

March 1, 1927.

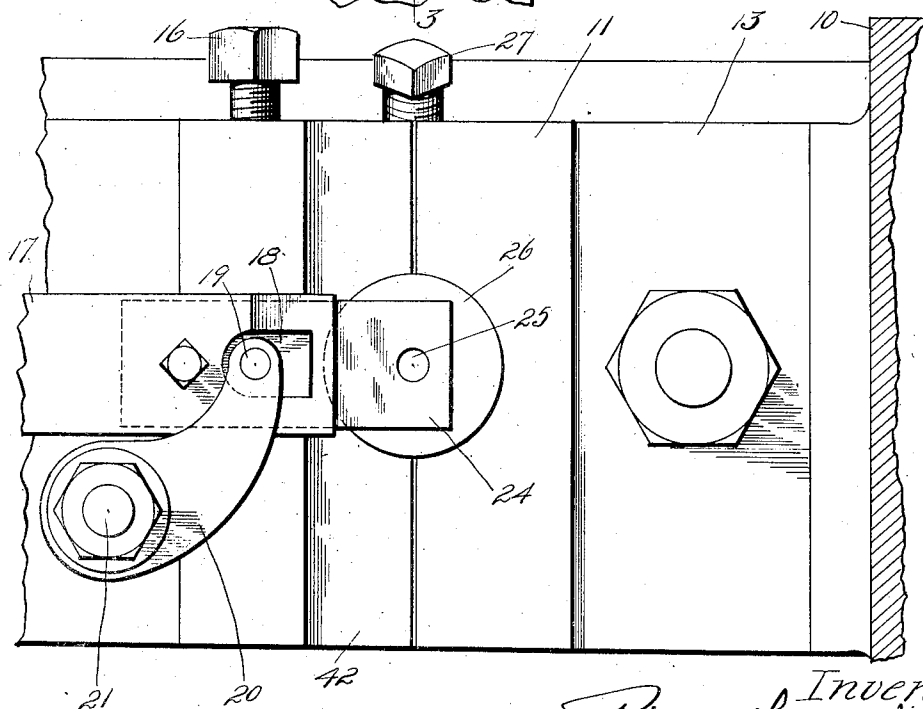
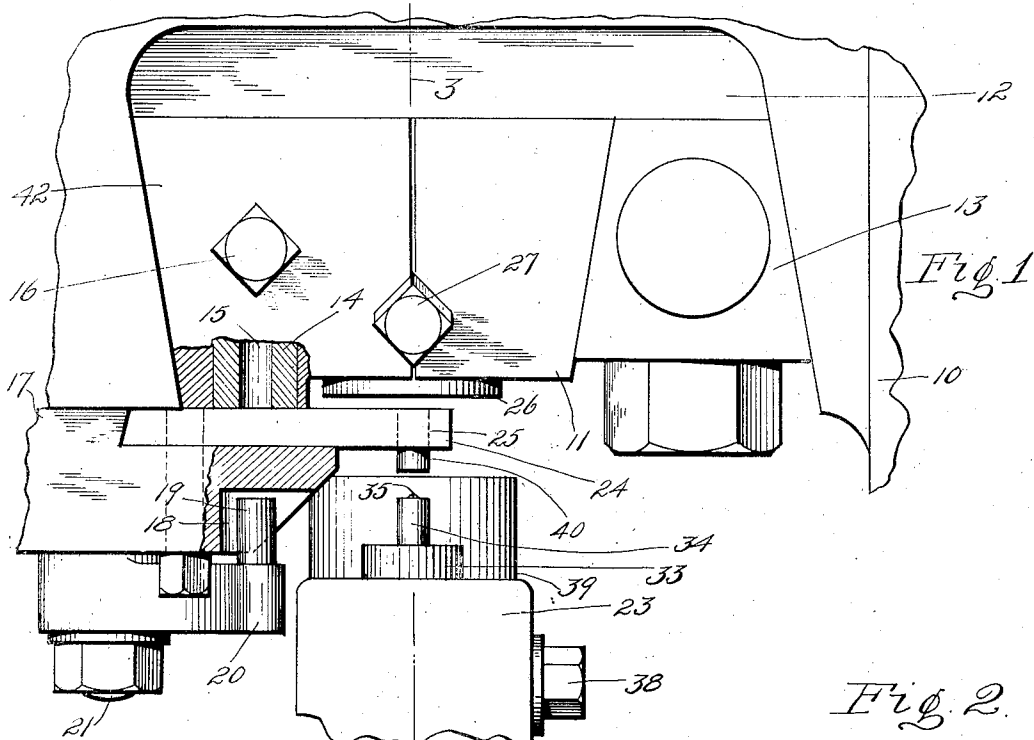
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R. L. WILCOX

UPSETTING MECHANISM

Filed Feb. 6, 1922

3 Sheets-Sheet 1



Inventor
Richard Lester Wilcox
By George E. Hall
Atty

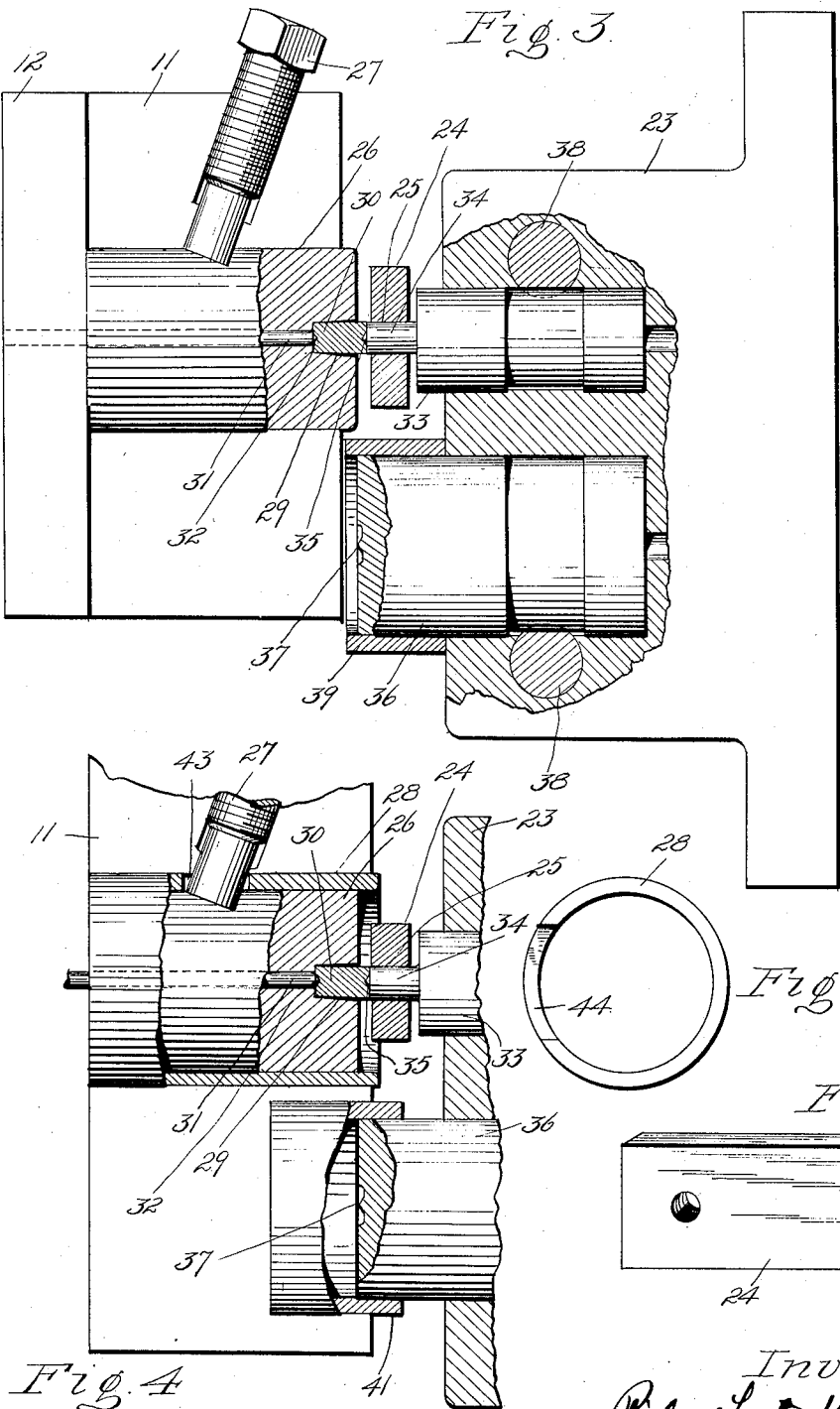
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3 Sheets-Sheet 2



Inventor
Richard Lester Wilcox
By *L. H. May*
Att'y

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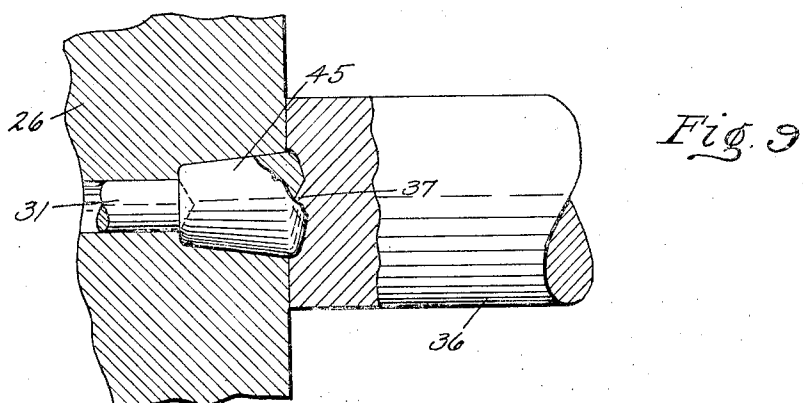
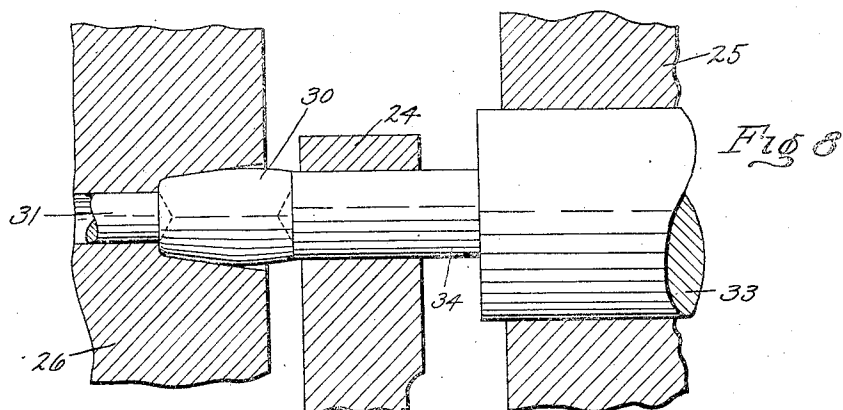
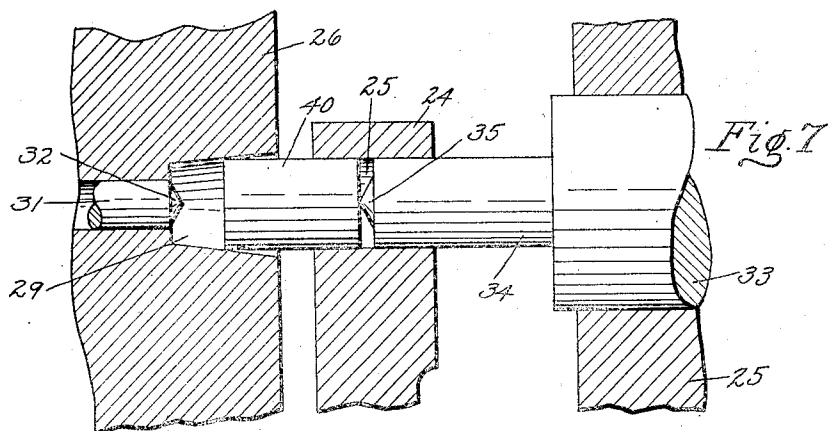
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R. L. WILCOX

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3 Sheets-Sheet 3



Inventor
Richard Lester Wilcox
By George Hall
Atty.

UNITED STATES PATENT OFFICE.

RICHARD LESTER WILCOX, OF WATERBURY, CONNECTICUT, ASSIGNOR TO THE WATERBURY FARREL FOUNDRY AND MACHINE COMPANY, OF WATERBURY, CONNECTICUT, A CORPORATION OF CONNECTICUT.

UPSETTING MECHANISM.

Application filed February 6, 1922. Serial No. 534,539.

My invention relates to new and useful improvements in upsetting or heading mechanisms referring more particularly to mechanism for cutting off and transferring a blank from the cut off or feed line to the upsetting line of a heading machine and insuring certainty of operation thereat.

Among the several objects of the invention may be recited the provision of a device of this character wherein the cut off mechanism will be positive in its operation, will transfer the blank to the upsetting line and there hold it until moved by one of the punches and returned only after the withdrawal of said punch, to provide means whereby the alignment of the punch and die will be absolutely relative to each other, to prevent the end of the blank outside of the die from becoming enlarged, if so desired, and in these and other ways to so improve the mechanism of upsetting and heading machines that the product thereof is of an exact predetermined size and shape.

To these and other ends, my invention consists in the upsetting mechanism having certain details of construction and combinations of parts as will be hereinafter described and more particularly pointed out in the claims.

Referring to the drawings in which like numerals of reference designate like parts in the several figures;

Figure 1 is a fragmentary plan view of my improved mechanism shown in connection with a portion of an upsetting or heading machine;

Figure 2 is a front view of a portion thereof;

Figure 3 is a transverse sectional view taken generally upon line 3—3 of Figure 1;

Figure 4 is a view similar to Figure 3, but illustrating a modified form of my invention;

Figure 5 is a perspective view of the knife or cutter;

Figure 6 is a front view of one of the bushings;

Figure 7 is an enlarged view of the punch and die and adjacent mechanism, with a blank in position to receive its first shaping pressure from the punch; Figure 8 is a similar view showing the relative position

of the parts and the blank after the application of such pressure; and Figure 9 is a view of the punch and die after the second shaping pressure and blank in its finished form.

In the drawings, 10 designates the frame of an upsetting or heading machine and in one end of which is secured a die block formed in two parts 11 and 42 against a backing plate 12 by means of the wedge plate 13 in a well known manner.

In one of the parts of the die block is mounted a bushing 14 having an opening therethrough, and held in its operative position by a screw 16 or other suitable means.

Movable transversely to the die block is a cut off bar 17 having a recess 18 at its inner end and adjacent thereto is a stop pin 19 fixed in an arm 20 connected with a rod 21.

The numeral 23 designates the punch block which is connected with the punch slide, operatively mounted upon the gate, as is usual in machines of this character.

Fixed on the inner end of the cut off bar 17 is a knife 24 having an opening 25 therethrough adjacent to its forward end of substantially the same size as the wire from which the blank is cut.

The die 26 is held in the die block by friction between the two parts therein and by the screw 27 or other suitable means, with its front face as in Figures 1, 2 and 3 slightly in advance of the face of the die block, or in the modification shown in Figure 4 slightly in rear thereof and surrounded by a bushing 28 which may or may not project beyond the face thereof as may seem desirable.

The recess 29 in the die is substantially the same shape as the body and one end of the finished article, which for the purpose of illustration, is shown herein as being the frustum of a cone. If this form of article is to be produced, it is desirable that the diameter of the wire and the blank be substantially the same as that of the finished article, at a point substantially midway between the ends thereof.

In Figures 3, 4 and 8 I have designated by the numeral 30 one of such blanks after the first upsetting blow thereon. A knock-out pin 31 operated in the usual manner is

projected into the die 26, in this case being pointed at its inner end 32 so as to form a depression in one end of the blank.

The punches as usual are held in the punch block 23, the first or upper punch 33 having a portion 34 thereon of substantially the same diameter as the wire from which the blank is formed, and a projection 35 on the front end thereof corresponding in shape with that of the pointed end 32 of the knockout pin 31. The lower or second punch 36 is provided with a centering piece 37 in the recess in the front face thereof and both punches are locked against relative movement in the punch block by the draw bolts 38 which operate in a well known manner.

In the structure shown in Figures 1, 2 and 3 the forward end of the second punch 36 is surrounded by a bushing 39 which is secured thereto in any preferred manner and projects beyond the face thereof.

In operation, the wire rod is projected by the feed mechanism through the bushing 14 into the opening 25 in the knife 24, until the end thereof abuts against the stop pin 19 which is shown in Figure 1 in an out position. The feed mechanism now stops its movement and the cut off bar 17 travels toward the center of the die 26, carrying with it the knife 24. During this travel, that portion of the wire rod projecting beyond the face of the bushing 14 is cut off and retained in the opening 25. The blank 40, now in the form shown in Figures 1 and 7, is thus presented in register with the opening or recess 29 of the die 26. Thereafter the punch block 23 through the movement of the gate travels toward the die and the portion 34 of the upper punch engages the outer end of the blank 40 pushing it into the die recess 29, which is then shaped substantially as shown in Figures 3 and 4.

The knife 24 being rigidly held and the portion 34 of the first punch being supported therein during this portion of its movement, the blank is thus registered and maintained in a central position in relation to the die recess 29 and the axis of the portion 34 is always coincident with the axis of the recess 29. A correct alignment of the first punch as well as the blank is therefore assured.

The punch block 23 is now withdrawn in a well known manner and the second punch 36 moved so that the axis thereof is now coincident with that of the die recess 29.

While the punch block 23 is being withdrawn, the knife 24 is also withdrawn and the opening 25 therein again registers with the opening 15.

While the knife is being withdrawn and is in its retracted position, the die block 23 again moves forwardly and the outer end of the die 26 enters the overhanging or projecting portion of the bushing 39, thus cen-

tering the second punch with said die, which further upsets the blank and produces the completed and finished article 45. Upon the next withdrawal of the punch block 23 the blank is ejected by the knockout pin 31 in a well known manner.

By the mechanism above described the blank is formed with depressions in the opposite ends thereof, which are concentric with the axis of the blank, owing to the fact that the die and each of the punches while operating upon the blank is absolutely concentric with each other.

In Figure 4 I have shown a modified form that my invention may assume, wherein the die 26 is surrounded by the bushing 28 and a bushing 41 is fixed in the die block below the die 26, thus in operation additional means are provided for insuring the positive alignment of the first punch with the die 26 other than the knife 24, this being accomplished by the entrance of the second punch 36 into the bushing 41. The bushing 28 is held rigid by being clamped between the parts 11 and 42 of the die block and the screw 27 projects through a slot 43 in one side thereof.

When the first punch is in engagement with the blank the second punch is in engagement with the bushing 41 and when the second punch is in engagement with the blank, it is held in positive alignment, by the bushing 28.

A solid instead of a two part die block may be used with my invention, if desired. If the outer end of the bushing 28 projects into the path of the knife 24, a slot 44 is formed in one wall thereof and through which the knife passes during its travel, in a well known manner.

As the blank is forced out of the knife by the upper punch 33 it brings up on the taper of the recess 29 in the die before it is pushed entirely out of the knife, so that the pressure of the upper punch 33 forces the material of the blank into the recess and the opening in the knife prevents the blank from enlarging. This is illustrated in Figure 7 wherein the inner end of the blank has just engaged the walls of the recess 29 in the die and the diameter of the outer end of the blank is still substantially the same as that of said opening.

While I have shown my device as applied to a two blow upsetting or heading machine, it is obvious that it will operate equally as well with one having a greater number of blows, or in fact, could be utilized in connection with a single blow machine.

Aside from the changes and modifications above suggested it is obvious other changes might be made within my invention and I therefore desire it to be understood that I do not limit myself to the exact construction herein shown and described, but claim

all that falls fairly within the spirit and scope of the appended claims.

What I claim as new and desire to secure by Letters Patent, is:

5 1. In a machine for cold shaping blanks into substantially frusto-conical form, a die having a conical blank receiving opening therein, a punch, holding means interposed between the die and punch and having an opening of a diameter substantially equalling
10 that of the blank to receive the blank and the punch therein, and means to operate the punch so as to initially cause the blank to enter the die opening while supported by the holding means so that the latter prevents enlargement of that part of the blank held
15 therewithin during partial shaping of the blank in the die, thereby to prevent the formation of an air pocket between the die and blank, and to finally move the blank out of the holding means and substantially completely into the die opening.

2. In a machine for cold shaping blanks into substantially frusto-conical form, a die
25 having a conical blank receiving opening therein, a punch, a combined blank cutter and support interposed between the die and punch and having an opening of a diameter substantially equalling that of the blank to
30 receive the blank and the punch therein, and means to operate the punch so as to initially cause the blank after cutting thereof to enter the die opening while the blank is held by the support so that the latter prevents enlargement of that part of the blank held
35 within the support during partial shaping of the blank in the die thereby to prevent the formation of an air pocket between the die and blank, and to finally move the blank out of the support and substantially completely into the die opening.

3. In a machine for cold shaping blanks into substantially frusto-conical form, a die
45 having a conical blank receiving opening therein, a punch, holding means interposed between the die and punch and having an opening of a diameter substantially equalling that of the blank to receive the blank and the punch therein, and means to operate the
50 punch so as to initially cause the blank to enter the die opening while supported by the holding means so that the latter prevents enlargement of that part of the blank held therewithin during partial shaping of the
55 blank in the die, thereby to prevent the for-

mation of an air pocket between the die and blank, and to finally move the blank out of the holding means and substantially completely into the die opening, said holding means being formed so as to support the
60 blank until the latter has been sufficiently shaped in the die to support itself in the latter.

4. In a machine for cold shaping blanks into substantially frusto-conical form, a die
65 having a conical blank receiving opening therein, a punch, a combined blank cutter and support interposed between the die and punch and having an opening of a diameter substantially equalling that of the blank to
70 receive the blank and the punch therein, and means to operate the punch so as to initially cause the blank after cutting thereof to enter the die opening while the blank is held by the support so that the latter prevents enlargement of that part of the blank held within
75 the support during partial shaping of the blank in the die thereby to prevent the formation of an air pocket between the die and blank, and to finally move the blank out of the support and substantially completely into the die opening, said combined cutter and support being formed so as to support the blank until the latter has been sufficiently shaped in the die to support itself in the
85 latter.

5. In a machine for cold shaping blanks, a die having a blank receiving opening therein, a punch, a combined blank cutter and support interposed between the die and
90 punch and having an opening defined by a continuous wall and of a diameter substantially equalling that of the blank to receive the blank and the punch therein, and means to operate the punch so as to initially cause
95 the blank after cutting thereof to enter the die opening while the blank is held by the support so that the latter prevents enlargement of that part of the blank held within the support in all directions radially of the blank during partial shaping of the blank in the die thereby to prevent the formation of an air pocket between the die and blank, and to finally move the blank out of the support and substantially completely into the
100 die opening.

In testimony whereof, I have hereunto affixed my signature.

RICHARD LESTER WILCOX.