Sept. 14, 1943. W. F. HUCK 2,329,469

SLITTER ROLLER FOR USE IN PRINTING MACHINES

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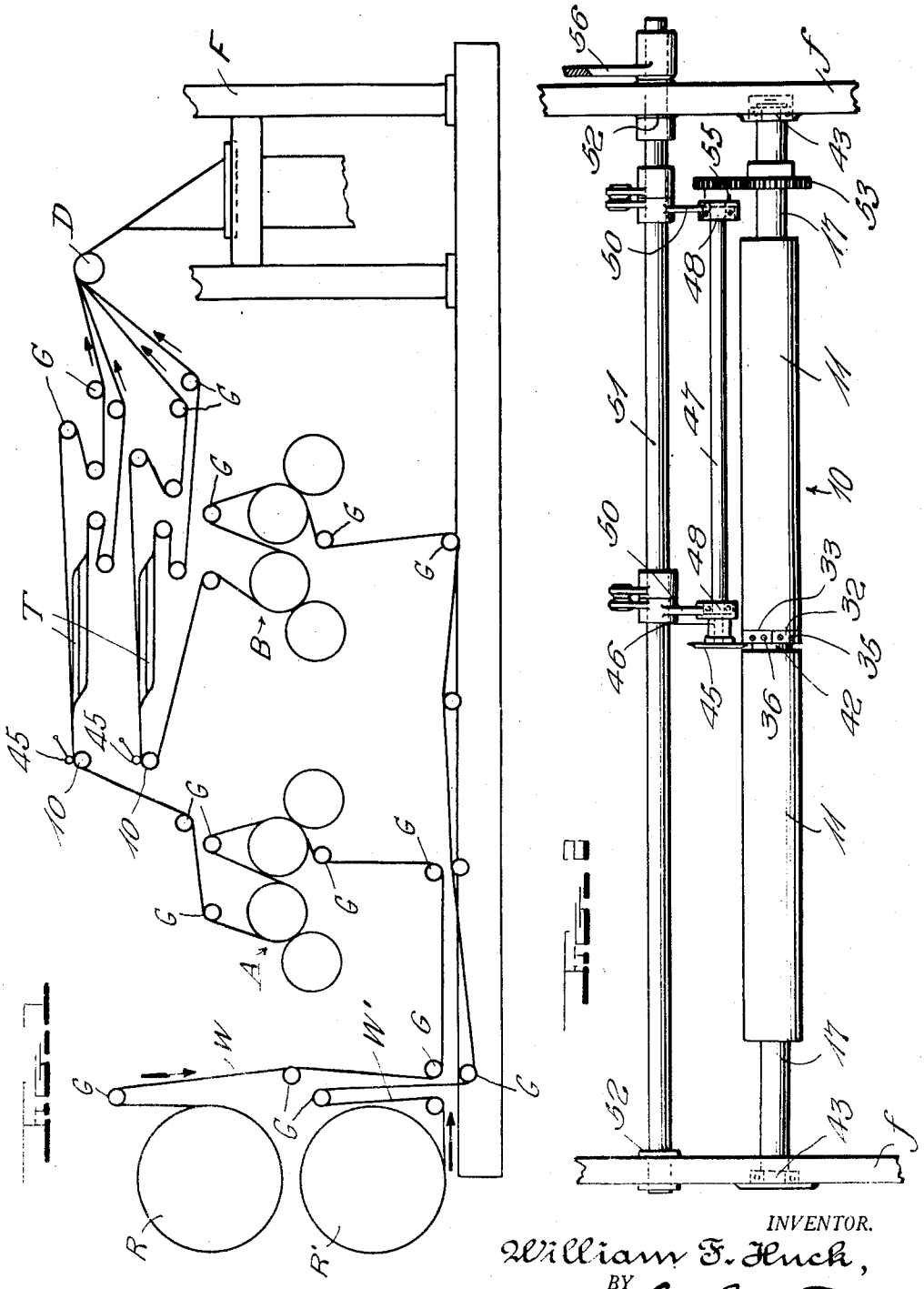


FIG. 2

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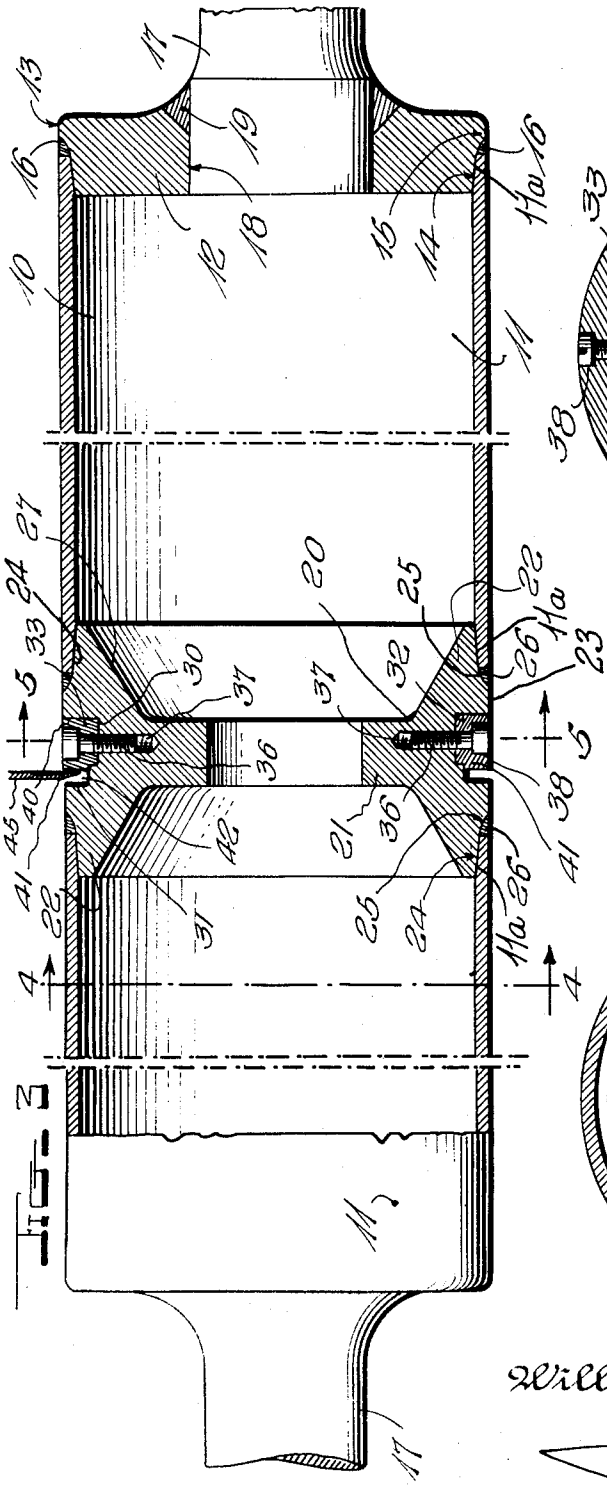
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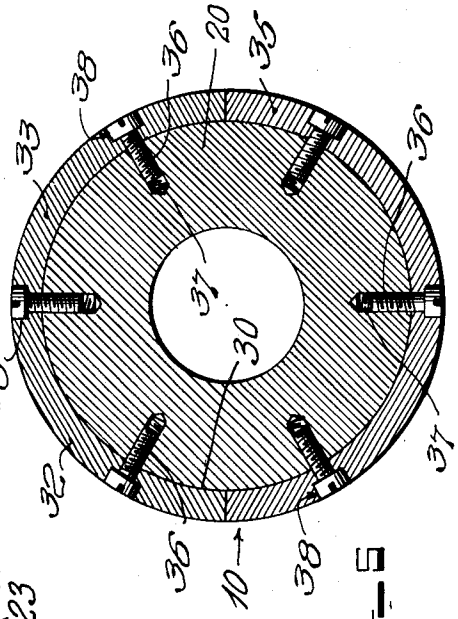
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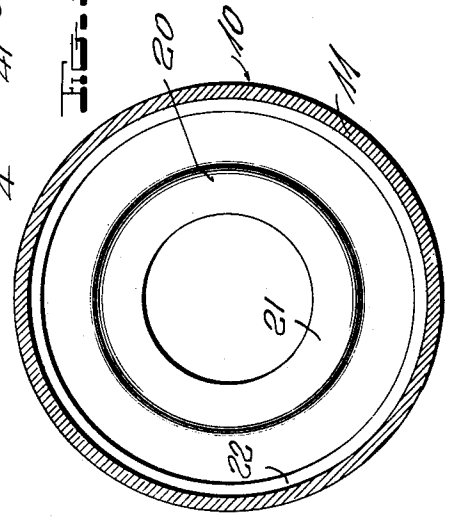
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SLITTER ROLLER FOR USE IN PRINTING MACHINES

Filed Dec. 8, 1942 2 Sheets-Sheet 2







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UNITED STATES PATENT OFFICE

2,329,469

SLITTER ROLLER FOR USE IN PRINTING MACHINES

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12 Claims. (Cl. 164—60)

This invention relates to web-engaging rollers, and more particularly to the construction of slitter rollers for use in rotary printing machines.

The slitter roller disclosed in this application is intended for use in printing machines, and it is preferably located in the web run between a conventional printing unit and conventional turner bars. Each roller is constructed and arranged to be cooperably engaged by one or more conventional slitter discs or cutters, so that a web may be cut into a plurality of ribbons before it reaches the turner bars. In its location, the roller guides the web to the turner bars, and it also cooperates with one or more cutters or slitters to cut the web into two or more ribbons, which ribbons are subsequently separated and guided through separate paths of travel to the folder or discharge terminal of the printing machine.

Slitter rollers heretofore used for this purpose have consisted of a number of pulleys or cylindrical members supported on a shaft which extends across the printing machine and is mounted in bearings located at or adjacent the ends of the shaft, and also in a bearing located intermediate the shaft terminals. Each pulley is provided with a hardened portion which cooperates with a conventional cutter or slitter disc, and the pulleys and discs are located at any desired position along the shaft in order to cut the web into the required number of ribbons of any preferred width.

The rigidity of a slitter roller of this type is dependent entirely upon the stiffness of the pulley-supporting shaft, and although the shaft is of relatively large diameter, it is necessary to support it adjacent its midpoint in order to present sufficient rigidity to successfully consummate the cutting or web slitting operation.

It is, therefore, an object of this invention to provide an improved slitter roller, for use in rotary printing machines, which is so constructed and arranged as to present sufficient rigidity to resist deflection when the roller guides a web and is operably engaged by one or more slitter discs or cutters in slitting a wide web into two or more ribbons.

Another object of this invention is to provide an improved slitter roller for use in rotary printing machines, the roller being formed from a plurality of tubular sections and one or more stiffening members which are so formed and assembled as to provide a roller of sufficient rigidity to resist deflection when the roller is operably engaged by one or more slitter discs or cutters in slitting a web into two or more ribbons.

A specific object of this invention is to provide a slitter roller for use in rotary printing machines, the roller being formed from a plurality of tubular sections and one or more stiffening members, and each stiffening member supporting a composite cutting ring that cooperates with a cutter or slitter disc to separate a web, the roller components being so constructed and assembled as to provide a roller of sufficient rigidity to resist deflection when the roller guides a web, and when its cutting ring or rings cooperates with one or more slitter discs or cutters in slitting the web into a plurality of ribbons.

It is also an object of this invention to provide a slitter roller of generally improved construction and arrangement, whereby the device will be simple, durable, and inexpensive in construction, as well as convenient, practical, serviceable and efficient in its use.

With the foregoing and other objects in view, which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that various changes in form, proportion and minor details of construction may be made within the scope of the claims without departing from the spirit or sacrificing any advantages of the invention.

For a complete disclosure of the invention, a detailed description thereof will now be given in connection with the accompanying drawings which form a part of the specification, wherein:

Figure 1 is a diagrammatic view depicting a conventional printing machine having the improved slitter rollers applied thereto;

Figure 2 is a fragmental plan view depicting the slitter roller in cooperable relation with a slitter and slitter actuating mechanism;

Figure 3 is a longitudinal sectional view taken through the improved slitter roller, parts appearing in elevation;

Figure 4 is a transverse sectional view taken on the line 4—4 of Figure 3; and

Figure 5 is a transverse sectional view taken on the line 5—5 of Figure 3.

Referring to the drawings, in which similar reference characters designate corresponding parts, there is diagrammatically depicted, in Figure 1, a printing machine having two conventional perfecting printing units A and B, a conventional folder F, conventional turner bars T, the usual drag roller D, and guide rollers G.

One of the improved slitter rollers 10 is positioned in each web run between a printing unit and its turner bars T, and, preferably, imme-

diately adjacent the turner bars. Web W and W' are supplied to the printing units A and B from conventional web supply rolls R and R'. The web W from the supply roll R is guided by guide rollers G to the printing unit A, and then to the upper slitter roller 10 where the web is slit into a plurality of ribbons. One of these ribbons passes around a set of turner bars T, so that the ribbons are superposed, and the superposed ribbons are guided around guide rollers G to the drag roller D, and finally pass down over the former of the folder F, in conformity with the usual practice. The web W' from the supply roll R' is guided to the printing unit B, and then to the lower slitter roller 10 where it is slit into ribbons. One of these ribbons passes around the lower turner bars T to superpose the ribbons, and the superposed ribbons are guided by rollers G to the drag roller D. These ribbons then run down over the former of the folder in the usual manner. Although, in the arrangement depicted, two printing units and two slitter rollers are provided, it is to be understood, of course, that any number of slitter rollers may be provided which best conform to the requirements of a given printing operation, and a web may be slit into any required number of ribbons. The printing arrangement illustrated forms no part of this invention, but merely depicts one of a great number of printing arrangements in which the improved slitter roller may be advantageously employed.

The improved composite slitter roller includes separate tubular members or cylinders 11 which are secured at their inner or adjacent terminals to a roller component or reenforcing member 20, and each tubular member is secured at its outer terminal, in a manner to be hereinafter described, to a cylindrical end cap or disc 12, as best seen in Figure 3. The inner surface of each tubular member 11 is slightly tapered at each terminal, as indicated at 11*a*, for a purpose to be hereinafter explained.

Each cap 12 has a peripheral surface 13 of substantially the same diameter as the outer diameter of each tubular member 11, and a reduced peripheral surface 14 which is tapered for a purpose to be hereinafter disclosed. An arcuate shoulder 15 is interposed between the surfaces 13 and 14.

In securing an end cap 12 to a tubular member 11, the cap is preferably forced into the tube 11 with the tapered circumferential portion 14 of the cap accurately engaging a tapered surface 11*a* of the tubular member 11. Each cap 12 is then preferably welded to the outer terminal of each tubular member 11, as indicated in Figure 3, with the welding metal 16 filling a circular recess defined between the arcuate shoulder 15 and the outer end of the tubular member 11. Each cap 12 is also provided with a stub shaft or gudgeon 17 which is received within an axially-disposed cylindrical aperture 18 formed in the cap. The stub shaft is then welded to the cap, as indicated at 19 in Figure 3.

The tubular members 11 are united by a reinforcing or supporting member 20 which has a stiffening web 21 and axially-extending annular flanges 22. The ring or member 20 has a peripheral surface 23 which has substantially the same diameter as the outer diameter of the tubes 11, and each flange 22 is provided with an outer tapered peripheral surface 24 of substantially the same diametrical dimensions as the tapered inner terminal surfaces 11*a* of the tubes 11. Arcuate shoulders 25 are defined between the cylindrical surface 23 and tapered surfaces 24.

In assembling the supporting member 20 and the tubular members 11, the tubular members 11 are forced onto the flanges 22 of the member 20 with a tapered surface 11*a* of each tubular member 11 accurately engaging the tapered peripheral surface 24 of each flange 22, and then the tubular members are welded to the member 20, as indicated in Figure 3, so that the welding metal 26 fills circular recesses defined between the inner terminals of the tubular members 11 and the arcuate shoulders 25.

The flanges 22 are tapered, as indicated at 27 (Figure 3), so that the terminal of each flange is relatively thin, but the thickness of the flange is gradually increased as it approaches the web 21 until it blends into the stiffening web 21 and the member 20, consequently the inner portion of each flange is relatively thick, to thus provide a structure of relatively great stiffness.

A circular recess 30 of rectangular cross section is formed in the supporting member 20 intermediate the tubular members 11, and this recess communicates with a circular rectangular recess 31 of less depth. The recesses 30 and 31 are provided for the reception of a composite cutting ring 32 which is preferably formed of hardened metal for cooperation with a cutter or slitter disc to be hereinafter disclosed. The composite ring 32 is preferably formed of two semi-circular components or sections 33 and 35 to permit the positioning of the ring within the recesses 30 and 31. Each semi-circular section is secured to the supporting member 20 by shoulder screws 36, the shank of each screw being threaded into a threaded aperture 37 formed in the supporting member 20, and the head of each screw being received within a cylindrical recess 38 formed in each cutting ring section (Figures 3 and 5). Each cutting ring component is rectangular in cross section and includes a relatively thick rectangular portion 40 (Figure 3) which is received within the rectangular recess 30, and a reduced rectangular extension 41 which is received within the rectangular recess 31, to thus position the cutting ring 32 in the recesses so that a circular slitter-receiving recess 42 is provided between the outer face of the reduced portion 41 of the ring 32 and the annular side wall of the recess 31.

In use, the stub shafts or gudgeons 17 of each slitter roller 10 are received in anti-friction bearings 43 carried by the machine frame *f*, in the usual manner, to thus rotatably support the roller 10.

A conventional slitter disc or cutter 45 is provided (Figures 2 and 3) which is supported by a slitter head 46 carried by a shaft 47. The shaft 47 is rotatably mounted in suitable bearings 48 (Figure 2) that are carried in brackets 50 supported on a rod 51 which is mounted for rotative movement in bearings 52 supported in the machine frame *f*.

By this arrangement, the cutter or slitter disc 45 is rotatably supported, and this slitter may be driven from a gear 53 carried by a stud shaft 17 of the slitter roller 10, and the gear 53 meshes with a pinion 55 supported on the shaft 47. When the slitter roller 10 is rotated, the gear 53, pinion 55, shaft 47 and slitter disc 45 are also rotated, so that the slitter disc 45 may cut a web that is supported on the slitter roller 10. When the slitter disc 45 is located in its normal cutting or slitting position, its peripheral portion is received within the circular recess 31 formed in the sup-

porting member 20, and the cutting face of the slitter disc is positioned adjacent but an appreciable distance from the flat annular face of the composite cutting ring 32, so that the slitter disc may be driven at a preferred speed independently of the peripheral speed of the roller 10. The cutter or slitter disc 45 may be moved from cooperable relationship with the slitter roller 10 by rocking the shaft 51 through the instrumentality of an operating lever or link 56 of usual construction.

This arrangement presents a slitter roller of exceptionally strong construction which is capable of resisting excessive deflection during the slitting operation of one or more slitters. This construction and arrangement also avoids the necessity of employing "through shafts" and "intermediate bearings," which are required in the conventional slitter roller structure. It is to be understood, of course, that any preferred number of slitting stations may be provided in each slitter roller by simply including the required number of supporting members 20 in the roller structure, and securing each supporting member to the tubular members 11 in the manner hereinbefore disclosed.

It will be understood that the invention herein disclosed may be embodied in other specific forms without departing from the spirit or essential attributes thereof, and it is therefore desired that the present embodiment be considered in all respects as illustrative and not restrictive.

What I claim as new and useful is:

1. In a cylindrical slitter roller for use in printing machines, spaced relatively thin tubular portions, a relatively thick reenforcing portion interposed between the tubular portions, the reenforcing portion having an endless recess formed therein which extends inwardly from its outer peripheral surface, a cutting ring secured within the endless recess to cooperate with a conventional slitter disc to slit a web supported on the roller, and shafts supported relative to the tubular members for rotatably supporting the roller.

2. In a cylindrical slitter roller for use in printing machines, spaced relatively thin tubular portions, a relatively thick reenforcing portion interposed between the tubular portions, an annular reenforcing web extending radially inwardly from the reenforcing portion, the reenforcing portion having an endless recess formed therein which extends inwardly from its outer peripheral surface for the reception of a conventional slitter disc to slit a web supported on the roller, and shafts supported relative to the tubular members for rotatably supporting the roller.

3. In a cylindrical slitter roller for use in printing machines, spaced relatively thin tubular portions, a relatively thick reenforcing portion interposed between the tubular portions, the reenforcing portion having an endless recess formed therein which extends inwardly from its outer peripheral surface for the reception of a conventional slitter disc to slit a web supported on the roller, caps secured to the outer terminals of the tubular portions, and a shaft rigidly secured to each cap for rotatably supporting the roller.

4. In a cylindrical slitter roller for use in printing machines, spaced relatively thin tubular portions, a relatively thick reenforcing portion interposed between the tubular portions, an annular reenforcing web extending radially inwardly from the reenforcing portion, the reenforcing portion having an endless recess formed therein which extends inwardly from its outer peripheral surface for the reception of a conventional slitter disc to slit a web supported on the roller, caps secured to the outer terminals of the tubular portions, and a shaft rigidly secured to each cap for rotatably supporting the roller.

5. A slitter roller for use in printing machines including, separate tubular members, a relatively heavy supporting member interposed between the tubular members and rigidly secured thereto and the outer peripheral surface of the supporting member having the same diametrical dimensions as the outer surfaces of the tubular members to form a cylindrical roller surface, the supporting member having an endless recess formed therein which extends inwardly from its outer peripheral surface for the reception of a conventional slitter disc to slit a web supported on the roller, and shafts supported relative to the tubular members for rotatably supporting the roller.

6. A slitter roller for use in printing machines including, separate tubular members, a relatively heavy supporting member interposed between the tubular members and rigidly secured thereto and having a reinforcing web, the outer peripheral surface of the supporting member having the same diametrical dimensions as the outer surfaces of the tubular members to form a cylindrical roller surface, the supporting member having an endless recess formed therein which extends inwardly from its outer peripheral surface, a cutting ring secured within the endless recess of the supporting member to cooperate with a conventional slitter disc to slit a web supported on the roller, and shafts supported relative to the tubular members for rotatably supporting the roller.

7. A slitter roller for use in printing machines including, separate tubular members, a relatively heavy supporting member interposed between the tubular members, opposed flanges extending axially from the supporting member, each flange being rigidly secured to a tubular member, the outer peripheral surface of the supporting member having the same diametrical dimensions as the outer surfaces of the tubular members to form a cylindrical roller surface, the supporting member having an endless recess formed therein which extends inwardly from its outer peripheral surface, a cutting ring secured within the endless recess of the supporting member to cooperate with a conventional slitter disc to slit a web supported on the roller, and shafts supported relative to the tubular members for rotatably supporting the roller.

8. A slitter roller for use in printing machines including, separate tubular members, a relatively heavy supporting member interposed between the tubular members and rigidly secured thereto, the supporting member having an endless recess formed therein, cutting ring segments secured within the recess to form a cutting ring to cooperate with a conventional slitter disc to slit a web supported on the roller, and shafts supported relative to the tubular members for rotatably supporting the roller.

9. A slitter roller for use in printing machines including, separate tubular members, a relatively heavy supporting member interposed between the tubular members and rigidly secured thereto, the supporting member having an endless recess

formed therein, cutting ring segments positioned within the recess, and means for securing the ring segments in the recess to form a ring to cooperate with a conventional slitter disc to slit a web supported on the roller, and shafts supported relative to the tubular members for rotatably supporting the roller.

10. A slitter roller for use in printing machines, including, separate tubular members, a relatively heavy supporting member interposed between the tubular members and rigidly secured thereto, a cutting ring secured within the recess and the axial dimensions of the cutting ring being less than the axial dimensions of the recess to provide a slitter-receiving opening between an end wall of the recess and an end wall of the cutting ring, the cutting ring cooperating with a conventional slitter disc which extends into the said slitter opening to slit a web supported on the roller, and shafts supported relative to the tubular members for rotatably supporting the roller.

11. In a cylindrical slitter roller for use in printing machines, spaced relatively thin tubular portions, a relatively thick reenforcing portion interposed between the tubular portions, the reenforcing portions having an endless recess formed therein which extends inwardly from its outer peripheral surface for the reception of a conventional slitter disc to slit a web supported on the roller, and shafts supported relative to the tubular members for rotatably supporting the roller.

12. A slitter roller for use in printing machines including, separate tubular members, a relatively heavy supporting member interposed between the tubular members and rigidly secured thereto, the supporting member having an endless recess formed therein for the reception of a conventional slitter disc to slit a web supported on the roller, and shafts supported relative to the tubular members for rotatably supporting the roller.

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