March 3, 1970 L. H. TINGLEY, JR 3,497,946

METHOD OF FORMING A BOLSTER CASE WITH A COLLAR MEMBER THEREON

Filed Nov. 8, 1967

Fig. 1.

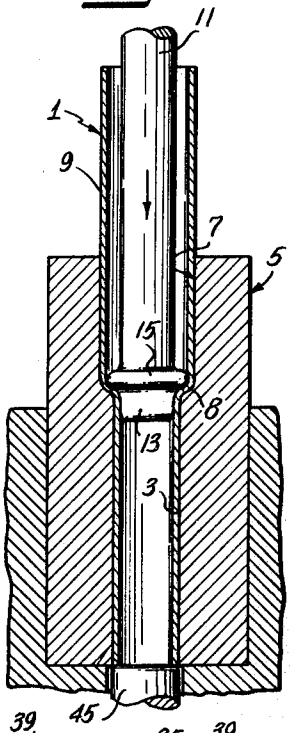


Fig. 2.

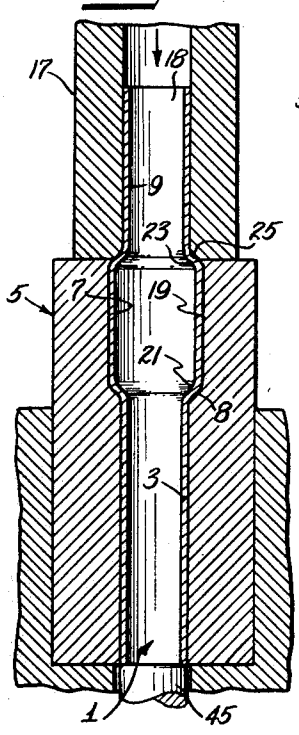
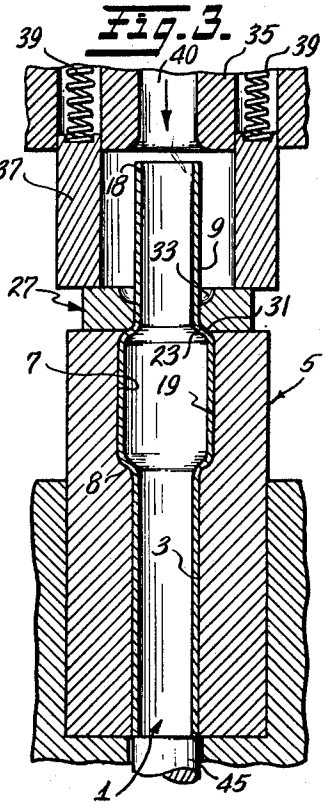


Fig. 3.



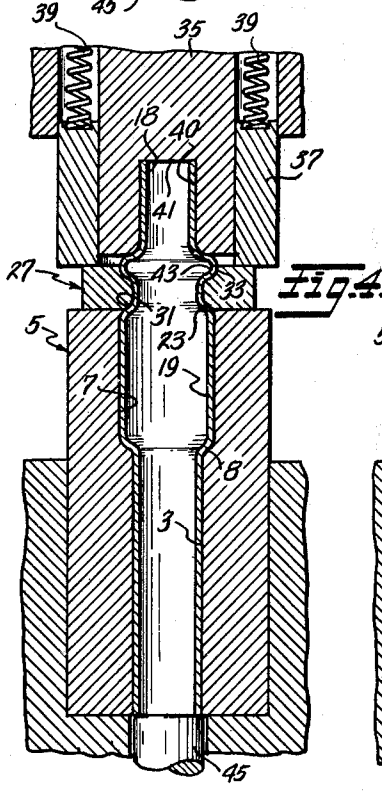
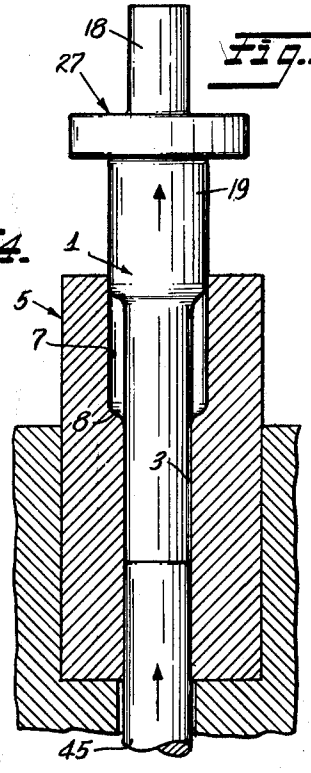


Fig. 4.

Fig. 5.



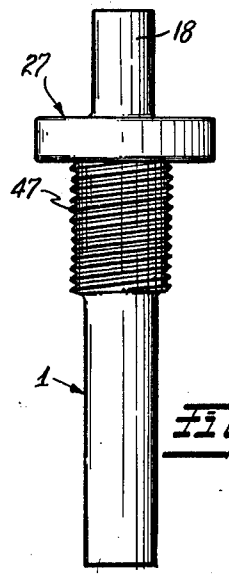


Fig. 6.

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METHOD OF FORMING A BOLSTER CASE WITH A COLLAR MEMBER THEREON

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U.S. Cl. 29—512 7 Claims

ABSTRACT OF THE DISCLOSURE

A machine element or the like, and a process for producing the same, wherein a tubular member is provided with a collar intermediate its ends and the collar is firmly engaged between an enlarged tubular portion formed at one side thereof and a bead formed at the other side.

This invention relates generally to a novel machine element of a type that may be used in the bolster assemblies of conventional textile spinning equipment, and to a novel process for producing the same. The invention has been developed with specific reference to the requirements of a bolster case for textile spinning or drawing equipment, where the extremely high speeds of operation and other demanding conditions of usage require a precision-formed element having a strong, sturdy, and rugged construction.

A primary object of the present invention is to provide a process for firmly fixing a collar or the like onto a tubular element whereby the final product is precisely dimensioned, rigidly interconnected and sturdy in construction, in the nature of an integral bolster case.

Another object is to provide a process for fixing a collar in position on a tubular element wherein the process is simple, quick and economical in operation, not requiring the skill and expense of welding, soldering or the like.

A further object is to provide a product of the appropriate general configuration, construction, and dimensions for specific application as the bolster case for conventional textile spinning equipment.

More specifically, it is an object of the present invention to provide a rigidly interconnected collar adapted to serve as the bolster flange on a bolster casing.

Other objects and advantages will be apparent from a study of the following specification, when considered in conjunction with the accompanying drawings, in which:

FIG. 1 is a side elevational view, largely in section, illustrating the first step of a process in accordance with the present invention;

FIG. 2 is a sectional view illustrating a second step of the process, as applied to the product shown in FIG. 1;

FIG. 3 is a sectional view illustrating a third step of the process, as applied in turn to the product shown in FIG. 1;

FIG. 4 is a sectional view showing a fourth step of the process, as applied in turn to the product shown in FIG. 1;

FIG. 5 is an elevational view illustrating the manner in which the product is removed from the apparatus after completion of the fourth step; and

FIG. 6 is an elevational view of the final product formed in accordance with the principles of this invention.

Referring now in more detail to the drawings, the product of this invention is preferably formed from conventional tubing of steel or the like, having the appropriate properties as to strength, hardness and so on. In the embodiment shown this tubing may be on the order of five and three-quarters inches in length with an outside diameter of 7/8 inch and an internal diameter of 11/16 inch. As shown in FIG. 1, the tubular member, generally indicated by the numeral **1**, is positioned in the bore **3** of a

conventional female die **5** having a corresponding internal diameter in the lower portion thereof. The upper portion **7** of the bore **3** is somewhat enlarged, providing an upwardly directed shoulder **8** that is preferably somewhat tapered in configuration. As shown in FIG. 1, the upper portion **9** of the tubular member **1** is enlarged by a male die member **11** introduced into the projecting upper end thereof. The male die member **11** may have a projecting pilot plug **13** at its lower end and is provided with a ball-type forming element **15** to enlarge the tube **1** by expanding its walls into conformity with the enlarged portion **7** of the die. This step may be accomplished by a single quick punching action.

When the die member **11** has been retracted, the tubing **1** and its associated female die **5** may be moved to another station for performance of the second step, as illustrated in FIG. 2. Here a conventional reducing die **17** is applied against the uppermost part **18** only of the expanded upper tubing portion **9**, i.e., that portion which projects above the upper extremity of the female die **5**. As a result, the uppermost portion **18** of the tubing, which had been expanded to an external diameter on the order of 15/16 inch, is reduced again to approximately its original diameter. This in turn leaves an enlarged portion **19** intermediate the ends of the tubing **1**, defined at its lower end by a first external annular shoulder **21** and at its upper end by a second external annular shoulder **23**. Preferably the open end of reducing die **17** is provided with an internal taper as shown at **25** to effect a corresponding taper in the shoulder **23**.

After the reducing die **17** has been retracted, the tubing **1** is provided with a collar **27** adapted to fit tightly about the reduced portion **18** and bear against shoulder **23**. As best shown in FIGS. 3 and 4, the collar **27** is provided with a taper **31** corresponding to the taper in shoulder **23** to thereby permit snug engagement therewith. It is also provided with an internal annular recess **33** for a purpose which will appear hereinafter.

As shown in FIG. 3 the tubing **1** carried in die **5** is brought into position beneath a beading punch **35**, and the collar **27** is engaged by a retaining ring **37** mounted concentrically on the punch **35**. Springs **39** serve to urge the retaining ring **37** into engagement with collar **27** to hold it firmly in position against the shoulder **23**.

At this point the beading punch **35** is actuated to move downwardly into closely surrounding relation with respect to the reduced upper portion **18** to thereby positively confine the same. Preferably the bore **40** of the beading punch is somewhat smaller in diameter than the portion **18** and serves to further reduce the cross-section of the latter. As the punch **35** is further lowered, the outer extremity of reduced portion **18** is engaged by the base **41** of the punch, and, with the wall of portion **18** confined along substantially its entire length, an external bead **43** is formed immediately below the punch **35**. As will be seen in FIG. 4, the bead **43** is at least in large part received in groove **33** of collar **27**. Again, a single punching operation is sufficient to, first, clamp the collar **27** in engagement and, secondly, form the bead **43**. Thus the collar **27** is rigidly and securely clamped in position on the tubular member **1** between the enlarged potion **19** and the bead **43**.

Subsequently the tubing **1** may be removed from the die **5**, as by actuation of an ejector **45** in the manner shown in FIG. 5. For the purpose of adapting it for mounting on a bolster rail, the enlarged portion **19** is next provided with screw threads **47** by any conventional means (not shown). Further fabrication may proceed in the conventional manner to adapt the fabricated bolster case for application in a bolster assembly.

It will be undestood that the single embodiment dis-

closed herein has been presented by way of illustration rather than limitation. Numerous modifications may be made without departing from the spirit of the invention or the scope of the annexed claims.

I claim:

1. A process for forming a bolster case or the like, comprising the steps of:

(a) expanding a portion of a tubular member at one end thereof to form a first external annular shoulder directed toward the opposite end thereof;

(b) reducing the outermost part only of said portion to leave an enlarged portion intermediate the ends of said tubular member and to provide a second external annular shoulder directed toward said one end;

(c) mounting a collar member on said outermost part of said tubing with one side of said collar engaging said second external annular shoulder; and

(d) forming an external bead on said outermost part in a position to engage the other side of said collar and to clamp said collar against said external annular shoulder.

2. The process of claim 1 wherein screw threads are subsequently formed on said enlarged portion.

3. The process of claim 1 wherein said bead is formed by confining the side walls of said outermost part outwardly of said collar and applying a force axially in the direction of said second external annular shoulder.

4. The process of claim 3 wherein said collar is firmly held in engagement with said second external annular shoulder while said bead is formed.

5. The process of claim 3 wherein said collar is fitted to snugly engage said outermost portion adjacent said second external annular shoulder and to thereby confine the same when said bead is formed.

6. The process of claim 5 wherein said bead is formed in an internal annular recess provided on said collar.

7. The process of claim 6 wherein said second external annular shoulder is tapered and a corresponding taper is provided on said collar.

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U.S. Cl. X.R.

29—523; 57—135; 285—382.5