March 21, 1967 L. H. EWING 3,310,252

EXPANSION CHUCK

Filed Aug. 22, 1966

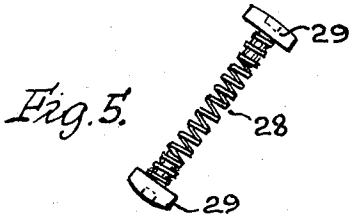


Fig. 5.

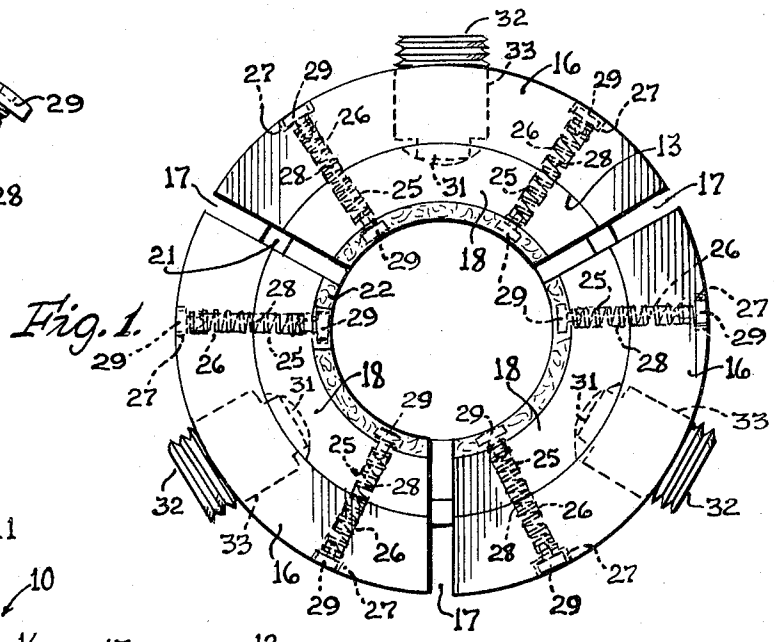


Fig. 1.

Fig. 2.

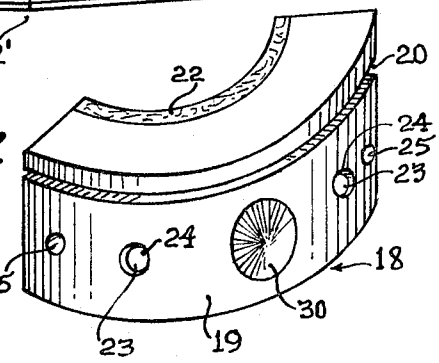


Fig. 3.

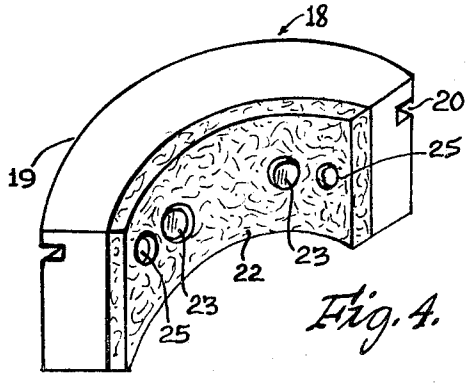


Fig. 4.

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EXPANSION CHUCK

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10 Claims. (Cl. 242—68.2)

My invention relates to a new and useful improvement in an expansion chuck and more particularly to a holding chuck for use in rotatably connecting a hollow core paper roll to a supporting shaft.

A principal object of my invention is to provide in a device of this character a structural means for rotatably securing a roll of paper to a supporting shaft by removably securing the device of this invention to the hollow core of the paper roll and to the supporting shaft.

Another object of my invention is to provide in a device of this character a means for radially expanding portions of the chuck sleeve into binding contact with the inner diameter of a hollow paper roll core, whether it be made from a fibre or metallic material, while at the same time creating a binding engagement between the device of the invention and the rotatable supporting shaft.

Yet another object of my invention is in the provision in a device of this character of a means including a plurality of arcuate members carried by the collar of the expansion chuck which cooperate together to embrace and secure the chuck to a rotatable supporting shaft, and which means includes a friction liner for preventing axial slippage between the chuck and the rotating supporting shaft.

Other objects will appear hereinafter.

The invention consists in the novel combination and arrangement of parts to be hereinafter described and claimed.

The invention will be best understood by reference to the accompanying drawings showing the preferred form of construction, and in which:

FIG. 1 is an end view of my expansion chuck showing in dotted lines the cooperating parts thereof;

FIG. 2 is a side elevational view of my expansion chuck,

FIG. 3 is a perspective side view of one of the securing elements as employed in my expansion chuck;

FIG. 4 is a perspective view similar to FIG. 3 but showing the reverse side of such securing element; and

FIG. 5 is a plan view of the yieldable connecting means used to connect the securing means to the expansion chuck.

The present invention is directed to the accomplishment of the above stated objects, and, as such, my expansion chuck is exemplified by the drawings which show but a single unit. It is to be understood that in each mounting of a paper roll on a rotatable supporting shaft, there is employed a pair of chucks, and as each chuck is identical in structure and function, I have but shown and will describe only one.

The chuck **10** has a body which comprises an enlarged cylindrical shaped collar **11** having laterally extending from one side thereof an elongated hollow sleeve **12**. As seen in FIG. 2, the longitudinal length of the sleeve **12** is tapered in an opposite direction from a mid-point **12'**. The collar **11** has an inner bore **13** of a size greater than the inner bore of the elongated sleeve which inner bore of such sleeve **12**, is of a size that will slidably receive a rotatable paper roll supporting shaft, not shown.

The sleeve **12** is divided into equal sections by slots **14** extending inwardly from the free end **15** of such sleeve **12** in the direction of the collar **11**, as seen in FIG. 2.

The collar **11**, as well as a portion of the sleeve **12**, is divided into equal sectors **16** by slots **17** which extend through the entire collar **11** and partially through the length of the sleeve **12**, as seen in FIG. 2. Adapted to be carried by the inner periphery of each of the sectors **16** of the collar **11** is a locking member **18**. Each of these members is arcuate to correspond to the inner diameter of the collar **11**. Each member **18**, therefore, provides a curved surface **19** which will normally engage in facial abutment a sector of the inner peripheral wall of the collar **11**. The grooved surface **19** of each of the members **18** has formed therein a groove **20** which is adapted to receive a portion of a split O ring **21**, which is adapted to be carried by a corresponding groove formed in the confronting peripheral wall of the collar **11**.

Each of the members **18** has mounted on its inner face a friction liner **22** which may be in the form of a brake lining felt material or the like. This friction liner is connected to each of the members by suitable rivets **23** which extend through suitable apertures **24** formed through the body of each of the members **18**.

Each of the members **18** adjacent the opposite ends thereof has formed therein apertures **25**. These apertures **25** are adapted to be placed in alignment with like apertures **26** formed through each of the sectors **16** of the collar **11**. The outer peripheral face of each of the sectors **16** of the collar **11** is provided with a countersunk bore **27** surrounding the aperture **26**, as seen in FIGS. 1 and 2.

A coil spring **28** is positioned in the aligned apertures **25** and **26** of each of the members **18** and collar **11** as shown in dotted lines in FIG. 1. Threaded into each end of the coil spring **28** is a machine bolt **29** with the enlarged head of each of the bolts being seated in the countersunk bore **27** formed in the collar **11**.

By the foregoing arrangement, it is apparent that each of the members **18** is yieldably connected to a sector **16** of the collar **11**. The arcuate surface **19** of each of the members **18** is provided intermediate the ends thereof with a recess **30**. The inner end **31** of an Allen screw **32** is adapted to be projected into each of these recesses **30** as such screw **32** is threaded through suitable threaded openings **33** formed through each sector **16** of the collar **11**, as shown in FIGS. 1 and 2.

In use the chuck **10** is connected to the hollow core of the paper roll by having the free tapered end of sleeve **12** projected into the corresponding end of a core. The chuck **10** is then positioned on a rotatable supporting shaft with such shaft extending through the sleeve **12** as well as the collar **11**.

The Allen screws **32** are successively threaded into their respective threaded openings **33** so as to forcibly bear the locking member **18** on to the supporting shaft. The threadable pressure created through the screws **32** will cause the sectors **16** of the collar **11**, as well as the sections of the sleeve **12** which are defined by the slots **17**, to expand radially away from the shaft and into binding engagement with the inner peripheral surface of the hollow core of the paper roll.

The friction liner **22** will prevent axial slippage of the chuck relative to the rotating supporting shaft. The split O ring **21** prevents axial displacement of each of the locking members **18** relative to the supporting shaft while the yieldable connection created by the coil spring **28** between each of the locking members **18** and its respective sector **16** of the collar **11** will prevent radial displacement of such locking members **18** from the inner periphery of the collar **11**.

The cylinder surface of the sleeve **12** may be serrated longitudinally to provide a more positive gripping surface

between the sleeve 12 and the hollow core of the paper roll when such hollow core is constructed of a fibre material or the like. When a metallic hollow core is used on the paper roll, I provide a locking pin connection between the chuck and such metallic core. Such locking pin mechanism includes a metal pin 34 insertable into the outer face of the collar 11 at a point of junction between the sleeve 12 and such collar 11 with the pins 34 extending in parallel confronting relation with such sleeve 12, as shown in FIG. 2.

In the drawings I show one of such pins 34 and as such they accomplish the desired object. These pins are adapted to project into a suitable notch formed in the exposed end of the paper roll core so as to further provide a connection between the chuck 10 and such core that functions to prevent axial slippage between the chuck 10 and such core.

The angular relation of the Allen screws 32 as well as the arcuate formation of the locking members 18 permits a positive connection between the chuck 10 and the supporting shaft as well as creating a sufficient expansion of the sections of the sleeve 12 so as to secure the chuck to the hollow core of the paper roll.

While I have illustrated and described the preferred form of construction for carrying my invention into effect, this is capable of variation and modification without departing from the spirit of the invention. I, therefore, do not wish to be limited to the precise details of construction and modification as come within the scope of the appended claims.

Having thus described my invention, what I claim as new and desire to protect by Letters Patent is:

1. A chuck for securing the hollow core of a paper roll onto a rotatable supporting shaft comprising

(a) a cylindrically shaped body journaled upon the rotatable supporting shaft,

(b) said body including an enlarged collar the center bore of which has a diameter greater than the diameter of the supporting shaft,

(c) a hollow elongated sleeve extending laterally from one side of said collar,

(d) said sleeve having an inner diameter of a size that freely receives the supporting shaft and an outer diameter that is freely insertable into the hollow core of the paper roll,

(e) means dividing said collar and a portion of said sleeve into radially expansible sections,

(f) clamping means within the center bore of said collar engageable with the supporting shaft for connecting said chuck to the shaft for rotation therewith,

(g) means for movably connecting said clamping means within the center bore of said collar whereby said clamping means are movable radially about the supporting shaft into and out of clamping engagement therewith, and

(h) means for radially expanding said collar and sleeve sections about the supporting shaft and into binding contact with the hollow core of the paper roll and for moving said clamping means into clamping engagement with the supporting shaft.

2. A chuck for securing the hollow core of a paper roll onto a rotatable shaft as defined by claim 1 wherein said means for radially expanding said collar and sleeve sections about said shaft include screw members threadable through said collar and into contact with said clamping means for moving the same into clamping engagement with the supporting shaft and for radially expanding said collar and sleeve sections about the supporting shaft and into binding contact within the hollow core of the paper roll.

3. A chuck for securing the hollow core of a paper roll onto a rotatable supporting shaft as defined by claim 1 wherein said clamping means includes a frictional liner for frictionally engaging the rotatable supporting shaft so as to prevent axial slippage therebetween when said frictional liner is moved into clamping engagement by said means for radially expanding said collar and sleeve sections.

4. A chuck for securing the hollow core of a paper roll onto a rotatable supporting shaft as defined by claim 2 wherein said clamping means includes a frictional liner for engaging the rotatable shaft so as to prevent axial slippage therebetween when said frictional liner is moved into clamping engagement by said screw members.

5. A chuck for securing the hollow core of a paper roll onto a rotatable supporting shaft as defined by claim 1 wherein the chuck body has elongated slots formed through said collar and partially through the elongated length of said sleeve for dividing said collar and a portion of said sleeve into radially expansible sections.

6. A chuck for securing the hollow core of a paper roll onto a rotatable supporting shaft as defined by claim 5 wherein said means for radially expanding said collar and sleeve sections about the supporting shaft includes screw members threadable through said collar and into contact with said clamping means for moving the same into clamping engagement with the supporting shaft and for radially extending said collar and sleeve sections about the supporting shaft and into binding contact within the hollow core of the paper roll.

7. A chuck for securing the hollow core of a paper roll onto a rotatable supporting shaft as defined by claim 6 wherein said clamping means includes a frictional liner for frictionally engaging the rotatable supporting shaft so as to prevent axial slippage therebetween when said frictional liner is moved into clamping engagement by said screw members.

8. A chuck for securing the hollow core of a paper roll onto a rotatable supporting shaft as defined by claim 1 wherein said means for movably connecting said clamping means within the center bore of said collar includes a split O ring carried by the inner peripheral edge of said collar and engageable in a groove formed in a confronting face of said clamping means carried within said center bore of said collar for preventing axial displacement of said clamping means from said collar, and a yieldable connection between said collar and said clamping means for preventing radial separation of one from the other.

9. A chuck for securing the hollow core of a paper roll onto a rotatable supporting shaft as defined by claim 8 wherein said means for radially expanding said collar and sleeve sections includes screw members threadable through said collar and into contact with said clamping means for moving the same into clamping engagement with the supporting shaft and for radially expanding said collar and sleeve sections about the supporting shaft and into binding contact within the hollow core of the paper roll.

10. A chuck for securing the hollow core of a paper roll onto a rotatable supporting shaft as defined by claim 8 wherein said clamping means includes a frictional liner for frictionally engaging the rotatable supporting shaft so as to prevent axial slippage therebetween when said clamping means is moved into clamping engagement by said means for radially expanding said collar and sleeve sections.

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