June 15, 1948. W. A. HAYSSEN 2,443,243

PAPER ROLL SHAFT

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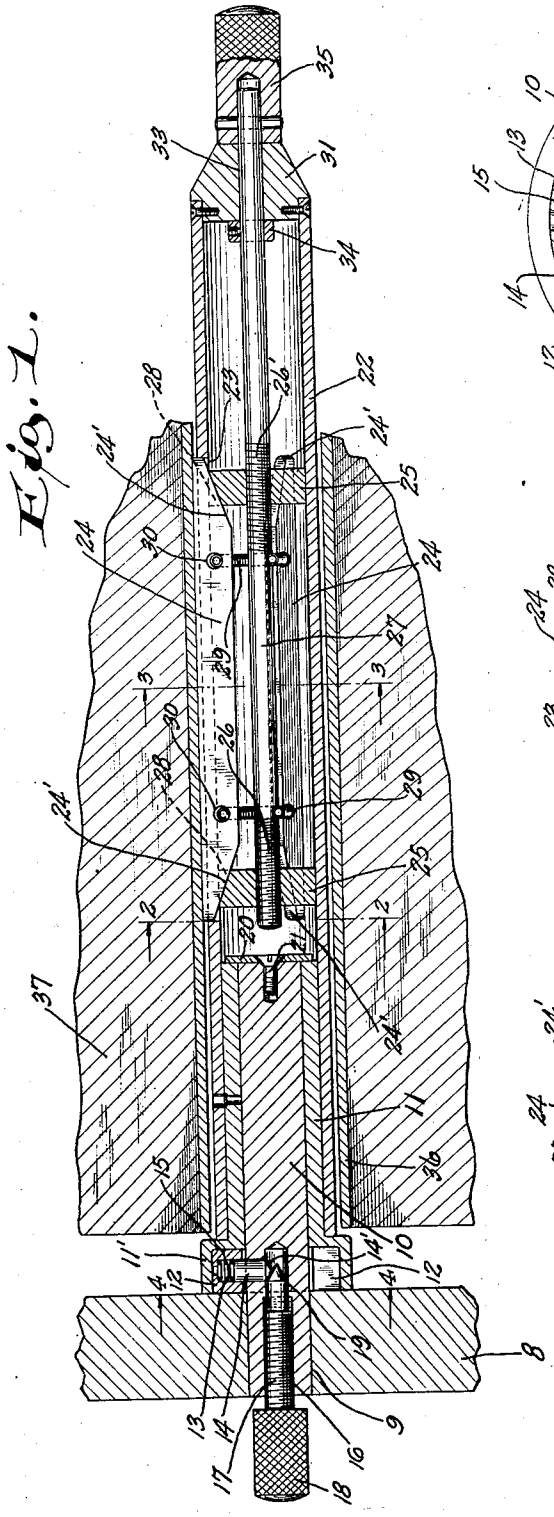

Fig. 1.

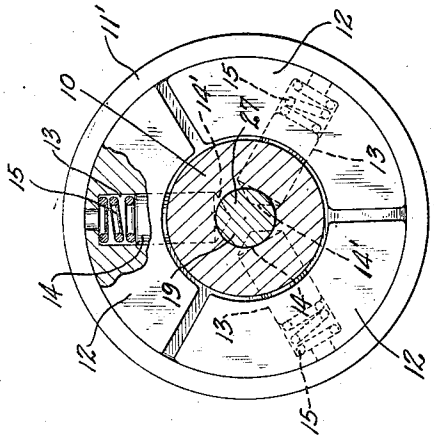

Fig. 4.

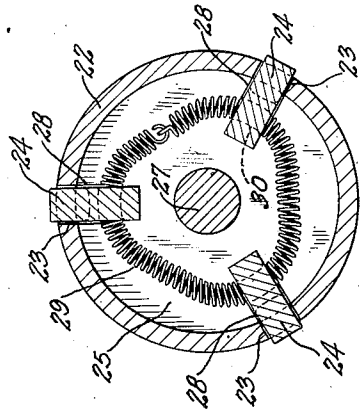

Fig. 3.

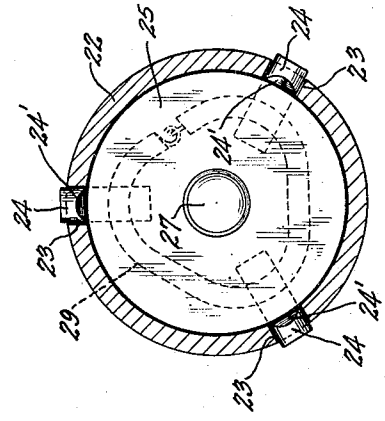

Fig. 2.

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PAPER ROLL SHAFT

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3 Claims. (Cl. 242—72)

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This invention relates to improvements in paper roll shafts.

Package wrapping machines customarily have incorporated therein revoluble shafts or arbors on which rolls of wrapping material or paper are mounted and from whence the paper is unwound in web formation to be wrapped about packages passing through the machines. In a conventional structure both ends of a paper roll shaft are mounted on the machine in frame-carried bearings or supports. As empty paper roll cores must be removed from a shaft periodically and be replaced by a new paper roll, it is necessary that some means be provided for permitting the removal of the shaft from its mountings or permitting the disengagement of one end of the shaft from its support to permit the axial movement for replacement purposes of the exhausted paper roll core and the new paper roll. It is also desirable in connection with the paper roll shaft of a package wrapping machine that means be provided for restraining or regulating the freedom of rotation of the shaft so that the wrapping material will not unwind therefrom too freely.

With the foregoing in mind, it is a primary object of the present invention to provide, for a package wrapping machine, a paper roll shaft mounted in the machine at only one end of the shaft whereby the other end of the shaft is at all times free of obstructions and connections permitting the free axial movement along the shaft in the direction of the free end thereof of paper roll cores and paper rolls, whereby replacements on the shaft may be accomplished easily and rapidly without disengaging any portion of the shaft relative to its mounting means.

A further object of the invention is to provide a paper roll shaft provided with manually operated adjustable means for quickly releasably engaging the core of a paper roll to removably clamp the paper roll on the shaft for revoluble movement with the shaft.

A further object of the invention is to provide a paper roll shaft having manually adjustable brake means for variably restraining free rotation of the shaft.

A further object of the invention is to provide a paper roll shaft readily applicable to conventional package wrapping machines and requiring a minimum of fixtures in connection with the shaft mounting.

A further object of the invention is to provide a paper roll shaft which is of very simple construction, is inexpensive to manufacture, which permits the easy replacement of paper rolls, which

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is manually adjustable while mounted on a machine and while carrying a paper roll, which is strong and durable and efficient in operation, and which is well adapted for the purposes described.

With the above and other objects in view, the invention consists of the improved paper roll shaft and its parts and combinations as set forth in the claims.

In the accompanying drawing in which the same reference characters indicate the same parts in all of the views:

Fig. 1 is a longitudinal sectional view of the improved paper roll shaft shown mounted in the frame portion of a package wrapping machine and having a paper roll applied thereto, a fragmentary portion of the latter being shown in section;

Fig. 2 is a cross sectional view taken on line 2—2 of Fig. 1 and on a larger scale;

Fig. 3 is a cross sectional view taken on line 3—3 of Fig. 1 and on a larger scale; and

Fig. 4 is a cross sectional view taken on line 4—4 of Fig. 1 and on a larger scale and with other portions broken away and in section to show structural details.

Referring now more particularly to the drawing, it will appear that a portion of the frame of a package wrapping machine or the like is indicated by the numeral 8, said machine portion having a transverse bore 9 in which the end portion of an inner shaft member or core 10 has a force fit so that in the mounted condition, the inner shaft member 10 remains stationary.

A portion of the stationary shaft 10 extending from an intermediate point toward the machine frame 8 is surrounded by a sleeve 11 which is free to rotate on the center shaft 10. At its outer end the sleeve 11 is enlarged and flanged to form a cup 11' whose open end abuts a face of the machine frame 8. Lodged within the cup 11' and surrounding the center shaft 10 are segment shaped brake shoes 12. Each brake shoe is formed with an internal radially directed cylindrical recess 13 which houses in its lower end a plunger 14 having a tapered or conical inner end portion 14'. The upper end portion of each plunger 14 resiliently engages a confined coiled spring 15 and each spring 15 has its other end impinging against the shoulder formed at the outer end of its bore 13. Thus, outward movement of a plunger 14 will apply, through the spring 15, yielding outward pressure on the engaged brake shoe 12 to frictionally contact the same with an inner surface portion of the cup 11' of the sleeve 11.

As will be apparent, the brake shoes 12 are intended to be adjusted in respect to their yielding frictional engagement with the cup 11' in a manner so as to exert a desired restraint or braking action on the rotation of the sleeve 11 and parts carried thereby. The supported end of the center shaft 10 has an axial bore 16, a portion of which is threaded and which is engaged by a threaded adjusting screw 17 whose projecting outer end portion is enlarged and knurled, as at 18, for manual manipulation. The shank of the adjusting screw 17, inwardly of its threaded portion, is reduced and its extremity is tapered or conical, as at 19. The tapered surface 19 of the adjusting screw 17 is in adjustable contact with the tapered extremities 14' of all of the brake shoe plungers 14. Thus, when the adjusting screw 17 is turned inwardly, its tapered extremity 19 will ride on the tapered extremities 14' of the plungers 14 to project the plungers outwardly and thereby cause the brake shoes 12 to apply greater frictional restraint on the cup 11' of the sleeve 11. When the adjusting screw 17 is turned in the opposite direction or outwardly, its contact with the tapered ends of the plungers 14 is such that the springs 15 are permitted to urge the plungers inwardly to relieve outward pressure on the brake shoes and to thereby reduce the frictional restraint imposed by the brake shoes.

The sleeve 11 is rotatably held in its assembled relation on the center shaft 10 and against axial separation by an end disc 20 of greater diameter than the center shaft which is secured to the inner end of the center shaft by a screw 21. Peripheral portions of the disc 20 impinge against the inner end of the sleeve 11.

An elongated outer tubular member 22 forms the outer or enclosing shell of the assembly. The outer tubular member 22 has a force fit with the sleeve 11 so as to form therewith a unit which will rotate on the center shaft 10.

Intermediate its ends and commencing inwardly of the inner end of the sleeve 11, the outer tubular member is provided with elongated spaced apart slots 23. In each of said slots there is radially adjustably positioned a core clamping bar 24. Each bar 24 has its opposite extremities outwardly inclined, as at 24'. Within the bore of the outer tubular member 22 and spaced apart a distance less than the length of a clamping bar 24 are a pair of slidable supporting discs 25. The diameter of the discs are slightly less than the internal diameter of the outer tubular member 22, and each disc is provided with a central bore threaded to engage the threaded shank portions 26 and 26' of an elongated axial screw rod 27. Peripheral portions of the supporting discs 25 are formed with spaced apart tapered slots 28 to slidably receive the tapered extremities 24' of the clamping bars 24. The clamping bars 24 are yieldingly held in their assembled relationship relative to the supporting discs 25 and are yieldingly joined together by circularly arranged coiled springs 29 which encircle the axial screw rod 27 and pass through apertures 30 therefor in the clamping bars.

The outer or free end of the tubular member 22 is closed by a head 31 secured thereto and formed with an axial bore 33 through which the outer end of the screw rod 27 revolubly extends. A portion of the screw rod 27, adjacent the inner face of the head 31, has affixed thereto a collar 34. Abutting the outer end of the head 31 and secured to an extended portion of the screw rod 27 is a knurled operating handle 35.

As has been mentioned, the improved shaft is adapted for mounting in a frame portion of a package wrapping machine and is designed to replaceably carry rolls of wrapping material or paper which usually comprises a central tubular core 36 with a supply of paper or wrapping material 37 wound thereon. It is intended that the paper 37 be unwound from the core 36 in web formation to pass into the wrapping machine for severance into desired lengths wherein it is wrapped about packages advancing through the machine. The internal diameter of the paper roll core 36 is slightly greater than the external diameter of the outer tubular member 22 of the shaft assembly to permit axial movement of the paper roll relative to the shaft for positioning the roll on the shaft and for removal and replacement purposes.

In the present improvements, as distinguished from conventional practices, the shaft assembly is supported in the machine frame at only one end of the shaft, thereby leaving the opposite end of the shaft formed with the handle 35 entirely free and accessible. Hence, it will be obvious that a paper roll may be slid onto the shaft into proper functioning position from the free end of the shaft and without any manipulation or disengagement of any portion of the shaft relative to its mounting in the machine frame. Prior to removing an empty paper roll core from the shaft assembly or prior to inserting a fresh paper roll on the shaft, the clamping bars 24 should be retracted so as to be in non-protruding positions relative to the outer surface of the tubular member 22. This is accomplished by turning the handle 35 in a direction so that the supporting discs or travelling nuts 25 will be moved away from each other and in directions toward the ends of the tubular member 22. Such movement of the disc 25 through the screw shaft 27 retracts the clamping bars 24 as the same are then permitted, because of their inclined ends 24', to ride downwardly in the inclined slots 28 of the disc 25. Obviously, retraction of the clamping bars 24 a sufficient distance will then release the paper roll core 26 to permit its axial movement along the shaft assembly and its removal therefrom, this movement being toward the right in Fig. 1. The empty paper roll core is replaced by a fresh roll of paper in a reverse manner, and when the new roll of paper is in position on the shaft assembly, the handle 35 is turned in a direction to operate the screw rod 27 so as to draw the supporting discs 25 toward each other. Such action, in conjunction with the inclined surfaces 24' and 28, will cause outward radial projection of the clamping bars 24, and when said bars are projected sufficiently far beyond the outer surface of the tubular member 22, their outer edges will impinge against inner surface portions of the core 36 to clamp it in position and to hold it to the revoluble sleeve portions of the shaft assembly. In a package wrapping machine with a web of paper extended from the roll, power is applied to the web to unroll it as desired from the shaft assembly. In the present improvements the center shaft member 10 is held stationary, but the sleeve members 11 and 22, with the roll being clamped to the latter, are free to turn. As previously mentioned, it is desirable that the freedom of revoluble movement of the shaft sleeve be regulatable and to that end the brake shoes 12, previously described, may be adjusted, to vary as desired the frictional

restraint placed on the revoluble portions of the shaft assembly.

The adjustment of the shaft brake, as well as the manipulation and adjustment of the paper roll core clamping bars, is accomplished manually through the accessible handles 18 and 35, both of which are readily manipulatable with the shaft in its mounted position and carrying a paper roll. The mounting of the improved paper roll shaft is extremely simple and a minimum of connections are required as between the shaft and the frame of a machine. Stoppage of a package wrapping machine equipped with the improved paper roll shaft is minimized as to time because of the facility with which paper roll replacements may be made, and such replacements are easily made without disturbing the mounting of the shaft relative to the machine frame. The improved paper roll shaft is furthermore of simple and inexpensive construction, is easily manipulated, and is well adapted for the purposes set forth.

What is claimed as the invention is:

1. A shaft construction, comprising an inner core, a sleeve and tube unit revolubly surrounding a portion of said core, said core extending axially beyond one end of the sleeve and tube unit for anchorage in a supporting frame, a brake interposed between portions of the core and sleeve and tube unit and housed by the latter, and manually operable expansible means associated with another internal portion of the sleeve and tube unit for releasable engagement with a material roll carried by the sleeve and tube unit, said sleeve and tube unit providing the housing and support for both the brake and the expansible means.

2. A shaft construction, comprising an inner core, a sleeve and tube unit revolubly surrounding a portion of said core, said core extending axially beyond one end of the sleeve and tube unit for anchorage in a supporting frame, brake shoes interposed between portions of the core and sleeve and tube unit and housed by the latter, manually actuated brake adjusting means mounted in the core and engaging the brake shoes and extending externally of the core, expansibe means housed within another portion of the sleeve and tube unit for releasable engagement with a material roll carried by the sleeve and tube unit, and a manual operating member extending axially of the sleeve and tube unit for controlling said expansible means.

3. In combination, a supporting frame, a stud shaft having one end fixedly mounted in said frame and extending laterally thereof, a sleeve and tube unit revolubly mounted on the extended portion of said stud shaft and projecting therebeyond, the outer end of the sleeve and tube unit being free and a portion of the sleeve and tube unit surrounding the stud shaft being formed with a cupped enlargement, brake shoes within said cupped enlargement, means yieldingly anchoring the brake shoes to the stud shaft, manually operable means extending axially into the stud shaft and engageable with said shoe anchoring means for varying the frictional engagement between the shoes and said cupped enlargement, the outwardly extended portion of the sleeve and tube unit having spaced longitudinal slots therein, clamping bars movably engaging said slots, means within the sleeve and tube unit yieldingly connecting said bars, shiftable discs within said sleeve supporting said bars, contacting portions of the bars and discs being formed with cooperating cam surfaces, and an operating rod disposed axially within said sleeve and tube unit and in screw threaded engagement with said discs, the rod extending beyond the free end of the sleeve and tube unit and turning movement of the rod being effective to shift the discs and project or retract the clamping bars in their slots and relative to the outer surface of the sleeve and tube unit for clamping or releasing a material roll mounted on the sleeve and tube unit, said sleeve and tube unit forming a closing housing for the major portion of the stud shaft, the brake shoes, the brake shoe operating means, the clamping bars, the shiftable discs, and the operating rod.

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