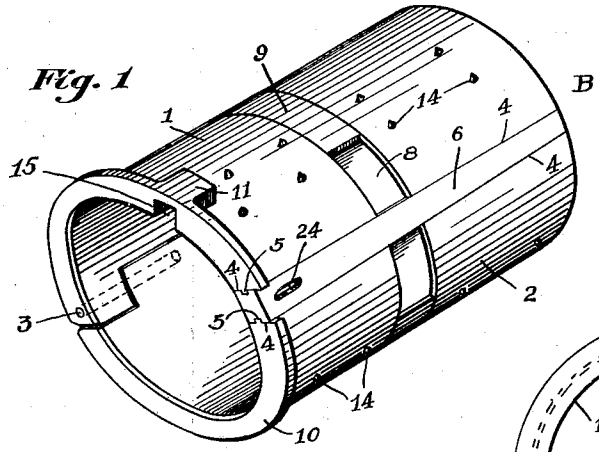
May 17, 1932. J. A. TAYLOR 1,858,753

EXPANSIBLE BUSHING FOR WINDING CORES

Filed April 27, 1931

Fig. 1



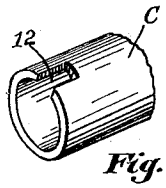


Fig. 8

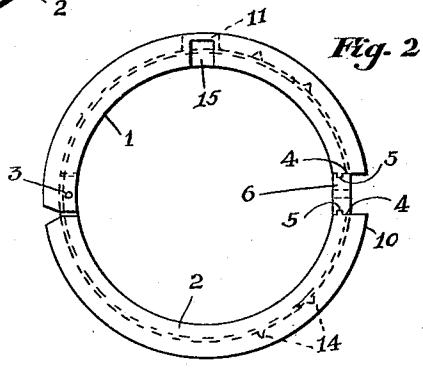


Fig. 2

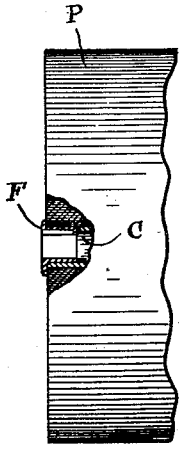


Fig. 7

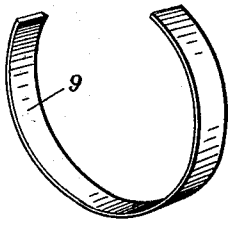


Fig. 5

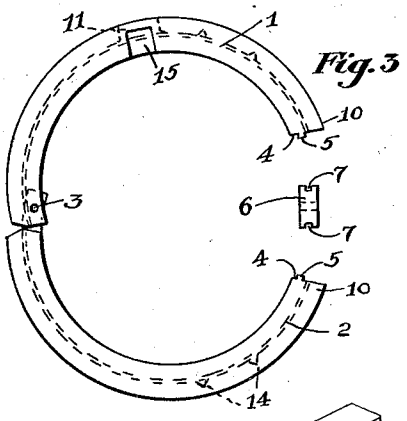


Fig. 3

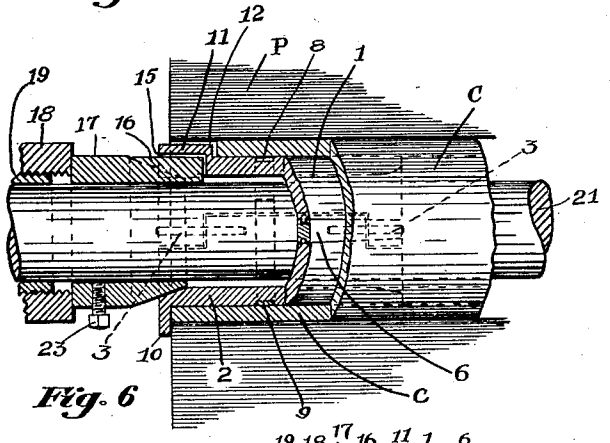


Fig. 6

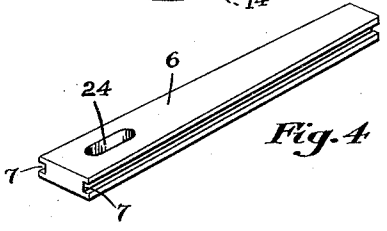


Fig. 4

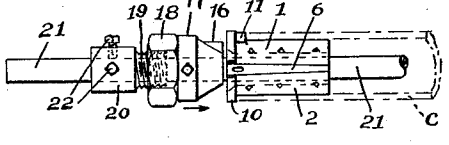


Fig. 9

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Patented May 17, 1932 1,858,753

UNITED STATES PATENT OFFICE

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EXPANSIBLE BUSHING FOR WINDING CORES

Application filed April 27, 1931. Serial No. 533,205.

The invention hereinafter to be described relates, in general terms, to the implements employed in handling the cores upon which a web of paper is wound at the paper manufacturing plant and from which it is unwound at the printing establishment, as for instance, during the process of printing a newspaper, or performing other continuous printing operations.

When the large rolls of paper leave the paper mill the web is wound on a core usually made in the form of a closely rolled, stiff paper tube with metal reenforcements on each end. These metal elements are non-detachable two-wall ferrules and include in their structure means for interlocking with chuck members fixed on the shaft supporting the roll of paper.

Due to the cost of constructing cores in this manner it has been the usual practice to return the cores to the paper mill after the depletion of the paper on the rolls, incident to its use in printing operations at the printing establishment.

But the expense involved in re-shipping these cores, including the matter of inventories to be kept, freight and trucking charges to be paid, together with other incidental expenses makes this item of overhead amount, in the course of a year, to a considerable sum.

One of the principal objects of the present invention is to eliminate this item of overhead expense and to accomplish this I have conceived of a method and devised the structural equipment to put it into practical use, whereby the repeated use of the same core becomes unnecessary.

In my improved construction the core element is a plain, quite inexpensive paper tube without reenforcements of any kind. Within each end of the core, when ready to mount on the shaft, is inserted my two-part bushing made, preferably, of a cast metal to insure strength and rigidity. The two halves are hinged, longitudinally, and opposite the hinged portion the longitudinal edges of the sections taper slightly and engage, respectively, the sides of a tapered wedge, means being provided to interlock these edges so that displacement of the wedge from the bushing, radially, is impossible. The function of the wedge is to increase or decrease the outside circumference of the bushing when moved longitudinally of the bushing, either inwardly or outwardly along its radially secured position interjacent the edges of the two sections.

Supplementing this frictional hold of the bushing on the inside surface of the core I provide a positive lock between the two members, a keyed portion on the bushing engaging a key slot on the core providing a double safeguard against relative rotatable movement between the core and the bushing.

On the inside of the bushing a key slot operating in association with a key on the shaft chuck joins the core and bushing to the supporting shaft so that they all revolve together when the paper is being wound or unwound.

After a full roll of paper has been wound on the core at the paper mill the bushings are removed from the core and replaced by a cheap metal ferrule at each end. These ferrules remain in the core while the roll of paper is being transported and until the paper is about to be unwound in the printing establishment.

They are then taken from the core, and bushings similar to those used at the paper mill substituted, the shaft with the chuck equipment mounted thereon inserted in the bushings after proper adjustments in the latter have been made, and the roll of paper is now ready to be unwound.

It will be understood that a duplicate set of the bushings are retained at the paper mill so that interchange of these between mill and printing establishment is not required. Each core, after the paper in the roll has been depleted in the printing operation, is discarded—as well also as are the ferrules, the cores being used as fuel or otherwise disposed of and the ferrules junked.

The original cost of the core and ferrules is considerably less than the expense entailed in making return shipment of the cores—as is required in the conventional method of handling the core proposition.

The character of the invention may best be understood by reference to the description found in the following specification when taken in connection with the accompanying drawings disclosing an embodiment thereof which, at the present time, I consider preferable to other possible forms in which the invention might be carried out.

In the drawings—

Fig. 1 is a perspective view of my expansible, two-section bushing, fully assembled;

Fig. 2 is an end view of the same, showing the two sections joined to the wedge;

Fig. 3 is the same as Fig. 2 but with the sections shown swung apart;

Fig. 4 is a view, in perspective, of the taper wedge;

Fig. 5 is a view, in perspective, of the binding spring;

Fig. 6 is a fragmentary view, partly in section, of the core, bushing, and chuck equipment, a portion of a roll of paper being shown wound on the core;

Fig. 7 shows one end of a roll of paper with the core-protecting ferrule employed to protect the core while the roll of paper is in transit;

Fig. 8 shows the key slot in one end of the core, and

Fig. 9 shows a complete assembly of the core supporting and retaining elements mounted on the shaft.

Similar reference characters are employed to identify like parts in all views of the drawings.

Referring to Fig. 7 of the drawings, P represents in fragmentary form a roll of paper wound on the core C at the paper manufacturing plant; F is a steel stamping made in the form of a ferrule and inserted in each end of the core before shipment of the paper is made. Its object is to protect the core end and prevent its being deformed or flattened while being handled during shipment from the mill, as any appreciable amount of change from the circular shape of the core would seriously handicap the operation of inserting the bushings when the paper reached the printing plant. Steel is best adapted for this purpose as wood is too susceptible to change of form with change in atmospherical conditions.

In Fig. 1 I illustrate my jointed bushing, identified in its entirety by the character B.

The bushing comprises in its structure two hinged sections, 1 and 2, the hinge being shown at 3, 3. On the side opposite the hinge the sections have tapering edges 4, 4, the taper being longitudinally of the bushing. On these edges are projecting tongues 5, 5, respectively.

Interposed between the edges 4 of the sections is a wedge 6, tapered to correspond to the taper on the contiguous edges of the sections, and in this wedge are longitudinal grooves 7 adapted, respectively, to engage the tongues 5, 5.

In a circumferential groove 8 operates a flat, arcuate spring 9 acting normally to hold the two sections in contact with the wedge when the bushing is not in active service, thus keeping the parts intact. Its length is considerably more than one-half the circumferential measurement of the groove in order that it may be retained on the circle.

When the bushing is in place in the core a lateral flange 10 abuts on the end of the latter and extending inwardly from this flange is a built up portion constituting a key 11 adapted to engage a key slot 12 in the end of the core C. This arrangement acts to positively lock the bushing against rotary movement in the core, and, taken in conjunction with the frictional engagement of the sections with the wall of the core preventing their collapse, provides a double surety against slipping of one member on the other. I may also elect to provide pointed projections 14 on the outside surface of the sections to guard against the tendency of one part to slip on the other—the projections embedding themselves in the wall of the core.

On the inside of section 1 of the bushing is a key-slot 15 in which is positioned the key 16 on the tapered face of the chuck 17. This chuck is a permanent mill and press room fixture and operates in conjunction with the thrust nut 18 which has screw-threaded engagement with the sleeve 19 on the shaft collar 20, the latter being secured to the shaft 21 by the set screws 22.

Rotating the nut 18 forces the chuck's tapered face into the bushing parts and brings the whole core assembly into concentric relation with the shaft. A set screw 23 locks the chuck, after proper longitudinal adjustment has been completed, against rotation on the shaft. It will be understood that there is a duplicate set of the elements just described on the opposite end of the core.

Fig. 9 illustrates a complete assembly of the core-supporting and securing elements, the chuck in this instance being shown slightly withdrawn from the bushing.

To withdraw the bushing from the core, after being tightly bound therein, it is first necessary to retract the wedge 6 from its seat in the bushing. When the shaft is removed from the assembled parts a bar with upturned ends is employed, one end being inserted in the oblong slot 24 in the wedge and the other end lightly struck with blows from a hammer made in a direction tending to withdraw the wedge from the bushing. After the wedge has become slightly loosened it is easily taken out and the removal thereafter of the bushing accomplished without difficulty.

As has previously been stated, the primary object of my present invention is to eliminate overhead costs attached to the present method of handling the core proposition.

By the use of my two-section, expansible bushing it is possible to employ a simple core the cost of which is so small that it may more profitably be thrown away than returned to the paper making plant to be re-wound with a new supply of paper.

There are, however, embodied in my invention other advantages which I believe will be found superior and of practical merit and in advance of the conventional apparatus now quite generally employed for the purpose of securing and supporting the cores in paper-winding and un-winding operations.

What I claim and desire to secure by Letters Patent is:

1. An expansible bushing for a paper winding core comprising a two-part tubular member, a longitudinal hinge pivotally connecting said parts, a key-slot in the end of said core, and means whereby, simultaneously, said bushing may be both frictionally and positively secured in said core.

2. A device of the character described adapted for use in a paper winding core comprising a two-part, longitudinally divided, tubular member, a hinge on one side of said member pivotally joining the two parts thereof, two longitudinally tapering, relatively spaced edges on the side opposite said hinge, a tapering wedge disposed interjacent the said tapering edges and adapted when moved toward the narrower end of said space to cause said tubular member to expand, and means on said tapering edges adapted to hold said wedge against radial displacement from said member.

3. An expansible bushing adapted to support the end of a paper winding core having an open key slot at its end, comprising a two-part, centrally and longitudinally divided cylindrical member insertable in said core, a longitudinal hinge pivotally connecting the two parts at two of its adjacent edges, a tapering wedge operable between the other two, opposite, adjacent edges of said member, adapted when moved in one direction along said edges to expand the two said parts and cause them to be frictionally bound to said core, means to facilitate the retraction of said wedge from the position in which it is fully expanding said member, and a key on the outside of said member adapted to engage the key-slot in said core to positively hold said member against rotation in said core.

4. In a device of the character described the combination of a plain, tubular paper core, an open key-slot cut through its wall at the end of said core, a two-part tubular bushing split longitudinally thereof and adapted to be inserted in said core, a hinge on one side of said bushing pivotally connecting its two parts, two edges on said bushing opposite said hinge, relatively spaced and converging toward the inner end of said bushing, a tapered wedge disposed in the space interjacent the two said edges and operable, when moved forwardly or backwardly along said edges, to increase or decrease, respectively, the circumferential measurement of said bushing, means to prevent radial displacement of said wedge from said bushing, and a key at one end and on the outside of said bushing adapted to engage the key-slot in said core to positively hold said core and said bushing against rotatable movement, relatively.

5. An expansible bushing for a paper core having a key-slot in the end thereof, comprising a two-part tubular member, a hinge on one side of said member joining the two parts, longitudinally tapering edges on the two parts opposite the hinged side of said member, a tongue projecting from each of said edges, a tapering wedge, having a groove in each side, longitudinally slidable between said edges, said tongues adapted, respectively, to engage said grooves, a key on the outside and at one end of said member engaging the key-slot in said core, positively preventing rotative movement between said core and said member, a circumferential groove in said member, and a spring element disposed in said groove for the purpose of yieldingly holding the said edges in contiguous relation to the respective sides of said tapering wedge.

6. In a device of the character described adapted for use in a paper winding core comprising in combination with a shaft chuck having a key thereon, an open key-slot in the end of said core, a two-section tubular bushing insertable in said core, a longitudinal hinge on the two adjacent edges of the two sections on one side of said bushing, a tapering wedge disposed interjacent the two opposite edges of said sections, said wedge, when moved longitudinally of said edges, being adapted to increase or decrease the circumferential measurement of said bushing, a key on the outside and at one end of said bushing adapted to engage the key-slot in said core, an open key-slot on the inside and at one end of said bushing in which said key in said shaft chuck may seat to positively lock said chuck and said bushing against rotation, relatively, and a flange on the outer end of said bushing engaging the end of said core.

In testimony whereof I affix my signature.

JAMES A. TAYLOR.