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R. E. TORREGROSSA ET AL
COLLAPSIBLE PAPER REWINDING SHAFT

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2 SHEETS—SHEET 1

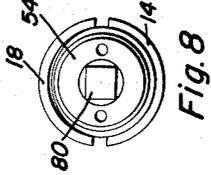
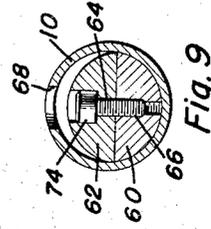
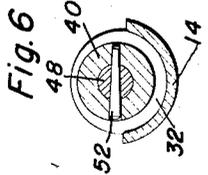
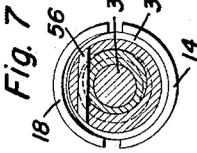
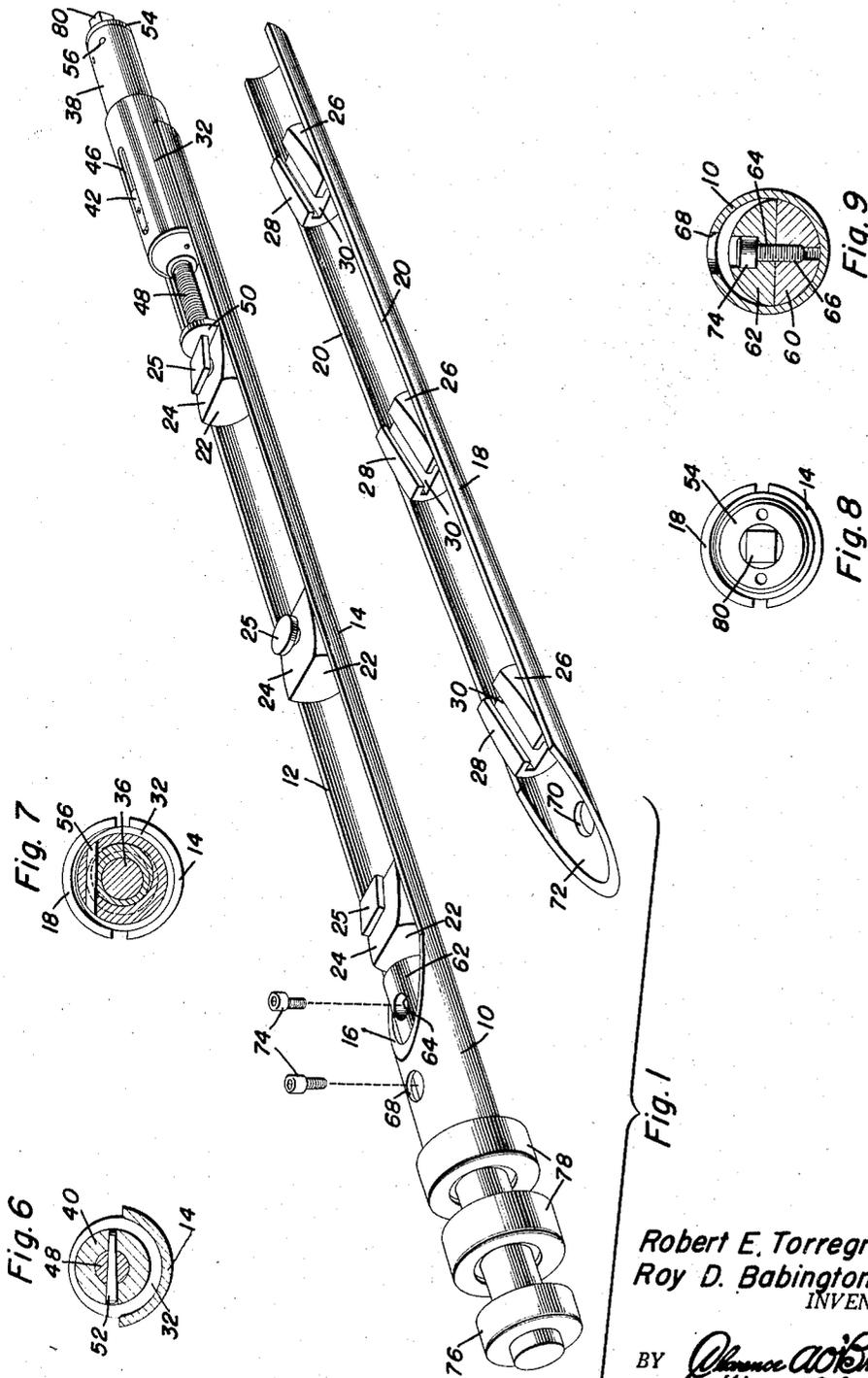


Fig. 1

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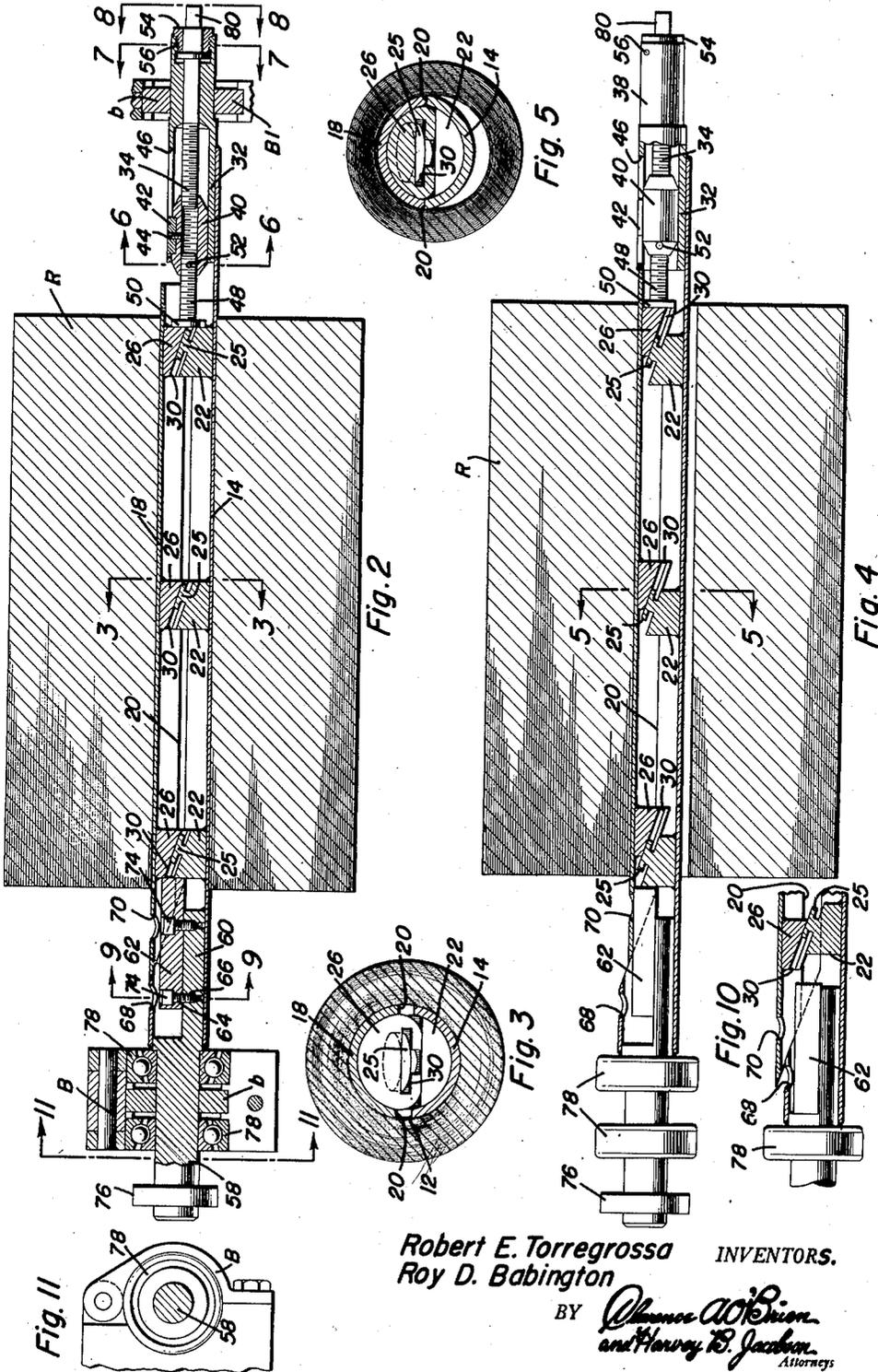
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2 SHEETS—SHEET 2



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UNITED STATES PATENT OFFICE

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COLLAPSIBLE PAPER REWINDING SHAFT

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6 Claims. (Cl. 242-72)

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This invention relates to new and useful improvements in sectional shafts and the primary object of the present invention is to provide a shaft such as disclosed in our pending application Serial No. 139,976, filed January 23, 1950, now abandoned, composed of two sections which are adjustable laterally of each other to vary the diameter of the shaft whereby the same may be readily removed from a roll of paper in a convenient manner.

Another important object of the present invention is to provide a paper rewinder shaft composed of two elongated concavo-convex shaft forming sections and means slidably securing the sections together and laterally moving the sections apart and parallel as the sections are adjusted longitudinally of each other.

A further object of the present invention is to provide a collapsible paper rewinder shaft of the aforementioned character including a means at one end of one section that is manually actuated with the shaft within the center of a roll of paper to adjust the sections longitudinally of each other.

A still further aim of the present invention is to provide a shaft as previously described that is simple and practical in construction, strong and reliable in use, efficient in operation, inexpensive to manufacture, and otherwise well adapted for the purposes for which the same is intended.

Other objects and advantages reside in the details of construction and operation as more fully hereinafter described and claimed, reference being had to the accompanying drawings forming part hereof, wherein like numerals refer to like parts throughout, and in which:

Figure 1 is a group perspective view of the present invention and showing one section removed and rotated 180° from the other section;

Figure 2 is a longitudinal vertical sectional view through present shaft and a roll of paper disposed about the shaft, and showing the sections expanded to engage the core or inner convolution of the roll of paper;

Figure 3 is an enlarged transverse vertical sectional view taken substantially on the plane of section line 3-3 of Figure 2;

Figure 4 is a view similar to Figure 2 but showing the sections of the shaft moved into engagement with each other for removal of or insertion of the shaft into a roll of paper;

Figure 5 is an enlarged transverse vertical sectional view taken substantially on the plane of section line 5-5 of Figure 4;

Figure 6 is an enlarged transverse vertical sectional view taken substantially on the plane of section line 6-6 of Figure 2;

Figure 7 is an enlarged transverse vertical sectional view taken substantially on the plane of section line 7-7 of Figure 2;

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Figure 8 is an enlarged end view taken substantially on the plane of section line 8-8 of Figure 2;

Figure 9 is an enlarged transverse vertical sectional view taken substantially on the plane of section line 9-9 of Figure 2;

Figure 10 is an enlarged fragmentary view of Figure 2 but showing the stop released to permit separation of the two sections; and

Figure 11 is a vertical sectional view taken on the plane of section line 11-11 of Figure 2.

Referring now to the drawings in detail, wherein for the purpose of illustration, there is disclosed a preferred embodiment of the present invention, the numeral 10 represents a tubular member having an elongated slot 12 that extends through one end of the member to form an elongated concavo-convex section 14. One end of the slot 12 is inclined outwardly to provide an inclined portion 15 for a purpose later to be described.

An elongated concavo-convex section 18 constitutes a part of the present shaft and is formed from the portion provided when the slot 12 is cut in the member 10. However, the longitudinal edges 20 of the section 18 are cut down and one end of the section 18 cut off to permit the section 18 to slide longitudinally in the slot 12.

A plurality of longitudinally spaced blocks 22 are suitably fixed to the concave surface of the section 14. Each of the blocks 22 is formed with an inclined surface 24 and the surfaces 24 lie in planes that are spaced parallel to each other. Headed lugs 25 are integrally formed with and project outwardly from the surfaces 24.

An additional group of longitudinally spaced blocks 26 are suitably fixed to the concave surface of the section 18. The blocks 26 are each formed with an inclined surface 28 complementary to the surfaces 24 of the blocks 22. The blocks 26 are also formed with inclined slots 30, that are T-shaped in cross-section, to slidably receive the headed lugs 25.

A sleeve 32 is fixed in one end of member 14 and receives the threaded portion 34 of a feed screw 36 whose cylindrical, smooth surfaced end is rotatably mounted in a bearing 38 integrally formed with the outer end of the sleeve 32.

The internally threaded bore of a traveling member or sleeve 40 that is slidably and non-rotatably mounted in the sleeve 32, receivably engages the portion 34. A guide lug 42 is secured in a recess in the member 40 by a screw 44 and the lug 42 is slidably received in a slot 46 in the sleeve 32 to prevent rotation of the member 40 in the sleeve 32.

The threaded shank 48 of a contact plate 50 is threaded in the inner end of the member 40. The shank 48 is locked to the member 40 by a removable fastener or cotter pin 52.

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An externally threaded head 54 is provided at the other end of the screw 36 and the head 54 is threaded in the outer internally threaded end of the bearing 38. A pin 56 removably secures the head 54 to the outer end of the bearing 38.

Means is provided for limiting the sliding movement of the section 18 longitudinally of the member 14. This means comprises a stub axle 58 having a segmental extension 60 that is fixed in the end of the member 18 remote from sleeve 32. The extension 60 slidably supports a slide or limiter 62 having a pair of threaded recesses 64 for registering with recesses 66 in the extension 60.

One of the recesses 64 is adapted to register with an aperture 68 in the member 18 whereas the other of the recesses 64 is adapted to register with an aperture 70 in the beveled end 72 of the section 18. Fasteners 74 are threaded in the recesses 66 and the apertures 68 to secure the limiter 62 to the extension 60.

A collar 76 is suitably secured about the axle 58 for receiving a tool or puller whereby the shaft may be withdrawn from the center of a roll of paper R. A pair of thrust bearings 78 are mounted on the axle 58 to hold the shaft while it is rotating in a rewinder.

In practical use of the present invention pillar blocks B and B1 provided with bronze bearings b are applied to the ends of the collapsible shaft with the bearings 78 positioned relative to block B as shown in Figure 2 to restrict axial shifting of the collapsible shaft.

The blocks B and B1 are slidably received in vertical slots provided in uprights so that the shaft 10, 14, 16 may be raised and lowered while remaining horizontal.

The shaft is lowered between two relative large rolls of paper to be frictionally driven by the power means rotating the roller with the exposed edge of paper on one roll placed about and tucked under the shaft so that as the shaft is rotated paper will wind on the shaft, it being understood that the sections 14 and 18 are first adjusted to the position shown in Figures 2 and 3.

As the paper winds on the shaft the same will move upwardly until the desired length of paper has been wound thereon. Then, the section 18 is adjusted to the position shown in Figures 4 and 5 to permit removal of the shaft from the paper.

It should be noted that the head 54 is adjusted by a wrench or the like applied to the multi-sided end 80 of the head 54. As the head 54 is threaded into the member 38, the plate 50 will engage the block 26 at one end of section 18 to move the section 18 longitudinally of the section 14 until the leftmost of the blocks 26 engages the limiter at which time the shaft will appear as shown in Figures 2 and 3.

Since the surfaces 24 and 28 slidably engage each other during longitudinal adjustment of the section 18 relative to section 14, the section 18 will move laterally from section 14 while remaining parallel to section 14. The pin 56 is inserted to prevent rotation of the bolt 36 after the adjustment has been made.

As long as limiter 62 is secured to extension 60 by fasteners 74, the section 18 cannot be adjusted to disengage the headed lugs 25 since the

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block 26 closest the limiter 62 will abut the limiter before end 72 can slide past slot portion 16.

Having described the invention, what is claimed as new is:

1. A collapsible shaft comprising a tubular member having an elongated slot, a plurality of blocks fixed in said member in registry with said slot, an elongated concavo-convex section adapted to oppose the slot in said member, a plurality of blocks fixed to the concave surface of said section, the blocks fixed to said member having inclined guide surfaces and the blocks fixed to said section also having inclined guide surfaces complementary to the guide surfaces of the first named blocks, interconnecting means between the first named blocks and the second named blocks, means for adjusting the section longitudinally of the member with the blocks fixed to the section slidably engaging the blocks fixed to the member to adjust the section laterally of but parallel to the member, and means detachably securing the section to the member.

2. The combination of claim 1, wherein said interconnecting means includes a plurality of headed lugs fixed to said first named blocks, said blocks secured to said section having key slots therein slidably receiving said lugs.

3. The combination of claim 1, wherein said adjusting means includes an internally threaded sleeve slidably secured to one end of the member, a contact rod carried by the sleeve, and a feed screw rotatably carried by the member and threaded in the sleeve.

4. A collapsible shaft comprising a pair of elongated concavo-convex sections, means slidably connecting the sections and maintaining the sections parallel and laterally spaced from each other during longitudinal adjustment of one section relative to the other section, and means securing the sections together and spaced parallel to each other, said means slidably connecting the sections including a first group of longitudinally spaced blocks fixed to one of the sections, each block of said first group having an inclined surface, and a second group of longitudinally spaced blocks secured to the other section, each block of said second group having an inclined surface complementary to and slidably engaging the inclined surfaces of said first group of blocks.

5. The combination of claim 4 and a slidable connection between each block of said first group and each block of the second group.

6. The combination of claim 5, wherein said slidable connection comprises a headed lug fixed to each of the first group of blocks, said second group of blocks having T-shaped slots slidably receiving said lugs.

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