Jan. 16, 1940. A. POTDEVIN 2,187,138

COLLAPSIBLE SHAFT

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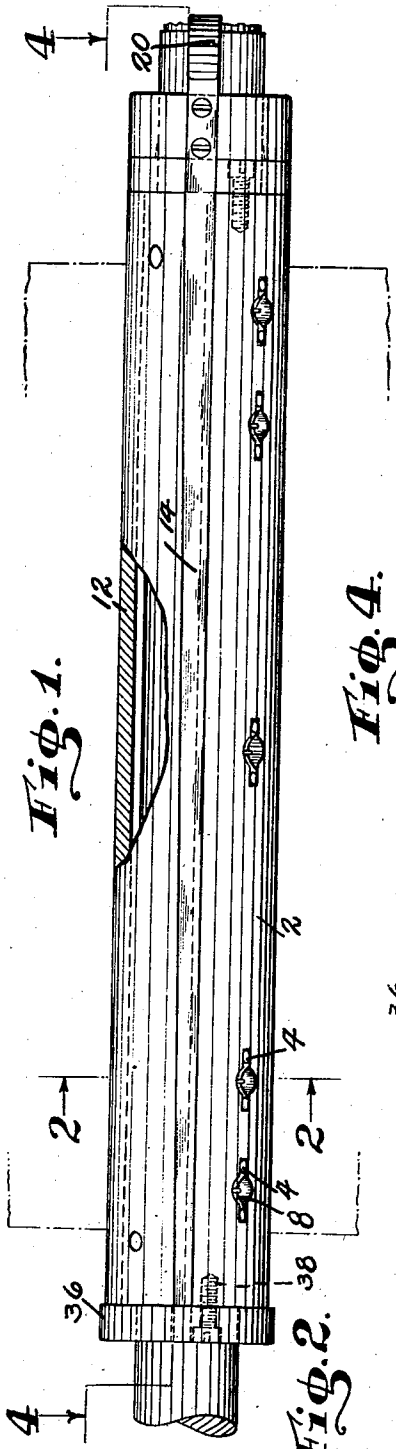


Fig. 1.

Fig. 2.

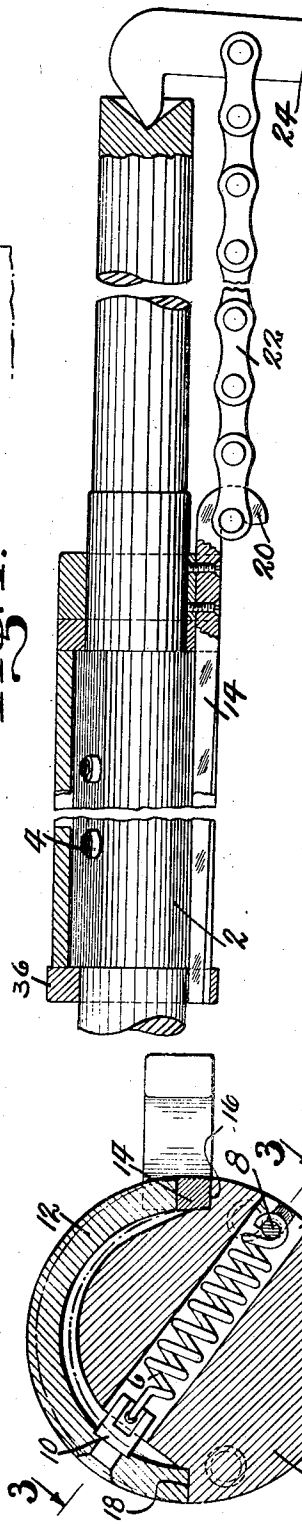


Fig. 4.

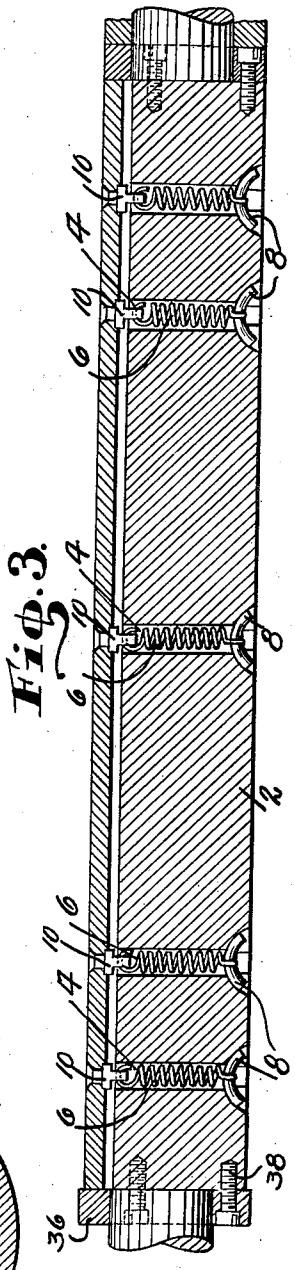


Fig. 3.

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COLLAPSIBLE SHAFT

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3 Claims. (Cl. 242—72)

This invention relates to improvements in collapsible shafts and is particularly directed to shafts upon which webs of paper and the like are wound and which are collapsible to reduce the diameter thereof when it is desired to remove the material therefrom.

One of the objects of my invention is the provision of a collapsible shaft which approaches a solid shaft in that the minimum of material is removed from the shaft periphery so that the maximum original strength and stiffness of the shaft is retained.

It is a further object of the present invention to provide a shaft of the character indicated wherein the shaft when expanded is circular in cross section to provide a smooth outer surface.

Another object of the invention resides in the novel manner of expanding a collapsible shaft.

Other objects of the present invention will be manifest from the following description and the accompanying drawing, in which drawing:

Fig. 1 is a plan view of my improved shaft;

Fig. 2 is a cross sectional view on line 2—2 of Fig. 1;

Fig. 3 is a view taken on line 3—3 of Fig. 2; and

Fig. 4 is a view taken substantially on line 4—4 of Fig. 1, and showing the means for collapsing the shaft in elevation.

Referring to the drawing in detail: 2 designates the body portion of the shaft, or one section of the shaft, which is provided with a series of transverse bores 4 in each of which is a coil spring 6 anchored at one end to the shaft section 2 by curved pins or loops 8 located in the concaved opening or counter-sunk portion of the bores 4. The other end of each spring is secured to a stud 10 anchored in an arcuate plate or shell 12 constituting another section of the shaft.

Intermediate the longitudinal sections 2 and 12 I provide an expanding member or wedge 14. This wedge, as will be seen from the drawing, is tapered longitudinally of the shaft and extends from end to end thereof. The wedge 14 is flush with the surface of the shaft and lies between a shoulder 16 formed on the shaft section 2 and extending the full length of the shaft and one edge of the curved expanding shaft section 12. The other edge of the shaft section 12, as will be seen from Fig. 3, rests on a corresponding shoulder 18 diametrically opposite the shoulder 16.

As will be seen from Fig. 3 the springs 6 tend to hold the curved shaft section 12 in place on the shoulder 18 and on the wedge 14 at all times.

The wedge 14 at its outer end is provided with a hooked portion 20 for the temporary attachment of a chain 22. The other end of this chain is attached to a lever 24 intermediate the ends thereof, the nose of this lever engaging the end of the shaft section 2 or an extension thereof. This chain and lever constitute a handy tool for retracting the wedge 14.

The shaft section 2 is provided at one end with a collar 36 held in place by means of screws 38 or in any other suitable manner. The end of the wedge passes under this collar.

When it is desired to wind a web of material the shaft is expanded by moving the wedge 14 forward to the position shown in Fig. 1 and Fig. 2. With the wedge in this position the shaft is circular in cross-section.

After the material is wound on the shaft the same may be removed by simply retracting the wedge with the chain and lever tool to permit the shaft to collapse under the action of the springs 6.

It is to be understood that various changes and modifications may be made in the structure herein illustrated and described without departing from the spirit and scope of my invention.

What I claim is:

1. In a collapsible shaft the combination of a pair of longitudinal sections, one of which is fixed, shoulders formed on said fixed section, the other end movable section lying intermediate said shoulders, a wedge between said movable section and fixed section, said wedge being slidable to move said movable section outwardly to vary the outside diameter of the assembly, said fixed section being provided with a plurality of bores, springs in said bores having one end anchored to the fixed section and the other end anchored to said movable section whereby to maintain said movable section in collapsed position when said wedge is withdrawn.

2. In a collapsible shaft the combination of a main shaft section having a plurality of transverse bores formed therein, shoulders formed on the exterior of said section, a movable shaft section between said shoulders, springs in said bores each having one end connected to said main shaft section and the other end connected to said movable shaft section, a wedge between said sections, said springs maintaining said shaft sections in engagement with said wedge, and means for withdrawing said wedge to permit said springs to contract in their respective bores to draw said movable section toward the main shaft section in collapsing the shaft.

3. A substantially solid collapsible shaft comprising in combination a solid fixed main shaft

section having a portion of its periphery removed to provide a pair of opposed shoulders, an arcuate section overlying said fixed section between said shoulders, a slidable wedge shaped member intermediate said arcuate section and one of said shoulders, the movement of said wedge-shaped member longitudinally of the shaft in one direction expanding said shaft to circular cross section, means for withdrawing said wedge shaped member, means for collapsing said arcuate section on said main section upon the withdrawal of said wedge member, and a ring surrounding the end of both shaft sections and the small end of said wedge, whereby the surface of the shaft is smooth with the wedge in retracted and extended position.

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