

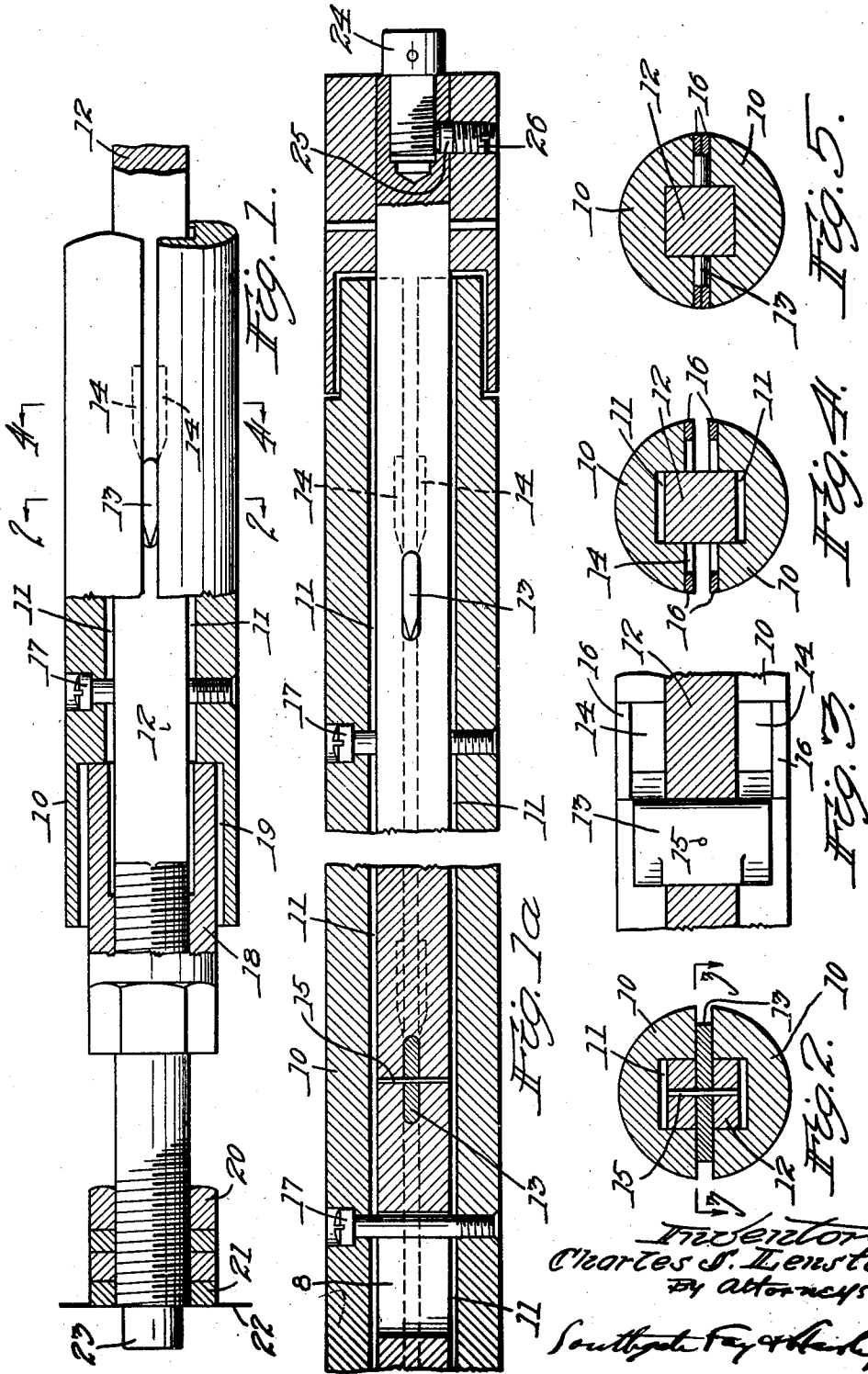
June 17, 1930.

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1,763,794

EXPANDING SHAFT FOR WINDING PAPER AND THE LIKE

Filed Nov. 26, 1926



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# UNITED STATES PATENT OFFICE

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## EXPANDING SHAFT FOR WINDING PAPER AND THE LIKE

Application filed November 26, 1926. Serial No. 150,863.

This invention relates to a shaft or mandrel of the expanding type for use in winding heavy rolls of paper, and particularly in those cases in which a plurality of rolls are wound on the same shaft at the same time and it is necessary to contract the shaft to get it out. It has been customary heretofore to make these shafts of light or sheet metal and they have not been heavy enough to stand up under the strain to which they are put.

One of the objects of this invention is to provide a construction which can be made of solid metal and to provide a simple expanding means therefor suitable for solid metal split shafts; also to provide a construction in which the shaft can be mounted in the machine frame in two different ways and to provide improvements in the means for holding the expanding wedges.

Other objects and advantages of the invention will appear hereinafter.

Reference is to be had to the accompanying drawings in which

Fig. 1 is a side view, partly in section, of one end of a split shaft constructed according to this invention;

Fig. 1<sup>a</sup> is a longitudinal sectional view of the other end of the shaft;

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

Fig. 3 is a longitudinal sectional view on the line 3—3 of Fig. 2; and

Figs. 4 and 5 are sectional views on the lines 4—4 of Fig. 1 showing the shaft expanded in Fig. 4 and contracted in Fig. 5.

The shaft involves two solid members 10 each consisting of substantially a semi-cylinder having longitudinal grooves 11 in their flat sides for receiving the pull bar 12. In the contracted position shown in Fig. 5 this pull bar fills the grooves 11 and allows the edges to come together. This pull bar is provided with wedges or expanding keys 13 located at intervals therealong and pointed at their forward ends. Normally the ends of these keys are located in recesses 14 in the two halves of the shaft. Each one of these keys is pinned to the pull bar by a cross pin 15 to hold it fixed with respect to it. When the pull bar is drawn back to the right with

its wedges in the recesses 14, the shaft is collapsed as shown in Fig. 5. When it is forced forwardly, the edges of the wedges come under the edges of the two halves of the shaft and force them apart as shown in the other figures. The edges of the two halves of the shaft are pieced out beyond the projections 14 by pieces 16 so as to make a smooth surface along this portion. These are shown as separate pieces but they can be made integral. The two halves are connected together by screws 17 which have their heads in countersunk recesses in one of the bars and their screw threaded portions extending into the other so that they guide the shaft parts to move in a transverse direction only. These screws pass through longitudinal passages 8 in the pull bar so that they permit of the relative motion of the pull bar with respect to the shaft.

At the ends, the pull bar is connected with bearing and supporting pieces. At the left end it is shown provided with a screw thread for receiving a sleeve nut 18 which sets into a recess 19 in the shaft 10 and screwing up against the shoulder formed by the bottom of the recess. Beyond this there is an adjusting nut 21 and a check nut 20 on the end of the screw-threaded part of the pull bar adapted to be screwed up against a flat surface 22 of a machine frame to hold this device between two such surfaces. The opposite end of the shaft is squared off for the same purpose.

This pull bar is also provided with a reduced projection or stud 23 adapted to enter a similar opening in the frame of the machine and with a stud at the other end having a head 24 constituting an end pivot for the same purpose. This stud at the other end is screw threaded for adjustment and is adapted to be held in its adjusted position by a brass plug 25 and a safety set screw 26 in an obvious manner.

The shaft is expanded by screwing up the sleeve nut 18 to draw the pull bar forward and the wedges or keys out of the recesses 14 and into the spaces between the adjacent edges of the two halves of the expanding shaft. There are several of these keys lo-

cated along the shaft as will appear and they constitute solid means engaging against solid surfaces for holding the shaft expanded. They can be pushed out positively to  
5 hold the two parts in their expanded position and there is nothing of a yielding nature in the whole construction, so that the device is rigid throughout, in spite of the fact that usually it is quite long. The keys  
10 are symmetrical and apply equal forces to the two halves of the mandrel. The two halves of the shaft are guided absolutely to be moved transversely in spite of the longitudinal motion of the keys and there is no danger of the  
15 parts binding on account of any play allowed in the construction. On account of the square ends above mentioned, and the two studs, the shaft is designed to be adjusted and lined up between two flat surfaces or in a pair of  
20 bearings as may be desired. It is a simple construction easily manufactured and of a thoroughly rigid character.

Although I have illustrated and described only a single form of the invention I am  
25 aware of the fact that modifications can be made therein by any person skilled in the art without departing from the scope of the invention as expressed in the claim.

Therefore, I do not wish to be limited to all the details of construction herein shown  
30 and described, but that I do claim is:—

In an expanding shaft, the combination with two halves and a pull bar located between them and having transverse keys  
35 thereon, the edges of the two halves having recesses for the keys, whereby the forcing of the keys out of the recesses will expand the shaft, of a nut screwed on the pull bar and engaging the two halves to move the pull bar  
40 longitudinally, said pull bar having studs at its ends for supporting it and having a nut and check nuts at one end for fitting it against a flat surface and a screw threaded plug  
45 at the other end providing means for longitudinal adjustment of the stud at that end.

In testimony whereof I have hereunto affixed my signature.

CHARLES S. LENSTON.

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