstand reel comprises a support shaft having axially spaced sets of arms extending therefrom to carry a plurality of web rolls, with the arms of each set being spaced apart angularly and aligned with the arms of the other set to form arm pairs each of which carries one of the rolls between the outer ends of its arms, and means mounting

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at least one arm of at least one of the sets for displacement axially on the shaft relative to another arm of the same set, whereby the arm pairs can be positioned to receive and carry web rolls of different widths.

5 A rollstand reel embodying this invention is further preferably provided with releasable means for clamping each axially displaceable arm in the desired axial position on the support shaft.

Another feature of the invention is the provision of 10 coating means, for example, in the form of a meshing pinion and rack, secured respectively to the axially displaceable arm and to the shaft and being operable to displace the former axially along the latter.

In a particularly advantageous embodiment of the invention, each arm which is to be axially displaceable on the shaft relative to another arm of the same set includes 15 laterally spaced inner end portions having thereon spaced clamping surfaces sloped convergently in the direction away from the reach of the arm, and each forming a seat portion to engage the shaft, and the shaft has oppositely 20 sloped bearing surfaces spaced apart thereon to mate with the clamping surfaces of the arm so that, when the inner end portions of the arm are drawn together, as by suitable fastening means engaging the same, the clamping 25 surfaces are contracted upon the bearing surfaces to cause the seat portions to be clamped tightly against the shaft.

The above, and other objects, features and advantages of the invention, will be apparent in the following detailed description of an illustrative embodiment thereof 30 which is to be read in connection with the accompanying drawing, wherein:

FIG. 1 is an end elevational view of a rollstand having a reel constructed in accordance with an embodiment of this invention;

35 FIG. 2 is an enlarged, detail sectional view taken along the line 2-2 on FIG. 1; and

FIG. 3 shows one of the arms of FIG. 2 removed from the support shaft.

Referring to the drawing in detail, it will be seen that 40 considerable simplification has been effected in the illustration of a rollstand 10 on FIG. 1 in order not to obscure the novel features with details of conventional parts well known to those skilled in the art. The rollstand 10 may be of the rewinding type used for rewinding, on one 45 roll after another, a processed web received from a printing press or other web processing machine, or the rollstand may be of the unwinding type for delivering the web to the web processing machine from one web supply roll after another. In the latter case, the rollstand may 50 require manual splicing of the webs of the successive rolls, or the rollstand may include additional devices, for example, as shown in detail in U. S. Patent No. 3,103,320, issued September 10, 1963, to William F. Huck, so as to constitute an automatic splicing rollstand for continuously 55 delivering a web from one web supply roll after another to a printing press or other web processing machine.

The illustrated rollstand 10 as shown to generally comprise side frame members 11A and 11B and a reel 12 60 mounted therebetween. The reel 12 includes a support shaft 13 having its ends journaled in suitable bearings carried by side frame members 11A and 11B, and axially spaced sets 14 and 15 of arms extending from the shaft to carry a plurality of web rolls, for example, as indicated at ER and NR.

Each of the sets 14 and 15 has a number of arms equal 65 to the number of rolls to be carried simultaneously by the reel, and the arms of each set are spaced apart angularly and aligned with the arms of the other set. Thus, where two rolls ER and NR are to be carried by reel 12, as 70 shown, set 14 includes two arms 14A and 14B which extend or reach radially outward from shaft 13 in diametri-

cally opposed directions, and set 15 similarly includes two diametrically opposed arms 15A and 15B which are aligned with arms 14A and 15B, respectively. The web roll NR is carried rotatably by suitable chucks (not shown) at the outer ends of the pair of aligned arms 14A and 15A, and the other web roll ER is similarly carried between the outer ends of the pair of arms 14B and 15B.

When reel 12 is rotated, for example, by operation of a motor 16 mounted on a bracket 17 extending from side frame member 11A and having a gear 18 secured on the motor shaft and meshing with a gear 19 secured on an end extension of shaft 13, the rolls ER and NR carried by the reel are moved in a circular path extending to and from a working or normal running position. When a roll is disposed at such working position, the periphery of the roll is engaged by a drive belt 20 which is suitably driven to rotate the roll and thereby either unwind or rewind the web at the speed at which the web is made to travel through the associated printing press or other web processing machine. When one pair of arms, for example, the arms 14B and 15B, is disposed to locate the roll ER carried thereby at the running position, the other pair of arms 14A and 14B is disposed at a loading position to receive the new or replacement roll NR. After the supply of web material on the roll at the running position has been substantially depleted, in the case of an unwinding rollstand, or after the roll at the running position has received approximately a full supply of web material, in the case of a rewinding rollstand, reel 12 is turned to bring the new or replacement roll NR to a splicing position where the running web is suitably spliced to its periphery and severed from the preceding or expired roll ER. Then, reel 12 is further turned to bring the replacement roll NR to the running position and to locate the preceding or expired roll ER at the loading position where it can be removed from the reel.

In accordance with this invention, reel 12 is constructed and arranged so that the web rolls ER and NR carried thereby for successive positioning at the working or normal running position of the rollstand can be of different axial widths, as is clearly apparent on FIG. 1. In order to permit rolls ER and NR to be of different widths, arms 14A and 14B of at least arm set 14 are separately formed and are mounted for displacement axially on shaft 13 relative to each other. Thus, arm pair 14A and 15A can be positioned to receive and carry the web roll NR of relatively small axial width, while arm pair 14B and 15B is positioned to receive and carry the web roll ER of relatively larger width.

The mounting of arms 14A and 14B for relative displacement axially on shaft 13 is preferably achieved by forming the inner end of each of those arms with butt surfaces 21a and 21b at opposite sides of an inwardly opening longitudinal slot 22 between laterally separated inner end portions 23a and 23b of the arm, as is particularly shown on FIG. 3 with respect to arm 14A. Butt surfaces 21a and 21b are shaped to bear against a seat on shaft 13, which seat may be the cylindrical surface of the shaft and, in that case, butt surfaces 21a and 21b are part-cylindrical, as shown. Laterally spaced inner end portions 23a and 23b further have thereon clamping surfaces 24a and 24b which are spaced apart and, as shown, may be defined by the side walls of grooves 25a and 25b cut in end portions 23a and 23b so as to extend parallel to the axis of shaft 13. Clamping surfaces 24a and 24b are sloped convergently in the direction away from the reach of the arm 14A or 14B, that is, generally in the direction toward the axis of shaft 13. Further, in the illustrated embodiment, butt surfaces 21a and 21b are disposed between clamping surfaces 24a and 24b of the arm.

As shown particularly on FIG. 2, shaft 13 has thereon a pair of spaced apart bearing surfaces 26a and 26b which extend parallel to the axis of the shaft and which are oppositely sloped to mate with the clamping surfaces 24a

and 24b of each of arms 14A and 14B. The bearing surfaces 26a and 26b for each arm may be defined by a pair of wing-shaped keys or flange-like members 27a and 27b secured to shaft 13, as by screws 28, at approximately diametrically opposed locations on the shaft. The members 27a and 27b for each arm are located and dimensioned to extend into grooves 25a and 25b of the related arm and to have their bearing surfaces 26a and 26b in facial contact with clamping surfaces 24a and 24b, respectively, of the arm.

When clamping surfaces 24a and 24b and bearing surfaces 26a and 26b extend parallel to the axis of shaft 13, as shown, it will be apparent that such contacting surfaces guide the related arm 14A or 14B in its displacement axially on the shaft.

Each of the arms 14A and 14B further has screws 29 extending through bores 30 in end portions 23b and screwed into tapped bores 31 in end portion 23a (FIGS. 2 and 3). When screws 29 are tightened, end portions 23a and 23b of the arm are drawn together and thereby contract clamping surfaces 24a and 24b upon bearing surfaces 26a and 26b of the shaft. By reason of the convergence of surfaces 24a and 24b toward the axis of shaft 13, the contraction of clamping surfaces 24a and 24b upon the mating bearing surfaces 26a and 26b exerts a wedging action which serves to tightly clamp butt surfaces 21a and 21b of the arm radially against the seat provided therefor by the surface of shaft 13 between flange-like members 27a and 27b.

The tight clamping of arms 14A and 14B on shaft 13, as described above, ensures that such arms are securely retained in their axially adjusted positions along the shaft and in alignment with the corresponding arms 15A and 15B of arm set 15, and further that the connections of the arms to the shaft will be adequate to resist the strains imposed thereon when very heavy web rolls are carried by the reel.

When screws 29 of the arm 14A or 14B are loosened, such arm is freed for displacement axially on shaft 13 so as to change the spacing between the arm pair 14A and 15A or 14B and 15B. In order to effect such axial displacement, each of arms 14A and 14B further preferably has a lateral bore 32 extending through its end portion 23b and opening into groove 25b, and a shaft 33 is rotatably received in bore 32 and has a toothed inner end portion constituting a pinion 34 which is in meshing engagement with a gear rack 35 (FIG. 1) formed along the outer longitudinal edge surface of flange-like member 27b. Each shaft 33 is retained in its bore 32 by means of a thrust ring 36 engaging a circumferential groove in shaft 33 and being secured to the related arm by screws 37 (FIGS. 2 and 3). Each shaft 33 further has a suitably shaped head 38 at its outer end for engagement by a crank or other tool by which shaft 33 and its pinion 34 may be rotated.

When pinion 34 is rotated, its engagement with rack 35 causes displacement of the related arm 14A or 14B axially along shaft 13 to adjust the spacing between one or the other of the arm pairs, whereupon the screws 29 of the adjusted arm are again tightened to clamp the same on shaft 13, as previously described.

The described arrangements for effecting displacement of arms 14A and 14B on shaft 13 and for clamping the arms to the shaft are further advantageous in that the heads 38 by which pinions 34 are turned and the heads of screws 29 are easily accessible from in front of rollstand 10, particularly when the arm 14A or 14B which is to be adjusted and its cooperating arm 15A or 15B are disposed at the loading position. Thus, when one arm pair disposes the web roll carried thereby at the working or normal running position, the other arm pair disposed at the loading position may have its spacing adjusted to receive and carry a web roll of a width different from that of the roll at the running position without interrupting the winding or unwinding of web onto or from the roll

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at the running position. The foregoing is obviously advantageous in the case of an automatic splicing rollstand in that it permits the usual automatic operation of the rollstand to transfer the continuously running web from one roll to another even when the rolls are of different widths. The possibility of adjusting the spacing of the arms at the loading position to receive a web roll of different width than the web roll at the running position is also advantageous in the case of a rollstand requiring manual splicing of the web to the new or replacement roll in that the adjustment of the arms for receiving a replacement roll of different width while the web is being unwound from, or rewound on the roll at the running position greatly minimizes the press down-time required for splicing.

In the illustrated embodiment of the invention, arms 15A and 15B of set 15 are integrally connected to each other, so that the successive rolls, irrespective of the width thereof, are set up with one end, and hence the related edge of the web, at a fixed distance from the center line of the printing press or other web processing machine. However, if desired, arms 15A and 15B may also be formed separately and mounted on shaft 13 in the same manner as described above with respect to arms 14A and 14B. In that event, arms 15A and 15B will also be adjustable relative to each other along shaft 13 to permit rolls of different widths set up in the rollstand to be centered with respect to the associated web processing machine.

The arm sets 14 and 15 have been shown to each have two arms for carrying two rolls. However, the described features of the invention may be applied equally to rollstand reels for carrying a larger number of web rolls.

Although an illustrative embodiment of the invention has been described in detail herein with reference to the accompanying drawing, it is to be understood that the invention is not limited to that precise embodiment or to the several previously mentioned modifications thereof, and that various changes and further modifications may be effected therein by one skilled in the art without departing from the scope or spirit of the invention as defined in the appended claims.

What is claimed is:

1. A rollstand including a reel comprising a support shaft having axially spaced sets of arms extending therefrom to carry a plurality of web rolls, the arms of each set being spaced apart angularly and aligned with the arms of the other set to form arm pairs each of which carries one of said rolls between the outer ends of its arms, and means mounting at least one arm of at least one of said sets for displacement axially on said shaft relative to another arm of the same set, whereby said arm pairs can be positioned to receive and carry web rolls of different widths; said at least one arm including laterally spaced inner end portions having thereon spaced clamping surfaces sloped convergently in the direction away from the reach of the arm, and further having thereon butt surfaces to bear radially against a seat on said shaft, said shaft having oppositely sloped bearing surfaces spaced apart thereon to mate with said clamping surfaces, and fastening means operable to draw together said inner end portions and thereby contract said clamping surfaces upon said bearing surfaces until said butt surfaces are clamped tightly against said seat on the shaft.

2. A rollstand according to claim 1; wherein said butt surfaces are located between said clamping surfaces.

3. A rollstand according to claim 1; wherein said mating clamping and bearing surfaces extend parallel to the axis

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of the shaft so that, upon loosening of said fastening means, said mating surfaces guide said at least one arm in its displacement axially on the shaft.

4. A rollstand according to claim 1; wherein said shaft further has a rack extending axially thereon, and a pinion is carried rotatably by said at least one arm and meshes with said rack to effect displacement of said at least one arm axially on the shaft in response to rotation of said pinion.

5. A rollstand according to claim 1; wherein said shaft has flange-like members extending therefrom to define said bearing surfaces, said flange-like members being circumferentially spaced on the shaft and directed parallel to the axis of the shaft, and said inner end portions of said at least one arm have grooves receiving said flange-like members and defining said clamping surfaces with said butt surfaces being located between said grooves.

6. A rollstand according to claim 5; said mounting means including a rack extending along a longitudinal surface of one of said flange-like members and a pinion rotatably carried by one of said inner end portions and meshing with said rack to effect displacement of said at least one arm axially on said shaft in response to turning of said pinion.

7. In a rollstand reel having a support shaft, an arm reaching outwardly from said shaft to carry an end of a web roll, said arm including laterally spaced inner end portions having thereon spaced clamping surfaces sloped convergently in the direction away from the reach of said arm, and further having thereon butt surfaces to radially bear against a seat on said shaft, said shaft having oppositely sloped bearing surfaces spaced apart thereon to mate with said clamping surfaces, and fastening means operable to draw together said inner end portions and thereby contract said clamping surfaces upon said bearing surfaces until said butt surfaces are clamped tightly against said seat on the shaft.

8. A rollstand reel according to claim 7; wherein said shaft has flange-like members extending therefrom to define said bearing surfaces, said flange-like members being circumferentially spaced on the shaft and directed parallel to the axis of the shaft, and said inner end portions of the arm have grooves at opposite sides of said seat portions receiving said flange-like members and defining said clamping surfaces.

9. A rollstand reel according to claim 8; wherein one of said flange-like members has a rack extending along a longitudinal surface thereof, and a pinion is rotatably carried by one of said inner end portions and meshes with said rack to effect displacement of said arm axially on the shaft in response to rotation of said pinion.

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