

Nov. 20, 1923

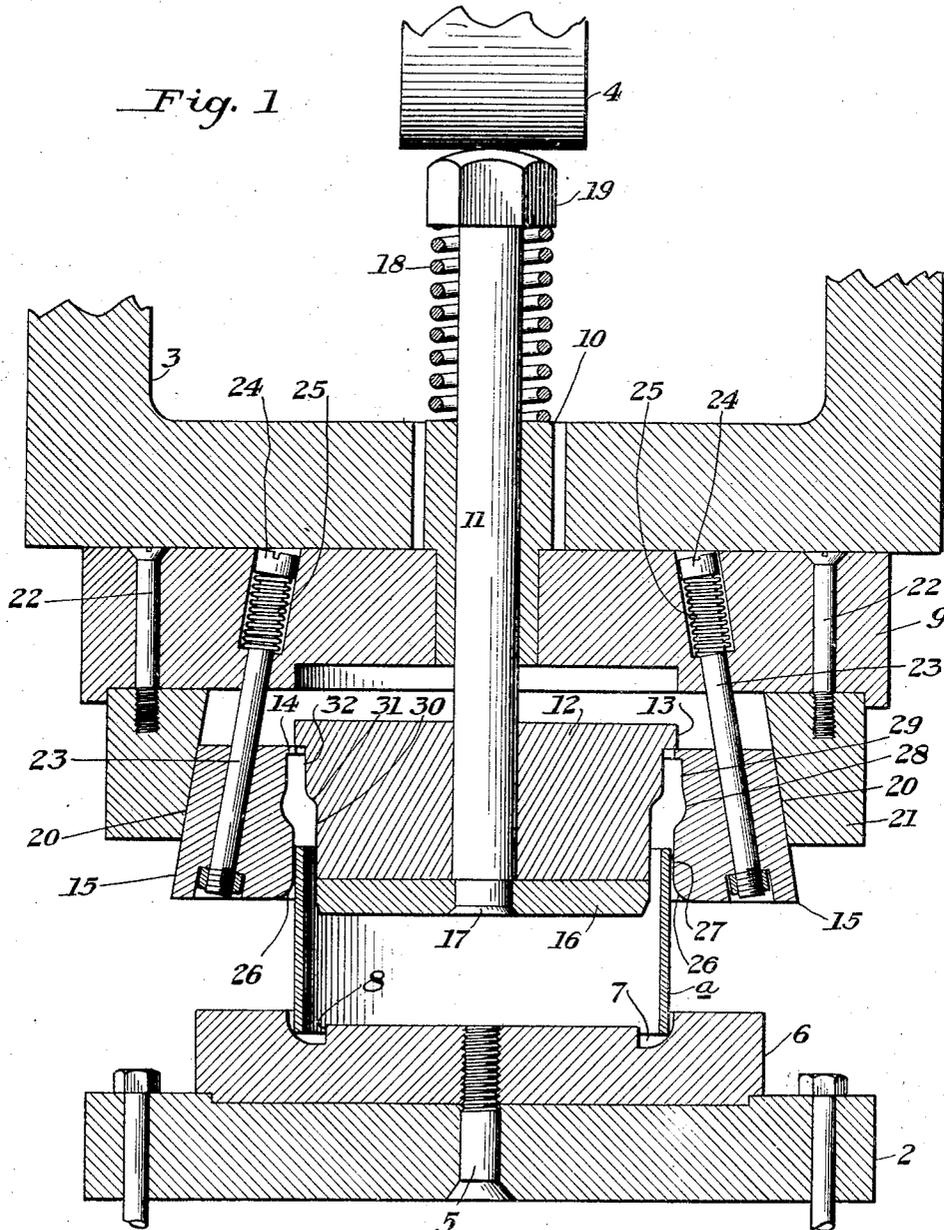
1,475,032

P. J. SHRUM ET AL

MECHANISM FOR MAKING THREAD PROTECTORS

Filed July 15, 1922

3 Sheets-Sheet 1



INVENTORS  
*Peter J. Shrum*  
*Harold A. Neuzen*  
by *C. M. Clarke*  
attorney



Nov. 20, 1923

1,475,032

P. J. SHRUM ET AL

MECHANISM FOR MAKING THREAD PROTECTORS

Filed July 15, 1922

3 Sheets-Sheet 3

Fig. 4

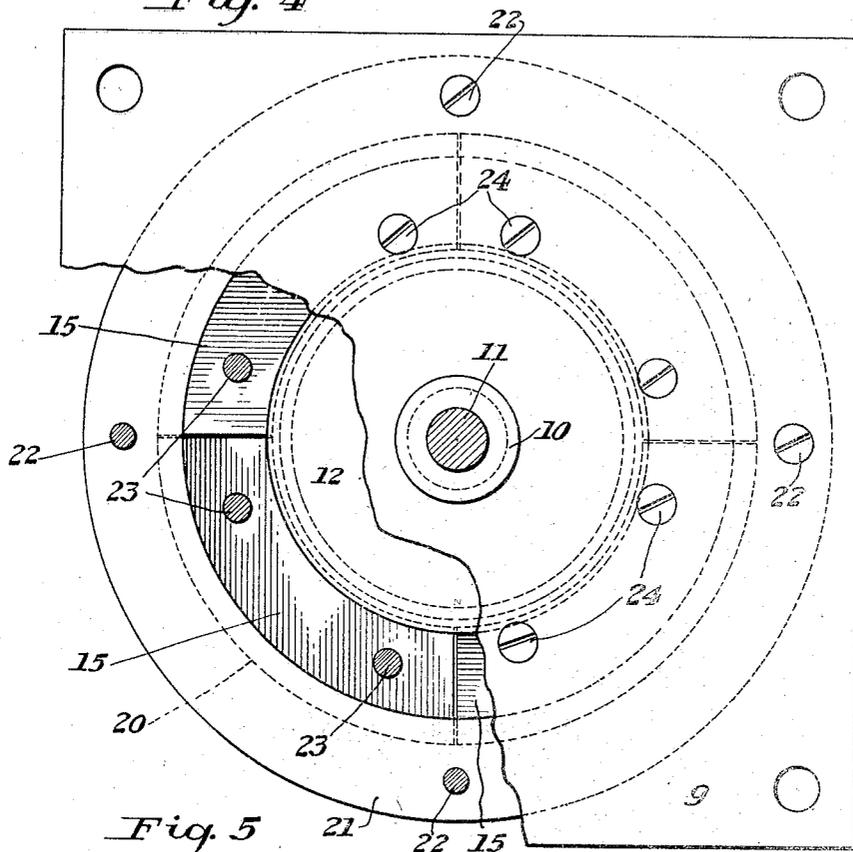
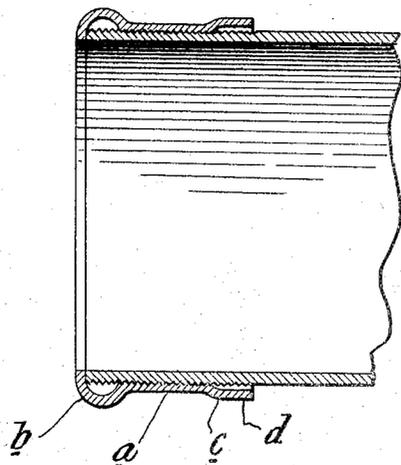


Fig. 5



INVENTORS.

Peter J. Shrum  
Harold A. Neuzen  
by O. M. Clark  
att'y

# UNITED STATES PATENT OFFICE.

PETER J. SHRUM, OF MONACA HEIGHTS, AND HAROLD A. HENIGEN, OF ROCHESTER, PENNSYLVANIA, ASSIGNORS TO COLONA MANUFACTURING COMPANY, OF PITTSBURGH, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

## MECHANISM FOR MAKING THREAD PROTECTORS.

Application filed July 15, 1922. Serial No. 575,167.

*To all whom it may concern:*

Be it known that we, PETER J. SHRUM and HAROLD A. HENIGEN, citizens of the United States, residing at Monaca Heights and Rochester, respectively, in the county of Beaver and State of Pennsylvania, have invented certain new and useful Improvements in Mechanism for Making Thread Protectors, of which the following is a specification.

Our invention consists of mechanism for making thread protectors or similar articles from cylindrical blanks or sections of metal tubing, utilizing pressing and forming dies. It has for its object to form the blank into shape, ready for threading, in one operation, and to discharge it for removal. The resulting blank is of generally cylindrical form, having a middle threaded body portion, an outwardly rounded inwardly deflected outer terminal, and an inner outwardly extended coping, as hereinafter described.

The device is formed from a section of tubing, either seamless or welded, by an upsetting and swaging operation, whereby to press the blank by its lower end against a bottom crimping die to turn its edge inwardly in rounded form, and then by lateral pressure to swage the middle portion inwardly, increasing the density of the thread engaging portion at the same time, slightly reducing it in diameter, and to outwardly flare or expand the other end, as hereinafter more fully described.

In the drawings,

Fig. 1 is a sectional view of the dies and portions of their operating mechanism, open, with the tubular blank in position;

Fig. 2 is a similar view with all of the dies in closed position at the bottom of the stroke;

Fig. 3 is a similar view showing the dies in position in ejecting the finished pressed article;

Fig. 4 is a plan view showing the arrangement of the upper outer forming dies;

Fig. 5 is a sectional view showing the finished protector in position on the end of a pipe.

The apparatus is adapted to be used in connection with a power press having a bottom block 2 and an upper vertically movable head 3 and a discharge cam or similar

device 4. Upon a block 2 is secured by screw or bolt 5, the stationary bottom die 6 having an annular groove 7 rounded inwardly toward an inner upwardly extending annular shoulder 8. The function of such die is to receive the lower end of the blank and to crimp it inwardly by downward pressure, forming the terminal limiting flange *b* of the protector.

The upper composite die consists of a rectangular plate 9 which is secured to the reciprocable head 3 of the press in any suitable way, as by bolts, and which is provided with a centrally inserted bushing or thimble bearing 10 for guiding the stem 11 of plunger die 12. The latter is normally held in retracted position up against the bottom of plate 9 by an upper lateral flange 13 seated in a central recess in plate 9 and extending over the upper inwardly extending edges 14 of the several laterally movable reciprocable side dies 15, hereinafter described.

Stem 11 extends down through die 12 and is in shouldered and riveted connection with the bottom ejecting die 16, as at 17. The latter die is circular and is normally held up against the bottom of circular die 12, with which it corresponds in diameter, by a spring 18 engaging underneath head 19 of stem 11, as in Fig. 1.

Side dies 15 are in quarter sections, forming when closed an outer ring concentric with center die 12, and providing the intervening annular space for the blank. They fit within the circular outwardly flaring continuous wedge face 20 of integral wedge ring 21, which is secured underneath plate 9 by bolts 22, as shown. Quarter section dies 15 are held upwardly against plate 9 by series of bolts 23, parallel with the wedge face 20 and having heads 24 bearing on cushioning springs 25 seated in receiving cavities in the upper portions of plate 9. By this mounting, the sectional dies 15 are capable of independent downward and outward movement around the upper portion of the blank, in lowering thereon, and of reacting movement for side swaging by the confining action of the wedge faces 20 of die 21 at the latter portion of the stroke.

The relatively movable quarter section dies 15 are rounded at their inner lower portions, as at 26, for the purpose of embracing

engagement with the upper edge portions of the blank *a*, in downward movement, and are provided with upwardly extending vertical and annular faces 27 extending to about the middle portion of the die. The face of the die is inwardly recessed, as at 28, providing an annular enlargement which merges into the terminal straight face 29, somewhat offset outwardly from the diametrical contour of lower faces 27.

The purpose of such construction of the inner faces of dies 15 is to provide ample clearance for the outwardly formed metal of the blank in passing between the center plunger die 12 and the outer relatively movable die sections 15, in downward movement of the composite dies over the blank *a*. The several sectional dies 15 are provided with the inwardly extending terminal edges or flanges 14 which, in the normal position of the dies, as in Fig. 1, provide terminating closures for the blank forming cavity, while at the same time, providing for supporting engagement with the upper flange 13 of plunger die 12.

Said die is of a diameter at its lower portion sufficiently less than that of the normal internal diameter of faces 27 to provide for the intervening space corresponding substantially to the thickness of blank *a*. For such purpose, the lower diametrical annular face 30 of die 12 extends forwardly to a point opposite to or slightly above the shouldered offset of faces 27, at which point the peripheral face of die 12 is laterally enlarged by means of an annular shoulder 31, upwardly beyond which the enlarged annular face 32 of the die extends to the flange 13.

By this construction and arrangement, a continuous intervening annular clearance space is provided, whereby to effect an outer enlarging swaging action on the upper portion of the blank in lowering the composite dies under pressure and the annular clearance cavity at 28 is slightly enlarged, as shown, so as to facilitate the swaging action in forming the blank *a* by downward pressure, assisted by the lateral movement of the sectional dies 15.

Thus, in operation, the blank *a* being inserted in the lower die 6, as shown, with its lower edges inserted in the annular rounded cavity 7, downward movement of plate 9, outer ring 21, and the series of sectional dies 15, together with the central plunger die 12, will come into embracing engagement with the upper portion of the blank, and as the series of dies descend, the sectional dies 15 will slightly expand by reason of the wedge faces 21, dies 15 traveling downwardly at a slightly greater speed than the normal lowering speed, and with corresponding lateral movement, as in the position shown in Fig. 3.

Such operation will continue until dies

15, in addition to ring 21, come into contact with the upper outer face of stationary lower die 6. At such point, flanges 14 will also have come into contact with the upper edge of the blank, and dies 15 being thus arrested, continued downward movement of ring 21 will operate to force dies 15 inwardly during the remainder of the stroke. In such position, sectional dies 15 will have been forced inwardly to their initial relative position, and faces 27 will have pressed the middle portion of the blank *a* inwardly against the annular face 30 of plunger die 12, faces 29 of the sectional dies at the same time pressing the upper portion of the blank inwardly against faces 32. At the same time, the shouldered portions of said coacting dies will have effected the formation of the shoulder *c* of the blank and its terminal laterally extending end *d*.

Thereupon, the blank having been formed into its desired shape, plate 9 is retracted by operation of the press through the crank, eccentric, or other element utilized, ring 21 at the same time rising, plunger die 12 being lifted simultaneously to the same degree. On the other hand, stem 11 is temporarily held in its lower position by action of cam 4, so that ejecting die 16 is temporarily held in its lowered position and by its peripheral edges engages the inwardly turned flange *b* of the formed blank. Such engagement continues during the full upward movement of the plate 9 and the outer dies to release the blank.

In their upward movement, sectional dies 15 are free to expand in the same manner as in lowering, so as to pass outwardly sufficiently far to provide for clearance of the enlarged upper portion *d*, as in Fig. 3. Thereafter, cam 4 having been released from its pressing action against the head 19 of stem 11, spring 18 will effect retraction thereof, raising ejecting die 16 and plunger die 12 to their normal position, ready for the next operation.

The finished blank having then been removed, the machine is ready for insertion of another blank, whereupon, the operation above described is repeated.

We claim as our invention:

1. Mechanism for making thread protectors comprising a pressing plunger and a block arranged in proper relation with each other for operation on a tubular blank, means on said plunger for applying a longitudinal pressure on the blank, and means on the plunger for applying radial pressure, and means for simultaneously crimping the end of the blank inwardly.

2. Mechanism for making thread protectors comprising a pressing plunger and a block arranged in proper relation with each other for cooperative engagement on a tubular blank, means on said plunger for ap-

plying a longitudinal pressure to the blank, and means on the plunger for applying a radial pressure to a part of the blank to decrease its diameter and upset the metal, and means for simultaneously crimping the end of the blank inwardly.

3. Mechanism for making thread protectors comprising a pressing plunger and a block arranged in proper relation with each other for cooperative engagement on a tubular blank, means on said plunger for applying a longitudinal pressure to the blank, means on the plunger for applying a radial pressure to a part of the blank intermediate its ends to decrease the diameter of such part and increase the thickness of the metal at that part, and means on the block for forming an annular bead adjacent the contracted intermediate part of the blank and for turning the end of the blank at which the bead is formed inwardly.

4. Mechanism for making thread protectors comprising a pressing plunger and a block arranged in proper relation with each other for cooperative engagement on a tubular blank, means on said plunger for applying a longitudinal pressure to the blank, means on the plunger for applying a radial pressure to a part of the blank intermediate the ends thereof to contract it, means on the plunger for forming an annular bead and a tubular extension at one side of said contracted intermediate part, and means on the block for forming a bead and an inwardly turned end at the other side of said contracted intermediate part of the blank.

5. Mechanism for making thread protectors comprising a pressing plunger and a block arranged in proper relation with each other for cooperative engagement on a tubular blank, means on said plunger for applying a longitudinal pressure to the blank, means on the plunger for applying a radial pressure to a part of the blank intermediate the ends thereof to contract it, means on the plunger for forming an annular bead and a tubular extension at one side of said contracted intermediate part, and means on the block for forming a bead and an inwardly turned end at the other side of said contracted intermediate part of the blank, said means on the plunger and block being arranged to effect all of said operations at a single reciprocation of the plunger.

6. Mechanism for forming thread protectors from a tubular blank comprising a block and a reciprocable plunger, said plunger comprising a main plate having a die member on its lower face adapted to be projected into a blank, laterally movable pressing members around said die and spaced therefrom and movable vertically relatively to the main plate, for applying lateral pressure to the blank, and means for effecting a

lateral movement of said laterally movable pressing members upon a relative movement between said members and said plate being effected.

7. Mechanism for forming thread protectors from a tubular blank comprising a block and a reciprocable plunger, said plunger comprising a main plate having a die member on its lower face adapted to be projected into a blank, laterally movable pressing members around said die and spaced therefrom and movable vertically relatively to the main plate for applying lateral pressure to the blank, means for effecting a lateral movement of said laterally movable pressing members upon a relative movement between said members and said plate being effected, and means on the plunger and block for subjecting a blank to endwise pressure during the same operation of the press that subjects the blank to lateral pressure.

8. Mechanism for forming thread protectors from tubular blanks comprising a block and a reciprocable plunger, said plunger comprising a main pressing plate, a die on the under surface thereof, movable vertically relatively to the pressing plate, laterally movable pressing members surrounding the die and having means thereon for moving said die vertically, said laterally movable pressing members being suspended from said plate in such manner as to be movable vertically relatively thereto, and cooperating means on said plate against which said laterally movable pressing members slide for effecting a lateral movement of said members upon relative vertical movement occurring between the plate and said laterally movable pressing members.

9. Mechanism for forming thread protectors from tubular blanks comprising a block on which the blanks may be supported, a composite plunger in cooperative relation with the block having a die adapted to be projected into a blank when one is on the block, laterally movable pressing members on the plunger for contracting the blank, means on the plunger for subjecting the blank to longitudinal pressure against the block, means on said block for causing the end of the blank to curl inwardly under such pressure, and an independently operated stripping member under said die for holding said blank on the block after the blank has been subjected to lateral and longitudinal pressures and while the die and lateral pressing means are being moved out of engagement with the blank.

In testimony whereof we hereunto affix our signatures.

PETER J. SHRUM.  
HAROLD A. HENIGEN.