June 28, 1938. F. C. BERTRAM 2,122,082

MEANS FOR FORMING WIRE HANDLES

Filed Feb. 18, 1936 3 Sheets-Sheet 1

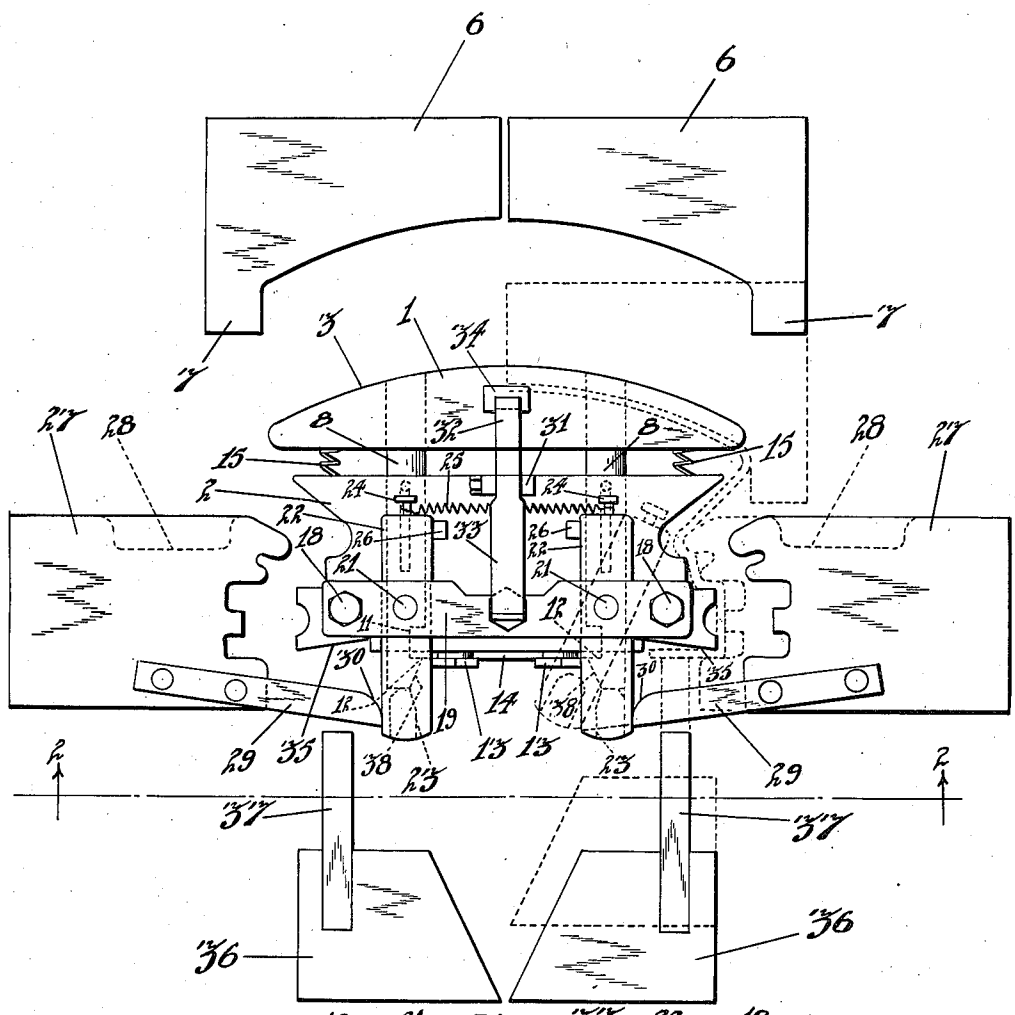


Fig. 1.

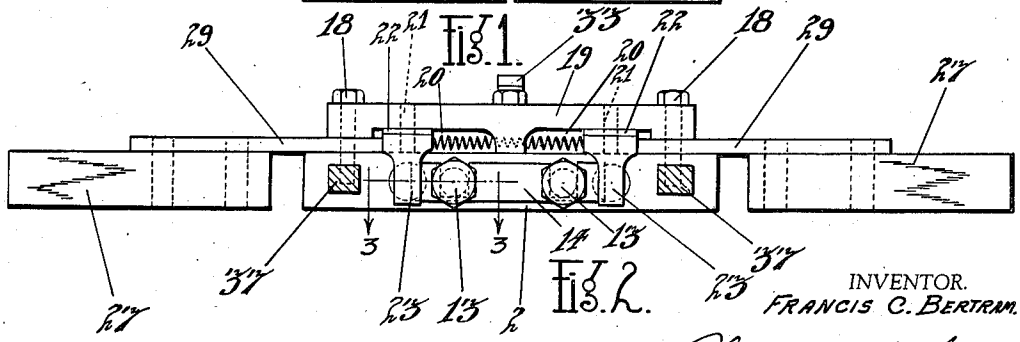


Fig. 2.

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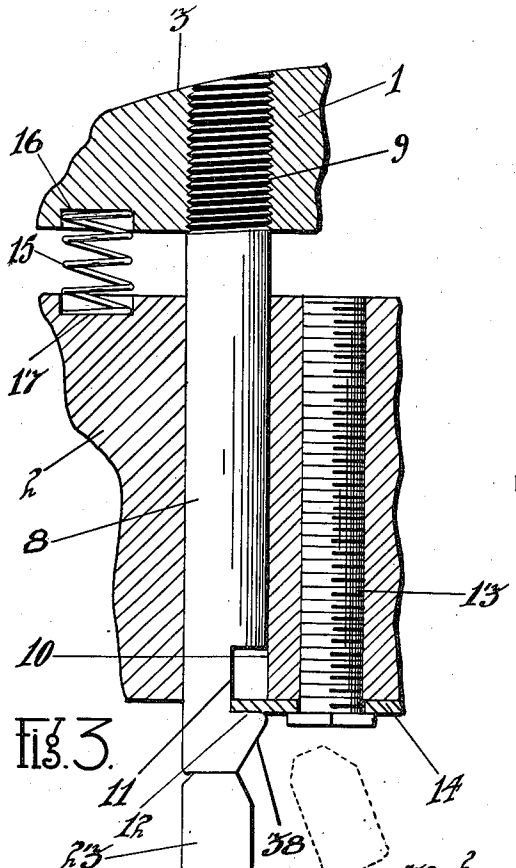


Fig. 3.

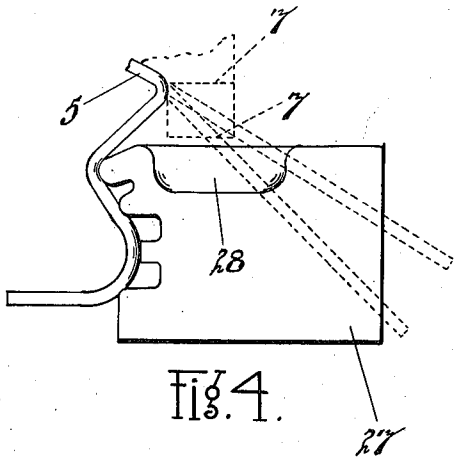


Fig. 4.

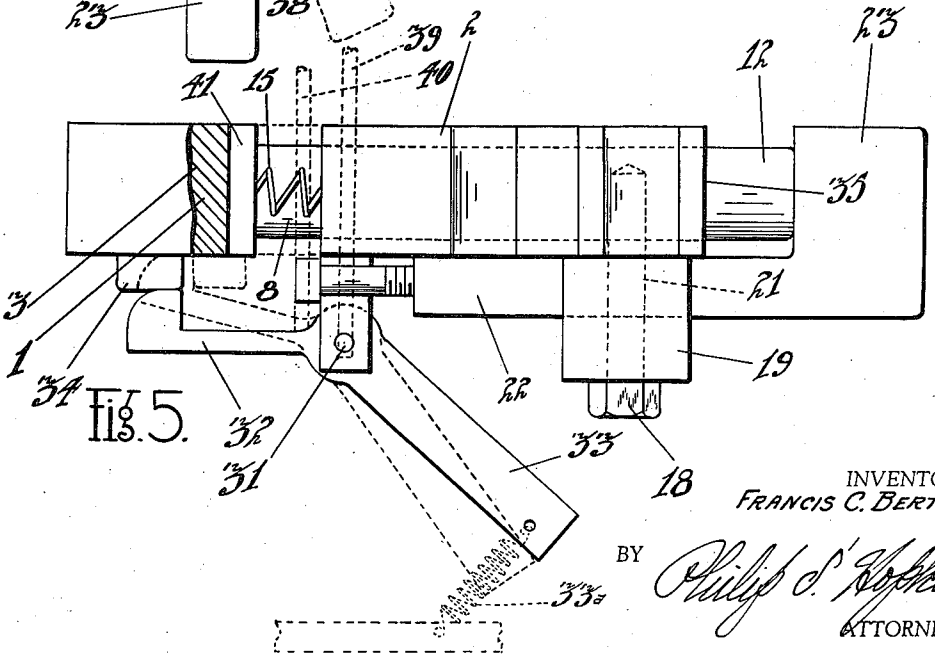


Fig. 5.

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MEANS FOR FORMING WIRE HANDLES

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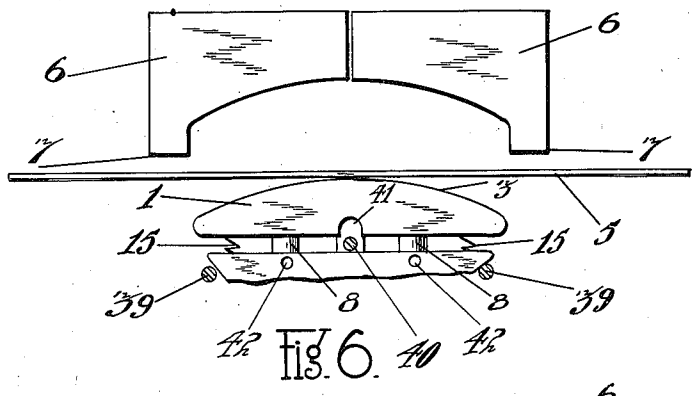


Fig. 6.

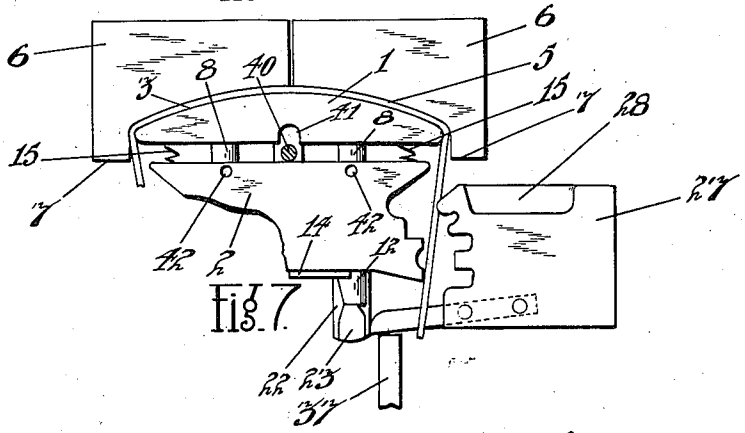


Fig. 7.

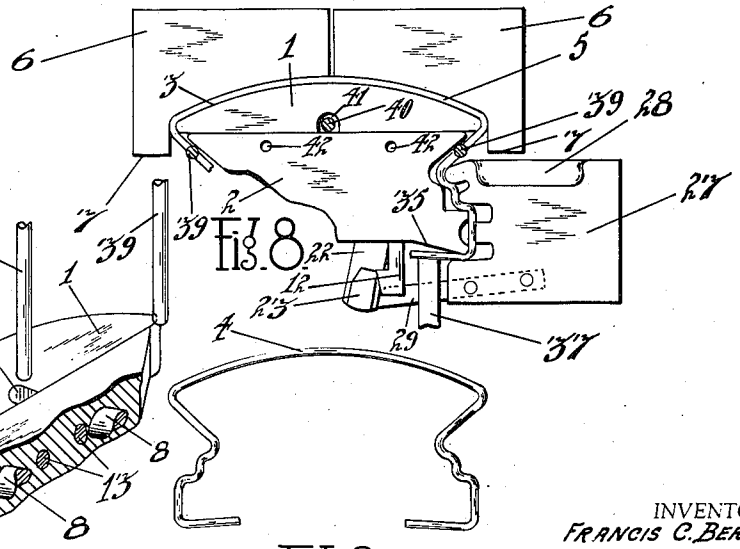


Fig. 8.

Fig. 10.

Fig. 9.

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Patented June 28, 1938 2,122,082

UNITED STATES PATENT OFFICE

2,122,082

MEANS FOR FORMING WIRE HANDLES

Francis C. Bertram, Portland, N. Y.

Application February 18, 1936, Serial No. 64,532

15 Claims. (Cl. 140—75)

My invention relates to a means for forming metal products and particularly wire handles such as are used on fruit baskets and the like.

The principal object of my invention lies in the provision of a forming die, a portion of which is yieldable to permit the use of slack material for the forming of a plurality of bends in the wire handle in a single continuous forming operation and without strain upon the metal or wire.

Other objects and advantages will be apparent as the description proceeds, reference now being had to the figures of the accompanying drawings forming a part of this application, and wherein like reference numerals indicate like parts.

In the drawings:

Figure 1 is a bottom plan view of the assembled die, the parts being shown in full lines in one position and certain parts being shown in dotted lines in another position.

Figure 2 is an edge view of the die taken on the line 2—2 of Figure 1.

Figure 3 is an enlarged detail sectional view of a portion of the forming die taken on the line 3—3 of Figure 2.

Figure 4 is a detail view of one of the forming dies illustrated in connection with the forming of a wire handle.

Figure 5 is a detail view of a portion of the die illustrating the latch device therefor, certain parts being broken away for clearness.

Figure 6 is a detail fragmentary view showing the position of certain of the die parts before the forming operation begins.

Figure 7 is a fragmentary detail view illustrating the position of certain parts of the die at the first forming step.

Figure 8 is a detail fragmentary view illustrating the position of certain parts of the die at the completion of the final forming operation.

Figure 9 is a detail view of a handle such as is formed in accordance with my invention.

Figure 10 is a detail perspective view of a portion of the die illustrating the handle removing means and the latch releasing means.

It will be understood, of course, that the die and the method constituting my invention is shown and will be described independent of any particular operating means therefor. It has not been deemed necessary to illustrate the machine in which my improved die is operable inasmuch as any desired machine for holding and guiding the various parts of the die and for causing the movement thereof may be used.

One of the principal problems involved in the forming of wire handles such as fruit basket handles, which are provided adjacent their ends with a plurality of bends and turns for basket engagement, has been the production of such formed handles at a speed commensurate with the automatic machinery designed for the forming dies. This is due to the fact that when the length of wire which has been fed to the forming die and cut, is given its preliminary formation it has not been possible practically to then form the sharp bends and turns in the ends in the same continuous forming operation with the preliminary forming because of the necessity for simultaneously holding the wire rigidly and at the same time permitting it to yield to the tongues and fingers of the die producing the turns and bends without unduly straining and pulling upon the wire. Consequently two operations have been necessary in the forming of these handles and this obviously materially slows down the speed at which they can be formed.

By my invention I have provided a means and method whereby in a single continuous operation, the wire can be given its preliminary forming and then by virtue of a yielding portion of the die sufficient slack wire is immediately and automatically made available to permit the ready forming of the bends and turns without strain on the wire, thus eliminating the second operation and handling of the handles.

Through my invention I have been able to greatly speed up the automatic forming of handles and thus greatly reduce the cost thereof.

In carrying out my invention I provide a forming die consisting of the yieldable head 1 and the rigid or fixed block 2. The head 1 has its outer surface curved as at 3 and is of such curvature and length as to define the hand grip or bight portion 4 of the handle (Figure 9). This head may be of any desired size or contour depending upon the particular size and shape of the handle to be formed. A length of wire 5 (Figure 6) is adapted to be suitably fed into engagement with the outer surface of the head 1, the center of the length of wire coinciding with the center of the head 1 whereby when the movable die members 6 are moved inwardly into engagement with the head 1 and wire 5 lying thereagainst, such wire is made to conform to the curvature of the head 1 and the ends of the wire are caused to turn downwardly around the ends of the head 1 by the end extensions 7 on the die members 6. The die members 6 may be formed in one piece or in two pieces as shown and any suitable means may be provided for supporting and completing

the inward movement of such die into engagement with the wire and head 1.

The head 1 carries a pair of parallel guide pins 8 suitably rigidly secured to the head 1 as by threaded engagement 9 (see Figure 3). These pins 8 pass into and through openings 10 in the block 2 and at their lower ends the guide pins 8 are provided with recesses 11 to form a hook 12 adjacent their lower ends.

Rigidly secured to the edge of the block 2 opposite the head 1, as by the headed screws 13, is a plate 14, the ends of which partially overlie the adjacent ends of the openings 10 through which the guide pins 8 pass and engage within the recesses 11 in such guide pins whereby separation of the head 1 and block 2 is limited by means of the hooks 12 engaging the ends of the plate 14. This is clearly illustrated in Figure 3. Coil springs 15 having their ends engaging in recesses 16 in the head 1 and 17 in the block 2 and extending between these elements, normally urge the head 1 away from the block 2 to the limit of their separation.

Rigidly secured to the underside of the block 2, as by the bolts 18, is a plate 19 spaced, for the greater portion of its length, from the block 2, as at 20 (see Figure 2). Pivotally mounted upon the plate 19 within the spaces 20 and at 21 are swingable arms 22, the lower ends of which are provided with laterally disposed lugs 23. The opposite ends of the arms 22 are provided with pins 24 secured to which is a coil spring 25 normally urging the upper ends of the arms towards each other and into engagement with fixed lugs 26 provided on the block 2. In this normal position of the arms 22, the arms are parallel with each other and are in parallel alignment with the guide pins 8 of the head 1. Also in such normal position the lugs 23 underlie the hook ends 12 of the guide pins 8 and serve to hold such pins and the head 1 in the separated position shown in Figures 1 and 3 against the tension of the springs 15, and against the pressure of the dies 6. If the arms 22 are rocked on their pivots 21 against the tension of the spring 25, as one of them is shown in dotted lines in Figure 1, the lugs 23 move out of registry with the ends of the guide pins 8 whereupon the head 1 is free to be moved inwardly into engagement with the block 2 against the tension of the coil springs 15. This happens at a predetermined time in the forming of the wire handle as will appear with the ensuing description.

Suitably mounted and guided for movement toward and from the ends of the block 1 are the oppositely disposed forming dies 27 adapted to move inwardly into engagement with the ends of the block 2 for the purpose of forming the bends and turns in the end portions of the wire handle. Here again the particular apparatus for supporting, guiding and moving the forming dies 27 has not been shown and forms no part of this invention. The ends of the block 2 are formed with recesses and projections of such a shape and character as to receive the wire and permit it to assume the desired bends and turns when the forming dies 27 engage the same and press such ends into engagement with the ends of the block 2. The adjacent faces of the forming dies 27 are likewise formed with projections and recesses of complementary character whereby the desired bends and turns may be produced in the wire ends. Obviously the size, number and shape of such projections and recesses depend upon the particular form and shape and number of the bends and turns desired in the ends of the handle. I do not wish to be limited to the particular type and shape of such bends and turns as are shown in the handle of Figure 9 as obviously my invention clearly includes a wide variety of forms of handles which might be produced.

As was previously explained, when the die members 6 move into engagement with the head 1, the ends of the wire are forced inwardly past the ends of the head 1. The adjacent edges of the forming dies 27, which lie in alignment with the wire and die members 6, are beveled off as at 28 (see Figure 4) so that the wire in its inward movement readily slips past and along one side (the upper) of the forming dies 27 to the position shown in Figure 7.

Carried upon the forming dies 27 are the fingers 29, the free ends of which are beveled as at 30 and project normally into engagement with the ends of the arms 22 carrying the lugs 23. In the normal outward position of the forming dies 27, the fingers 29 merely engage such arms 22 without disturbing the normal latching position thereof. Obviously however, when the dies 27 move inwardly toward the ends of the block 2, for the purpose of bending the bends on the sides of the handle between the terminals and the bight, the arms 22 are rocked on their pivots 21, as shown in dotted lines in Figure 1, whereupon the guide pins 8 and the head 1 are free to move inwardly toward and into engagement with the block 2. This inward movement of the head 1, after its release by the latch lugs 23, is caused by the strain of the wire being formed by the side dies 27. The dies 6 form the wire snugly about the head 1 while the latter is locked rigid. When unlocked, however, by the inward forming movement of the side dies 27, as described, the head 1 is free to recede from the dies 6 and move toward the fixed block 2 as pulled by the wire under the forming action of the dies 27.

This is probably the most important feature of my invention as it permits the ready supply of slack wire necessary to the continued bending of the wire between its terminal ends and the bight portion.

It will be quite clear that if the head 1 remains in its fixed outermost position when the forming dies 27 move into engagement with the ends of the block 2, it would not be possible to simultaneously form the various angle bends and turns in the ends of the wire without placing an undue strain upon the wire because of the necessity of drawing the same to a sufficient length to permit the various bends provided for. That is why it has been necessary heretofore, to make two operations of the forming, namely, first, through the preliminary forming as by means of the head 1, and then place the wire thus formed in another die for completing the formation of the bends in the ends thereof. By my invention, however, and by virtue of the permitted inward movement of the head 1 with the wire thereover, sufficient wire is immediately made available as needed for the operation of the forming dies 27 thereon to produce the various bends desired.

It will be noted that the forming ends of the dies 27 as well as the forming ends of the block 2 are provided with relatively deep recesses adjacent the wire engaging points so as to allow adequate room for the wire in assuming its various angle bends. The timing of the movement of the dies 27, is such that the continued inward movement thereof for the bend forming operation follows immediately upon the release of

the head 1 to provide the additional wire for such forming. Likewise the release of the head 1 for this purpose is made possible by the preliminary inward movement of the dies 27 and fingers 29, in timed relation.

Pivotally mounted as at 31 on the under face of the block 2 is a latch member 32, one end 33 of which is weighted whereby to normally urge the hook 32 into latching position. The head 1 is provided on its underside with a lug 34 to cooperate with the latch 32 whereby when the head 1 is moved inwardly into engagement with the block 2, the hook 32 engages behind the lug 34 and locks the head 1 in such innermost position where it remains until the latch hook 32 is released in a manner to be explained. A light coil spring 33a is provided, secured at one end to the latch end 33 and at its opposite end to a fixed part of the frame whereby to assist the weight of the latch arm and insure its prompt operation and also to prevent clattering of the latch during operation of the machine.

It will be noted with reference to Figure 1 that the lower edge of the block 2 adjacent its ends is provided with slightly slanting portions 35. After the forming dies 27 have reached their innermost position and formed the bends in the ends of the wire, the forming dies 36 carrying the fingers 37 now move inwardly towards the block 2 and the free ends of the fingers 37 engage the extreme ends of the wire and force the same toward the inclined surfaces 35 whereby a slight angle bend is provided for the free ends of the wire.

All of the forming dies, namely, the die members 6, 27 and 36 having now completed the forming operations, are now moved back away from the block 2 and head 1 by any suitable means. As the dies 27 move away from the block 2, the arms 22 tend to resume their vertical parallel position under the influence of the spring 25. The lugs 23, however, engage against the beveled ends 38 of the hook ends 12 and are prevented from resuming their normal position beneath such hook ends until the guide pins 8 and head 1 are released from the latch 32. Before this occurs, however, suitable means (not shown) are provided with kick-off pins 39 which move downwardly into engagement with the wire handle on the die and push the same from said die. Also carried by this same means is a pin 40 adapted to pass through a recess 41 in the head 1 in alignment with the latch hook 32 and upon continued movement the pin 40 engages the latch hook 32 releasing it from the lug 34 whereupon the head 1 under the influence of the springs 15 moves outwardly to its normal position. Immediately also the arms 22 again swing to their normal parallel position under the influence of the spring 25 and the head 1 is again locked in its outer position.

Figures 6, 7 and 8 show diagrammatically the various forming operations. In Figure 6 the wire 5 has been fed to its proper position and cut to length and is ready to be formed. In Figure 7 the die members 6 have formed the wire around the head 1 and moved the ends downwardly past the dies 27 ready for the next operation.

In Figure 8 the head 1 has moved inwardly in the manner described into engagement with the block 2 to provide sufficient wire for the bends to be formed by the dies 27. This forming has taken place and the extreme ends have been formed inwardly by the dies 36.

The block 2 is provided with openings 42 in alignment with the openings 10 through which the guide pins 8 pass, whereby such guide pins may be lubricated.

In Figure 8 it will be clear that the engaging projections of the forming dies 27 and the forming ends of the block 2 engage the wire only at the necessary points to provide the desired bends and the recesses provided adjacent such projections are ample to readily accommodate the wire without strain thereon.

By this method, it will be clear that the wire is first given a preliminary formation to bring the ends into position for bending and then the yieldable portion of the die permits moving of the entire wire into position to permit, in a continued operation, the bending of the ends of the wire without strain thereon.

The wire engaging inner edges of the forming dies 27, and particularly the projecting portions thereof, are slightly hollowed out as clearly shown in Figure 4 whereby the wire is received therein without danger of lateral displacement.

Of course, changes may be made in details of construction and arrangement of parts without departing from the spirit and scope of my invention. I do not limit myself, therefore, to the exact form herein shown and described other than by the appended claims.

I claim:

1. A wire forming device for handles having a plurality of bends, comprising a die having a fixed portion and a movable portion normally held in spaced relation to said fixed portion, means for forming a length of wire over said movable portion in said spaced relation, means for releasing said movable portion for movement toward said fixed portion, and means for further forming said wire length against said fixed portion subsequent to said first mentioned forming.

2. A wire forming device for handles having a plurality of bends, comprising a die having a fixed portion and a movable portion normally held in spaced relation to said fixed portion, means for forming a length of wire over said movable portion in such spaced relation, means for further forming said wire length against said fixed portion, and means for releasing said movable portion for movement toward said fixed portion just prior to said further forming.

3. A wire forming device for handles having a plurality of bends, comprising a die having a fixed portion and a movable portion normally held in spaced relation to said fixed portion, means for forming a length of wire over said movable portion in such spaced relation, means for further forming said wire length against said fixed portion, and means for releasing said movable portion for movement toward said fixed portion just prior to said further forming, said second forming means releasing said movable portion.

4. A wire forming device for handles having a plurality of bends, comprising a die having a fixed portion and a movable portion normally held in spaced relation thereto, means for forming the hand grip part of a wire handle over said movable portion in said spaced relation and disposing the ends of said handle in a temporary position with respect to said fixed portion, means for releasing said movable portion for movement toward said fixed portion and changing the position of said ends, and means for forming said ends in such position.

5. A wire forming device for handles having a plurality of bends, comprising a die having a fixed

portion and a movable portion normally held in spaced relation thereto, means for forming the hand grip part of a wire handle over said movable portion in said spaced relation and disposing the ends of said handle in a temporary position with respect to said fixed portion, means for releasing said movable portion for movement toward said fixed portion and changing the position of said ends, and means for forming said ends in such position, said releasing means being operable by the movement of said end forming means to forming position.

6. A wire forming device for handles having a plurality of bends, comprising a die having a fixed portion and a movable portion normally held in spaced relation thereto, means for forming the hand grip part of a wire handle over said movable portion in said spaced relation and disposing the ends of said handle in a temporary position with respect to said fixed portion, means for releasing said movable portion for movement toward said fixed portion and changing the position of said ends, means for forming said ends in such position, means for latching said movable portion in its moved position, and means for releasing said latching means to permit restoring said movable portion to its normal position.

7. A wire forming device for handles having a plurality of bends comprising a die having a fixed portion and a movable portion normally held in spaced relation thereto, means for forming the hand grip part of a wire handle over said movable portion in said spaced relation and disposing the ends of said handle in a temporary position with respect to said fixed portion, means for releasing said movable portion for movement toward and into engagement with said fixed portion and changing the position of said ends, means for forming said ends in such position, means for latching said movable portion in its last named position, means for releasing said latching means to permit restoring said movable portion to its normal position, and spring means between said fixed and movable portions normally urging the latter to its spaced position.

8. A wire forming device for handles having a plurality of bends, comprising a die having a fixed block and a head slidably mounted therein and normally held spaced therefrom, means on said block normally locking said head in said spaced relation, means for engaging and forming a wire length over said head in said spaced position and for bending the ends thereof into partial forming relation with said block, means for releasing said head for movement toward and into engagement with said block to bring said ends into complete forming relation thereto, and means for then forming said ends.

9. A wire forming device for handles having a plurality of bends, comprising a die having a fixed block and a head slidably mounted therein and normally held spaced therefrom, means on said block normally locking said head in said spaced relation, means for engaging and forming a wire length over said head in said spaced position and for bending the ends thereof into partial forming relation with said block, means for releasing said head for movement toward and into engagement with said block to bring said ends into complete forming relation thereto, and means for then forming said ends, said last named forming means carrying the said releasing means for said head and said releasing means being operable as said forming means move to forming position.

10. A wire forming device for handles having a plurality of bends, comprising a die having a fixed block and a head slidably mounted therein and normally held spaced therefrom, means on said block normally locking said head in said spaced relation, means for engaging and forming a wire length over said head in said spaced position and for bending the ends thereof into partial forming relation with said block, means for releasing said head for movement toward and into engagement with said block to bring said ends into complete forming relation thereto, means for then forming said ends, said last named forming means carrying the said releasing means for said head and said releasing means being operable as said forming means move to forming position, latching means for holding said head in its last named position, and means for releasing said latching means after the forming operation.

11. A wire forming device for handles having a plurality of bends, comprising a die having a fixed block, a head having guide pins slidably mounted in said block, spring means between said block and said head normally urging said head to spaced relationship with said block, pivoted means on said block and normally engaging the ends of said pins for locking said head in such spaced relation, means for forming a wire length over said head in such position and disposing the ends thereof in partial forming relation with said block, forming dies movable into engagement with said ends and block to provide bends in said ends, and means carried by said end forming dies for releasing said locking means and permitting movement of said head to bring said wire ends into full forming position during the forming thereof by said end forming die.

12. A wire forming device for handles having a plurality of bends, comprising a die having a fixed block, a head having guide pins slidably mounted in said block, spring means between said block and said head normally urging said head to spaced relationship with said block, pivoted means on said block and normally engaging the ends of said pins for locking said head in such spaced relation, means for forming a wire length over said head in such position and disposing the ends thereof in partial forming relation with said block, forming dies movable into engagement with said ends and block to provide bends in said ends, and means carried by said end forming dies for releasing said locking means and permitting movement of said head to bring said wire ends into full forming position during the forming thereof by said end forming dies, said releasing means comprising fingers on said forming dies engageable with said pivoted locking means to move the same out of locking engagement with said guide pins.

13. A wire forming device for handles having a plurality of bends, comprising a die having a fixed block, a head having guide pins slidably mounted in said block, spring means between said block and said head normally urging said head to spaced relationship with said block, pivoted means on said block and normally engaging the ends of said pins for locking said head in such spaced relation, means for forming a wire length over said head in such position and disposing the ends thereof in partial forming relation with said block, forming dies movable into engagement with said ends and block to provide bends in said ends, means carried by said end forming dies for releasing said locking means and permitting movement of said head to bring said wire ends into full forming position during the forming

thereof by said end forming dies, said releasing means comprising fingers on said forming dies engageable with said pivoted locking means to move the same out of locking engagement with said guide pins, a latch pivoted on said block and operable to hold said head in its last named forming position, and means for releasing said latch after the last forming operation.

14. A wire forming device for handles having a plurality of bends, comprising a die having a fixed block, a head having guide pins slidably mounted in said block, spring means between said block and said head normally urging said head to spaced relationship with said block, pivoted means on said block and normally engaging the ends of said pins for locking said head in such spaced relation, means for forming a wire length over said head in such position and disposing the ends thereof in partial forming relation with said block, forming dies movable into engagement with said ends and block to provide bends in said ends, and means carried by said end forming dies for releasing said locking means and permitting movement to said head to bring said wire ends into full forming position during the forming thereof by said end forming dies, said end forming dies having beveled portions whereby the wire ends slide over and past the same during the first forming operation.

15. A wire forming device for handles having a plurality of bends, comprising a die having a fixed block, a head having guide pins slidably mounted in said block, spring means between said block and said head normally urging said head to spaced relationship with said block, pivoted means on said block and normally engaging the ends of said pins for locking said head in such spaced relation, means for forming a wire length over said head in such position and disposing the ends thereof in partial forming relation with said block, forming dies movable into engagement with said ends and block to provide bends in said ends, means carried by said end forming dies for releasing said locking means and permitting movement to said head to bring said wire ends into full forming position during the forming thereof by said end forming dies, and separate forming dies movable into forming engagement with the extreme ends of said wire to bend the same.

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