Dec. 9, 1941. H. J. HOGUE 2,265,428

HEADING AND TRIMMING APPARATUS

Filed July 13, 1940 3 Sheets-Sheet 1

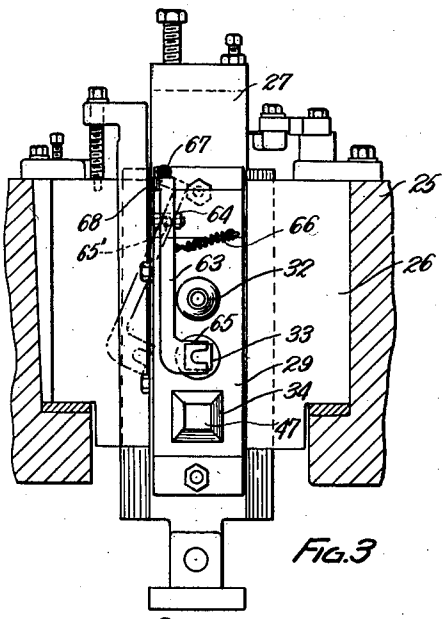


FIG. 3

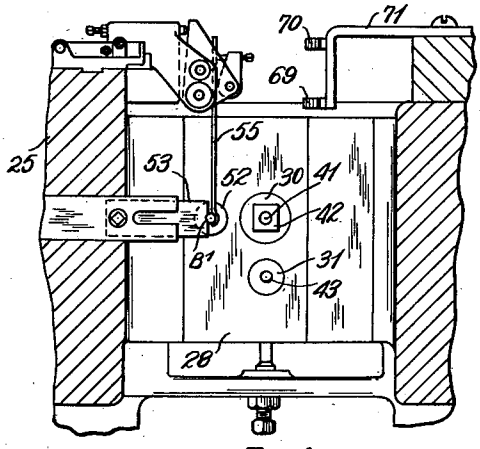


FIG. 4

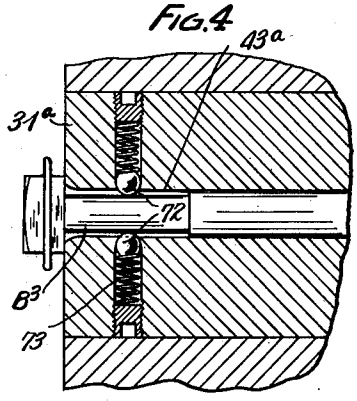


FIG. 5

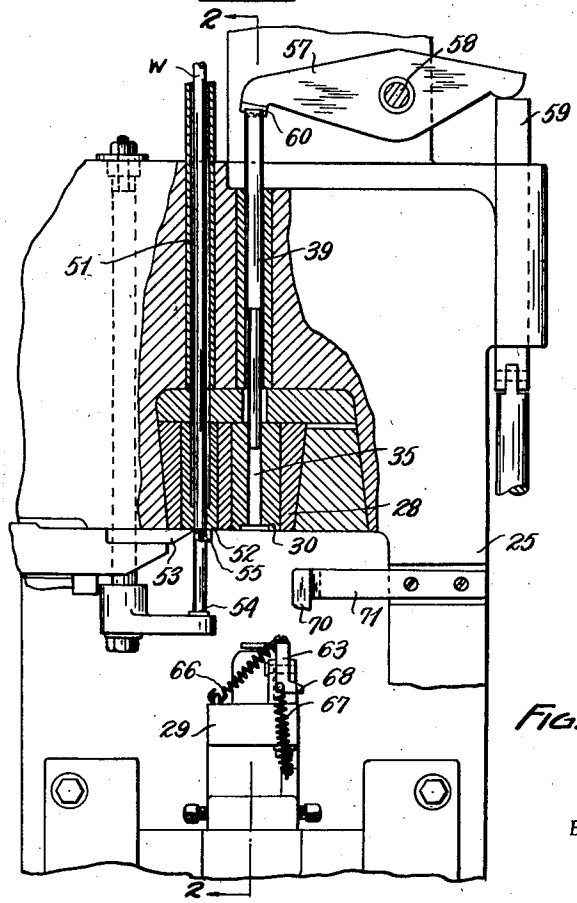


FIG. 1

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HEADING AND TRIMMING APPARATUS

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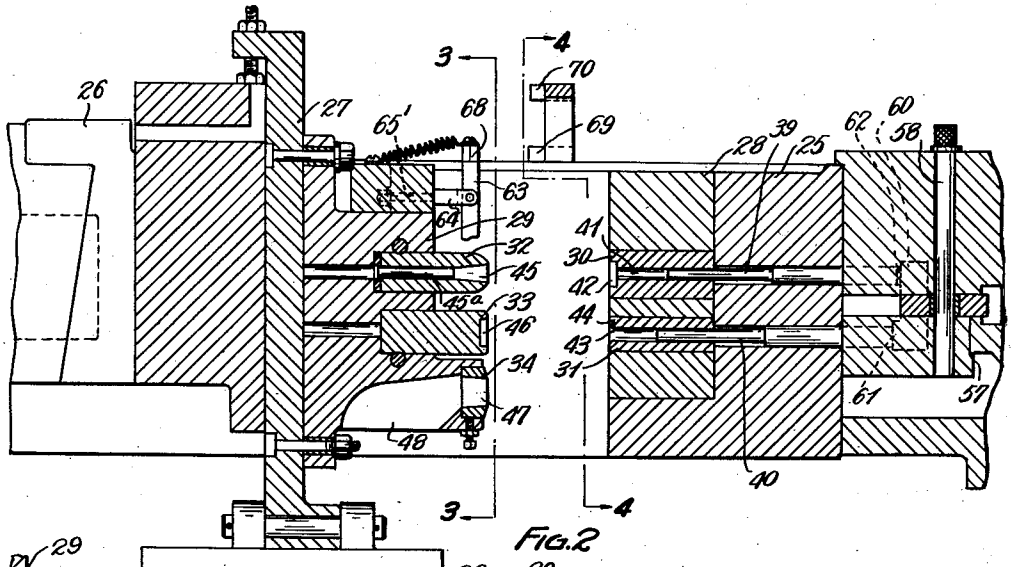


FIG. 2

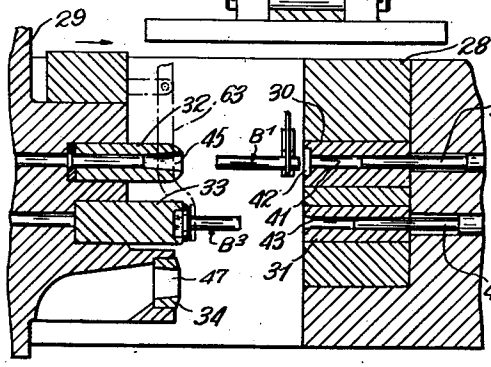


FIG. 6

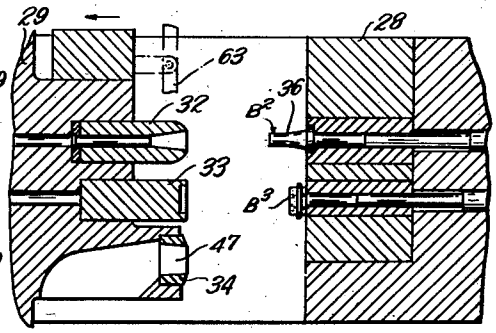


FIG. 7

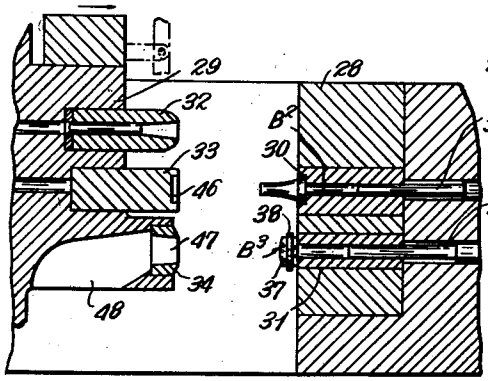


FIG. 8

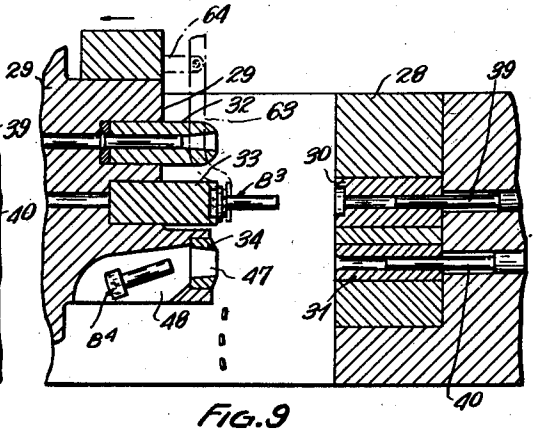


FIG. 9

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HEADING AND TRIMMING APPARATUS

Filed July 13, 1940 3 Sheets-Sheet 3

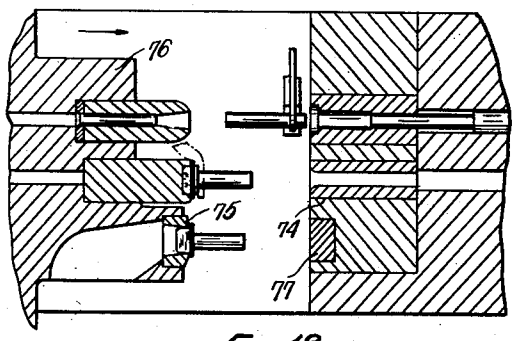


FIG. 18

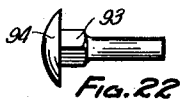


FIG. 22



FIG. 23

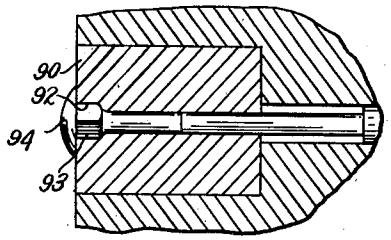


FIG. 20

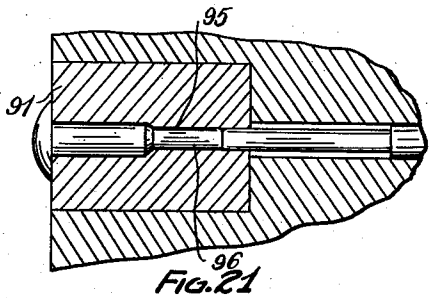


FIG. 21



FIG. 10



FIG. 11

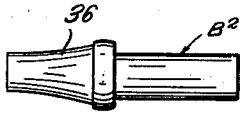


FIG. 12

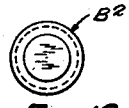


FIG. 13

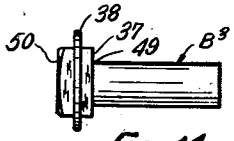


FIG. 14

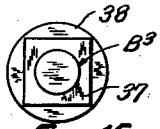


FIG. 15

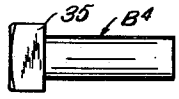


FIG. 16

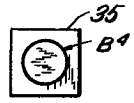


FIG. 17

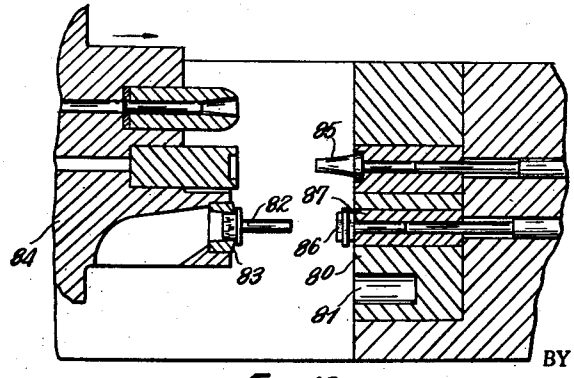


FIG. 19

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Patented Dec. 9, 1941 2,265,428

UNITED STATES PATENT OFFICE

2,265,428

HEADING AND TRIMMING APPARATUS

Henry J. Hogue, Lakewood, Ohio, assignor of one-third to Charles L. Wasmer and one-third to John C. Wasmer, both of Lakewood, Ohio

Application July 13, 1940, Serial No. 345,392

6 Claims. (Cl. 10—12)

This invention relates to the production of blanks for bolts, screws and other headed articles, and more particularly to improved apparatus in which heading and trimming operations on such blanks can be carried out in the same machine.

Attempts have heretofore been made to provide a combined heading and trimming machine but so far as I am aware such prior attempts have been unsuccessful. In one form of such heading and trimming machine heretofore proposed a length of wire stock is upset to form thereon a polygonal head having a fin of flash metal projecting outwardly between its inner and outer faces, and the headed blank is then transferred by one of the movable dies to a trimming station where it is subjected to a trimming operation by passing the blank, stemfirst, through a hollow trimming die. In the operation of the form of machine just referred to, the passing of the blank stemfirst through the trimming die causes burrs or irregularities to be formed or left on the head projecting from or above the outer face or top thereof. These burrs and irregularities being on the outer head surface not only detract from the appearance and salability of the articles but are in a position to scratch or cut persons who are required to handle the articles or to grasp the heads of bolts or screws with their fingers while they are being installed. It has also been found that when the dies of this form of machine become worn, the blanks frequently drop out of the dies and the transferring of the blanks to the trimming station in an efficient and satisfactory manner cannot be obtained. To overcome these difficulties I have devised the improved heading and trimming apparatus hereinafter described with which headed blanks of more smooth and regular form can be produced in a rapid and uninterrupted manner.

It is, therefore, an object of this invention to provide improved apparatus for the rapid and economical production of screw blanks, or like headed articles, in which the heading and trimming of the blanks is carried out in the same apparatus and without causing burrs or irregularities to be formed on the outer face of the head and in which the transferring of the headed blanks to the trimming station is carried out in a positive and regular manner.

Another object of my invention is to provide combined heading and trimming apparatus embodying a heading means and a hollow trimming die and in which the headed blank is forced, headfirst, through the trimming die by the use of a hollow trimming punch into which the stem of the blank extends and which aligns the blank with the trimming die.

Still another object of my invention is to provide improved apparatus, of the character referred to, embodying die means including a heading means, a hollow trimming die and a hollow trimming punch and wherein cooperation of the hollow trimming die with the punch causes movement of a blank, headfirst, into the trimming die, and knockout means operable in the hollow punch acts to complete the movement of the blank through the trimming die.

A further object of my invention is to provide improved heading and trimming apparatus having die means including a stationary heading die, a stationary hollow trimming punch, a movable heading die adapted to cooperate alternately with such stationary die members for heading a blank and transferring the same to the hollow punch, and a hollow trimming die movable with the movable heading die and adapted to cooperate with the trimming punch to cause the blank to be forced, headfirst, through the trimming die.

Yet another object of my invention is to provide improved heading and trimming apparatus, of the character mentioned, having cooperating die members including stationary and movable heading dies and a hollow trimming punch, and in which the movable heading die is actuated to cooperate alternately with the stationary heading die and the trimming punch, and novel transfer means cooperating with the movable heading die is actuated automatically to enable the latter to transfer the headed blank from the stationary heading die to the hollow trimming punch.

My invention may be further briefly summarized as consisting in certain novel combinations and arrangements of parts hereinafter described and particularly set out in the appended claims.

In the accompanying sheets of drawings,

Fig. 1 is a partial plan view showing combined heading and trimming apparatus of my invention with portions thereof in section;

Fig. 2 is a partial longitudinal sectional view taken through the apparatus, as indicated by line 2—2 of Fig. 1;

Fig. 3 is a partial transverse sectional view taken through the apparatus, as indicated by line 3—3 of Fig. 2;

Fig. 4 is another partial transverse sectional

view taken through the apparatus, as indicated by line 4—4 of Fig. 2;

Fig. 5 is a partial longitudinal sectional view taken through the hollow trimming punch and showing blank centering means embodied therein;

Figs. 6 to 9, inclusive are partial longitudinal sectional views on the order of Fig. 2 but more or less diagrammatic in form, illustrating the operating sequence of my improved heading and trimming apparatus;

Fig. 10 is a side elevation of a section of wire stock showing the same preparatory to the initial heading or upsetting operation;

Fig. 11 is an end view thereof;

Fig. 12 is a side elevation showing the stock or blank after the initial heading or coning operation has been performed thereon;

Fig. 13 is an end view of the blank;

Fig. 14 is a side elevation of the blank showing the same after the final heading operation has been performed thereon and preparatory to the trimming operation;

Fig. 15 is an end view of this blank;

Fig. 16 is a side elevation showing the finished blank after the trimming operation has been performed thereon and as it is delivered from the machine;

Fig. 17 is an end view of the finished blank;

Fig. 18 is a longitudinal sectional view similar to Fig. 2, but showing a modified form of my heading and trimming apparatus;

Fig. 19 is a similar longitudinal sectional view showing another modified form of my heading and trimming apparatus;

Figs. 20 and 21 are partial longitudinal sectional views illustrating other forms of hollow trimming punches which may be used in my improved apparatus;

Fig. 22 is a side elevation showing a headed blank produced by apparatus embodying the modified trimming punch of Fig. 20; and

Fig. 23 is a side elevation showing a headed blank produced by apparatus embodying the modified trimming punch of Fig. 21.

More detailed reference will now be made to the accompanying drawings for the purpose of describing the construction and operation of my improved heading and trimming apparatus, but it will be understood, of course, that the invention is not limited to the particular apparatus and steps of procedure hereinafter described.

My improved heading and trimming apparatus may be embodied in or applied to various kinds of heading machines and is here shown as applied to a double stroke crank header of a type now commercially available. Heading machines of this character are well known in the art and the construction and general operation thereof need not here be described in detail. Such a heading machine, portions of which are shown in Figs. 1 to 4, inclusive, generally includes a frame 25 having means for mounting the stationary die members and also having a rotatable power driven crankshaft. Such a machine also includes a reciprocating ram 26 adapted to be actuated by the crankshaft and carrying a transversely movable die slide 27 by which the movable die members are supported. The die slide 27 is movable transversely of the ram by appropriate means and in timed relation to the reciprocation of the ram.

As shown in Figs. 1 to 4, inclusive, I provide a stationary die block 28 which is suitably mounted on the frame 25 and a movable die block or hammer block 29 which is suitably mounted on the die slide 27 and is adapted to be moved toward and away from the die block 28 by the reciprocating ram 26. The die block 28 may have a stationary hollow heading die 30 and a stationary hollow trimming punch 31 mounted therein, with their axes substantially parallel and spaced apart in the plane of movement of the die slide 27 which, in this instance, is the vertical plane. The movable block 29 carries a coning die or hammer 32, a heading die or hammer 33 and a hollow trimming die 34. The dies 32, 33 and 34 may be arranged to oppose the stationary dies 30 and 31, that is to say, may be arranged with their axes lying in the same vertical plane and spaced apart the same distance as the axes of the stationary dies. The movable dies 32, 33 and 34 are reciprocated by the ram 26 and are thereby moved into cooperating relation with the stationary dies 30 and 31 and are also shifted in the vertical plane by the die slide 27 in timed relation to the reciprocation of the ram 26, so that the heading die 33 may cooperate alternately with the stationary heading die 30 and the stationary trimming punch 31 and so that the coning die 32 and the trimming die 34 may have intermittent cooperation, respectively, with the stationary heading die 30 and the stationary trimming punch 31.

The specific shape of the above-mentioned die members will, of course, depend upon and vary with the shape or form of the article to be produced. The die members shown in this instance were designed for the production of a screw blank B^4 having a square head 35, as shown in Figs. 16 and 17, although a head of any other desired shape could be formed. As will be explained more in detail hereinafter, these die members operate on a blank B^1 in the form of a length or section of wire stock to first form a blank B^2 (see Figs. 12 and 13) having one end thereof upset into a cone-like head 36 and to then form a blank B^3 (Figs. 14 and 15) having a square head 37 corresponding with the head 35 except that it has a projecting fin 38 of flash metal. The die members 34 and 31 then cooperate to trim the blank by removing the fin 38.

The stationary die member 30 may have an axially extending chamber or recess 41 for the stem portion of the blank to be formed and a polygonal recess 42, in this instance a square recess, at the outer end of such stem recess for shaping the head of the blank. The head-forming recess 42 may be of a depth approximately equal to or slightly less than one-half the thickness of the head 35. The stationary die member or trimming punch 31 may also have an axial chamber or recess 43 for the stem of the blank and which may be flared or tapered adjacent its outer end, as indicated at 44, to facilitate the insertion of the stem of the blank into the punch. The recess 43 may be of a size to receive the stem of the blank but to provide enough friction to prevent the blank from being pulled out of the punch by the die member 33.

Knockout pins 39 and 40 may be arranged to operate in the chambers or stem recesses of the die members 30 and 31 for ejecting the blanks therefrom and may be actuated in timed relation to the movements of the ram 26, as will be presently explained.

The movable die or hammer 32, above referred to as the coning die, has a tapered recess 45 therein of which the inner end wall may be formed by the end of the upsetting pin 45^a. This

die member cooperates with the stationary die member 30 for initially upsetting the section or length of wire stock B^1, and during this operation, the tapered recess 45 forms a correspondingly tapered cone-like head or upset portion 36 on the blank, as shown in Fig. 12. The movable heading die or hammer 33 cooperates with the stationary die member 30 for performing the final heading operation on the blank and is provided with a recess 46 similar in shape and size to the recess 42 of the die member 30. The hollow trimming die 34 has an opening 47 therethrough which, at the outer face of the die, has a size and shape corresponding with that of the head 35 of the finished blank B^4. The opening 47 may be slightly tapered to facilitate the movement of the blank therethrough. Inwardly of the trimming die 34, the block 29 may be provided with an opening or passage 48 through which the trimmed blanks may be discharged and from which they can drop into a chute or suitable container.

In the final heading operation performed by the die members 30 and 33, the cone-like head 36 of the blank B^2 is shaped or further upset into the square head 37, as shown in Figs. 14 and 15 which corresponds in size and shape with the head 35 of the finished blank B^4, but which has a fin 38 of flash metal projecting therefrom between its inner and outer faces 49 and 50.

The trimming operation removes this fin 38 by a shearing action which is performed on the blank by the cooperation of the die members 34 and 31 after the blank has been transferred to the latter die member. During this trimming operation the hollow die member 34 closes on the die member or trimming punch 31 and causes the head of the blank B^3 being held by the trimming punch 31 to be forced into the opening 47 of the trimming die thereby causing the fin 38 to be trimmed from the blank. During this closing of the trimming die against the trimming punch, it will be noted that the blank enters the opening of the trimming die, headfirst, and therefore the trimming operation will be such that no burrs or irregularities will be produced on the sides or on the outer face 50 of the head. If there is any tendency to cause burrs, they will extend from the inner face 49 of the head and in this location they will not detract materially from the appearance of the product, nor will they be in a position to scratch or cut the fingers of persons handling or installing the headed articles.

During the closing of the trimming dies, the stem of the blank is in the recess 43 of the trimming punch 31 and the blank is thereby accurately aligned with the opening of the trimming die 34. I find that when the blank is thus properly aligned for the trimming operation there is little or no tendency to produce burrs on the blanks or for the heads of the blanks to be sheared on a bevel which would require the articles to be scrapped. The engagement of the stem in the opening of the trimming punch also eliminates the possibility of the blank dropping out of the machine before the completion of the trimming operation, such as might occur if the blank were being held by its head and the dies had become slightly worn.

The blanks B^1 may be obtained in any suitable way such as by cutting sections of the desired length from wire stock W by appropriate cut-off mechanism. The wire stock W may be fed into the machine at a suitable point, such as through the passage 51, and the cut-off mechanism may comprise cooperating stationary and movable cut-off dies 52 and 53. The stationary cut-off die 52 may be located in laterally spaced relation to the stationary heading die 30 as shown in Figs. 1 and 4. The movable cut-off die 53 may be in the form of a shear blade movable across the die 52. The stock W may be advanced by suitable feed rolls (not shown) to bring the leading end thereof in engagement with the feed stop 54. The section of stock or blank B^1 is severed from the wire W by the transversely movable shear blade 53 and is carried thereby to a position in front of and in alignment with the recess of the die member 30. A resilient transfer finger 55 cooperates with the shear blade 53 for gripping the blank B^1 while it is being moved to such position.

Figs. 6 to 9, inclusive, illustrate the operating sequence of my improved heading and trimming apparatus and reference will now be made to these views. Fig. 6 shows the section of stock or blank B^1 as having been cut from the wire W and moved laterally to a position in front of the stationary die member 30. In this view the hammer block 29 is moving, or is about to move, toward the die block 28 and the coning die 32 and the heading die 33 are in axial alignment, respectively, with the stationary die member 30 and the stationary trimming punch 31. Upon closing of the die members 32 and 30 the blank B^1 will be carried into the recess of the die member 30 and the outer end of the blank will be upset in the tapered recess 45 to form the cone-like head 36. In this same view the die member 33 is shown as carrying a blank B^3 on which the final heading operation was performed on the previous closing stroke of the hammer block. As the die member 33 approaches the trimming punch 31, the stem of the headed blank B^3 will be inserted into the recess 43 of the trimming punch and the blank will be transferred to the latter preparatory to the trimming operation.

Fig. 7 shows the hammer block 29 moving away from the die block 28 after the coning operation has been performed by the die members 32 and 30 and after the headed blank B^3 has been deposited in the trimming punch 31. As shown in Fig. 7 the blank B^2 remains in the die member 30 as the dies open following the coning operation. During or after the movement of the hammer block 29 away from the die block 28, the block 29 is lifted by the die slide 27 to the position shown in Fig. 8 to bring the die members 33 and 34 into alignment with the die members or punches 30 and 31, respectively. Fig. 8 shows the hammer block 29 moving or ready to move toward the die block 28 to thereby close the die members 33 and 30 to perform the final heading operation on the blank and to close the trimming dies 34 and 31 to trim the headed blank B^3 in the manner above explained. During the closing of the heading dies 33 and 30 the cone-like head 36 of the blank B^2 is further upset and pressure shaped in the recesses 42 and 46 into the square head 37 having the fin 38 thereon.

Fig. 9 shows the hammer block 29 as moving, or having moved, away from the die block 28 at the completion of the heading and trimming operations. During this opening movement of the block 29, the blank B^3 upon which the final heading operation has just been performed by the die members 33 and 30, moves with the die member 33 so that when the block is shifted downwardly by the die slide to the position shown in Fig. 6, the headed blank B^3 will be in alignment with

the recess 43 of the trimming punch 31 preparatory to insertion of the stem of the blank therein. Fig. 9 also shows a trimmed blank B^4 which has just been forced through the trimming die 34 and which is moving through the discharge passage 48.

As mentioned above, the knockout pins 39 and 40 operate in the recesses of the die member 30 and 31 to eject the blanks therefrom at the proper time. The pin 39 serves to eject the blank B^3 from the die 30 after the final heading operation has been performed thereon and during the same opening of the dies the pin 40 acts to eject the blank B^4 from the trimming punch 31 so as to complete the movement thereof through the hollow trimming die 34. Such ejecting movement is imparted to these knockout pins substantially at the time that the hammer block 29 begins to move away from the die block 28 at the completion of the heading and trimming operations so that the headed blank B^3 will be released from the stationary die member 30 for movement with the die member 33, as shown in Fig. 9, and also to complete the movement of the blank B^4 through the trimming punch 34.

The knockout pins 39 and 40 may be actuated by any suitable means, such as a lever 57 fulcrumed on the pivot pin 58 and which is rocked by a push rod 59 in timed relation to the reciprocation of the ram 26. The lever 57 may have a head or arm portion 60 thereon for contact with the ends of the knockout pins 39 and 40. It may be desirable to have the knockout pin 40 actuated in advance of the knockout pin 39 and before actual separating movement of the block 26 away from the block 28 takes place. I may accomplish this by providing the arm portion 60 of the lever 57 with a shoulder or projection 61 for engagement with the knockout pin 40 and may also provide a space 62 between the arm portion 60 and the knockout pin 39. With this construction and arrangement it will be seen that the knockout pin 40 can be actuated in advance of the knockout pin 39 and an operating sequence can be obtained in which the knockout pin 40 will act to kick the headed blank through the trimming die 34 at or before the beginning of movement of the block 29 away from the die block 28, and the pin 39 will eject the headed blank B^3 from the die member 30 substantially simultaneously with the start of the separating movement of the block 29 away from the block 28.

As I have already explained above, the movable die member 33 cooperates with the die member 30 in the final heading operation and also serves as a means for transferring the headed blank B^3 to the trimming punch 31. In this transfer operation the die member 33 is assisted by a transfer finger 63 which prevents the headed blank from becoming accidentally dislodged from the recess 46. The transfer finger 63 may be in the form of an arm pivoted for rocking movement in a bracket 64 and having a forked portion 65 at its lower end for engagement with the blank B^3 under the head 37 thereof. The bracket 64 may have a stem 65' thereon by which it is pivoted on a section or portion of the hammer block 29 to provide for lateral swinging of the finger 63 to the broken line position shown in Fig. 3. One or more tension springs, in this instance two such springs, 66 and 67 may be arranged to act on the finger 63 to normally hold the same in the full line position shown in Figs. 1 and 3, but adapted to be extended to permit rocking of the finger in the bracket 64 as well as lateral swinging of the finger with the bracket. The transfer finger 63 may be provided at its upper end with a contact portion 68 which is engageable with one or the other of a pair of lugs 69, 70 during the closing of the dies. The engagement of the contact portion 68 with either of these lugs will cause lateral swinging of the finger to its broken line position shown in Fig. 3.

When the heading die 33 is in alignment with the stationary heading die 30, as shown in Fig. 8, and moves toward the latter for the final heading operation on the blank, it is desirable that the transfer finger 63 be swung laterally from between the dies to prevent breakage or interference with the heading operation. Such swinging of the transfer finger prior to the heading operation is caused by the engagement of the contact portion 68 with the lug 70. As the heading die 33 moves away from the die 30, after the final heading operation, the spring 66 promptly swings the transfer finger 63 back to its normal position shown in Fig. 3 with its forked end 65 engaging under the head of the blank B^3 to retain the latter in the die recess 46.

When the die member 33 carrying the headed blank has been aligned with the trimming punch 31 and moves toward the latter, as shown in Fig. 6, to insert the stem of the blank into the recess 43, the contact portion 68 of the transfer finger 63 engages the lug 69 to thereby swing the transfer finger out from between the dies and thus releasing the blank from the recess of the die member 33. The engagement of the contact portion 68 with the lug 69 preferably occurs after the stem of the blank has been started into the recess 43 of the trimming punch 31. The lugs 69 and 70 may be supported in any suitable manner, such as on a bracket 71 which may be bolted or otherwise connected to the frame of the heading machine.

It may be desirable to construct the trimming punch with the recess thereof somewhat larger than the stem or shank of the blank B^3 so that the latter can be more readily inserted thereinto by the heading die. When this is done it is also desirable to provide the punch with a blank gripping and centering means which serves to frictionally grip and hold the stem of the blank B^3 to prevent it from being pulled out of the punch by the heading die and which also serves to center the blank for registration with the opening of the trimming die. One form of such gripping and centering means is illustrated in Fig. 5 wherein I show a trimming punch 31*a* having a recess 43*a* which receives the stem of the blank and is somewhat larger in diameter than the stem. The gripping and centering means may comprise a plurality of spring pressed balls or pawls 72 located in radially extending openings 73 and adapted to project part way into the recess 43*a* for gripping and centering the stem of the blank therein. The spring pressed balls 72 are preferably three in number although any larger number may be provided.

It is not necessary that the knockout pin 40 be used in my heading and trimming apparatus and if desired, can be omitted, as shown in the modified arrangement shown in Fig. 18. When the trimming operation is performed without a knockout pin in the trimming punch 74, the headed blank sticks in the trimming die 75 and when the trimming dies are opened the blank moves with the die member 75 causing the stem thereof to be withdrawn from the trimming punch 74. Following this opening movement of

the dies the hammer block 76 is shifted down to the position shown in Fig. 18 preparatory to the next succeeding coning and transferring operation, and during the subsequent closing of the dies the stem of the trimmed or partially trimmed blank engages a thrust block 77 and is thereby pushed the remaining distance through the trimming die 75.

Fig. 19 shows an arrangement similar to that of Fig. 18 but in which the die block 80 has an open clearance recess 81 in place of the thrust block 77. In the operation of this modified arrangement the partially trimmed blank 82 sticks in the trimming die 83 and on the stroke of the hammer block 84 following the trimming stroke this blank moves into and out of the clearance recess 81. On the next succeeding stroke, during which the previously coned blank 85 is headed, the stem of the blank 82 engages the previously headed blank 86 then in the punch 87 and is thereby pushed the remaining distance through the trimming die 83 to complete the trimming of the blank 82. The latter portion of this same stroke causes the blank 86 to be started through the trimming die.

In the apparatus thus far described, the trimming punch is used only as a means for holding and aligning the headed blank for the trimming operation, but, if desired, this punch can be so shaped that an additional operation will be performed on the blank when the latter is transferred to the trimming punch and forced thereinto by the movable heading die. For example, a trimming punch 90, of the form illustrated in Fig. 20, may be used, or a trimming punch 91, of the form illustrated in Fig. 21, may be employed. The trimming punch 90 may have a recess 92 of square or other desired cross-section adjacent its outer end into which some of the metal of the blank is upset during the closing of the trimming dies to form a corresponding squared portion 93 on the blank immediately under the head 94 thereof, such as is frequently desirable on carriage bolts and other screws. The trimming punch 91, shown in Fig. 21, may be formed so that its recess has a reduced portion 95 at its inner end into which some of the metal of the blank is extruded during the closing of the trimming dies to thereby form a corresponding reduced stem portion 96 on the blank.

From the foregoing description and the accompanying drawings, it will now be readily understood that I have provided an improved heading and trimming apparatus by which bolts, screws and like members can be rapidly and economically produced and in which the trimming of the blank can be carried out in the same apparatus as that which forms the head. It will be seen moreover that in my improved apparatus the trimming of the blank is accomplished by forcing the blank, headfirst, through a hollow trimming die so that the likelihood of leaving burrs on the outer face or top of the head will be avoided. Moreover, it will be seen that I have provided an improved arrangement of heading and trimming dies, as well as an improved arrangement for the knockout pins and transfer finger employed with such dies.

While I have illustrated and described my improved heading and trimming apparatus in a more or less detailed manner, it will be understood, of course, that I do not wish to be limited to the particular apparatus and details of construction herein disclosed, but regard my invention as including such changes and modifications as do not constitute a departure from the spirit of the invention and the scope of the appended claims.

Having thus described my invention, I claim:

1. In a heading and trimming machine for producing headed bolt blanks, a stationary die block, a hammer block movable toward and away from said die block and also movable transversely of the die block to either of two positions, means for causing such movements of the hammer block, a hollow die and a hollow punch carried by said die block, a coning die, a heading die and trimming die carried by said hammer block and arranged so that the coning and heading dies are alternately aligned with said hollow die for said two positions of the hammer block and said heading die and said trimming die are alternately aligned with the punch, the openings of said hollow die and hollow punch being adapted to receive the stems of bolt blanks and said punch cooperating with said trimming die for aligning a bolt blank therewith and causing movement of such blank headfirst therethrough, and knockout members operable in the openings of said hollow die and hollow punch for ejecting the blanks therefrom.

2. In a heading and trimming machine of the character described, a pair of blocks the first being movable toward and away from the second and also movable transversely of the second to either of two positions, a hollow die and a hollow punch carried by said second block and whose openings are adapted to receive the stems of bolt blanks, a heading die and a hollow trimming die carried by said movable first block, means for causing such movements of the movable block, said heading die being adapted and arranged to cooperate with said hollow die for heading a blank and transferring the headed blank to said hollow punch by inserting the same stemfirst thereinto, means cooperating with said heading die for retaining the headed blank therein during said transferring, said trimming die being adapted and arranged to cooperate with said punch so that the latter starts the blank headfirst through the trimming die while holding the blank in substantial alignment with the axis of the trimming die, and a knockout operable in said hollow punch for completing the movement of the blank through the trimming die.

3. In a heading and trimming machine of the character described, a pair of blocks the first being movable toward and away from the second and also movable transversely of the second to either of two positions, a hollow die and a hollow punch carried by said second block and whose openings are adapted to receive the stems of bolt blanks, a heading die and a hollow trimming die carried by said movable first block, means for causing such movements of the movable block, said heading die being arranged to cooperate alternately with said hollow die and said hollow punch for heading a blank and transferring the same to the latter, means carried by the movable block for retaining the headed blank in said heading die during the transfer of the blank to said hollow punch, said heading die operating to insert the headed blank stemfirst into said hollow punch to be held thereby in alignment with the trimming die and said hollow trimming die being adapted and arranged to cooperate with said hollow punch to cause the blank to move headfirst into the trimming die, and knockout means for ejecting the blank from said hollow punch.

4. In a heading and trimming machine of the character described, a pair of blocks the first being movable toward and away from the second and also movable transversely of the second to either of two positions, a hollow die and a hollow punch carried by said second block, a heading die and a hollow trimming die carried by said movable first block, means for causing such movements of the movable block, said heading die being arranged to cooperate alternately with said hollow die and said hollow punch for heading a blank and transferring the same to the latter, a transfer finger carried by said movable block and arranged for swinging movement to a position for retaining the headed blank in said heading die and from said position to release the blank, means adapted to be engaged by said finger to cause such swinging movements thereof, said heading die operating to insert the headed blank stemfirst into said hollow punch to be held thereby in alignment with the trimming die and said hollow trimming die being adapted and arranged to cooperate with said hollow punch to cause the blank to move headfirst into the trimming die, and knockout means for ejecting the blank from said hollow punch.

5. In a machine of the character described, a punch having an opening to receive the stem of a headed blank, a heading die and a trimming die, means mounting said heading die and trimming die for movement to cause the same to cooperate alternately with said punch for depositing a headed blank therein and subsequently trimming the blank, means for actuating the mounting means for imparting such movement to the heading and trimming dies, spring pressed means on said punch for gripping the blank to disengage the same from the heading die and to center the same for the trimming die, said punch and trimming die cooperating with each other so as to force the headed blank headfirst into the trimming die, and knockout means for ejecting the blank from said punch.

6. In a machine of the character described, a pair of cooperating relatively movable dies for operating on a headed blank comprising a trimming die and a punch having an opening for the stem of the headed blank, means for moving one of said dies toward the other to force the blank headfirst into the trimming die, a plurality of circumferentially spaced radially movable spring pressed elements in said punch and engageable with the stem of said blank for gripping and centering the same, and knockout means for ejecting the blank from said punch.

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