

[54] TOOL FOR INSTALLING LOCKING PIN USED TO HOLD A DIE-CUTTING MAT ON A ROTARY ANVIL

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[75] Inventors: John C. Duckett, Clyde; Ivan Gaster, Waynesville; Rufus Neal Ensley, Clyde, all of N.C.

Primary Examiner—Othell M. Simpson  
Assistant Examiner—Harold P. Smith, Jr.

[73] Assignee: Dayco Corporation, Dayton, Ohio

[57] ABSTRACT

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An improved tool for installing and removing an elongated wedge which has a longitudinal opening therein between locking flanges of a die-cutting mat to thereby urge the flanges tightly against holding surfaces provided on an associated rotary anvil supporting the mat to tighten and lock such mat against the anvil.

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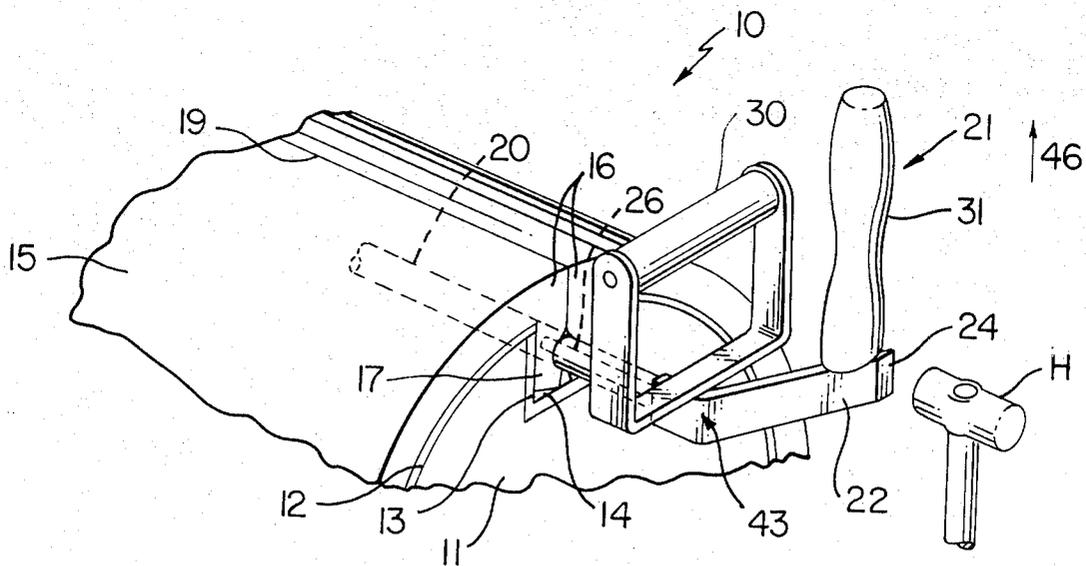
[58] Field of Search ..... 29/244, 234, 255, 29/270, 278, 283, 275; 254/133 R; 30/360, 366

[56] References Cited

UNITED STATES PATENTS

9 Claims, 4 Drawing Figures

1,435,511 11/1922 Sutherland ..... 29/275 X





## TOOL FOR INSTALLING LOCKING PIN USED TO HOLD A DIE-CUTTING MAT ON A ROTARY ANVIL

### CROSS-REFERENCE TO RELATED APPLICATION

This application is related to application Ser. No. 223,903 filed Feb. 7, 1972.

### BACKGROUND OF THE INVENTION

The above referenced application discloses a rotary anvil construction which employs a rotary anvil and a die-cutting mat which is wrapped around such anvil with the mat having opposite end portions provided with locking flanges which are received within a longitudinal groove provided in the anvil. The locking flanges comprising such mat are firmly clamped in position by an elongated wedge which is installed between the flanges to urge the flanges tightly against associated holding surfaces defining the longitudinal groove to thereby tighten and lock the mat against the rotary anvil. To assure efficient use of the overall anvil construction it is necessary that the die-cutting mat be installed on and removed from its anvil in a minimum amount of time and without damage thereto.

### SUMMARY

This invention provides a simple, economical and rugged tool for installing and removing an elongated wedge which has a longitudinal opening therein between locking flanges of a die-cutting mat of the character mentioned above to thereby urge the flanges tightly against associated holding surfaces provided on an associated rotary anvil which supports the die-cutting mat to thereby tighten and lock the mat against such rotary anvil.

Other details, uses, and advantages of this invention will be readily apparent from the exemplary embodiments thereof presented in the following specification, claims, and drawing.

### BRIEF DESCRIPTION OF THE DRAWING

The accompanying drawing shows present preferred embodiments of this invention, in which

FIG. 1 is a fragmentary perspective view illustrating a rotary anvil which has a die-cutting mat wrapped in position therearound and illustrating one exemplary embodiment of an improved tool of this invention which is used to install an elongated wedge in position to lock the mat against the rotary anvil;

FIG. 2 is a perspective view drawn to an enlarged scale looking toward the front of the tool of FIG. 1;

FIG. 3 is a fragmentary perspective view illustrating a modified handle which may be used on the tool of FIG. 2; and

FIG. 4 is a fragmentary perspective view illustrating the forward portion of another main body which may be used interchangeably with the main body shown on the tool of FIG. 2.

### DESCRIPTION OF ILLUSTRATED EMBODIMENT

Reference is now made to FIG. 1 of the drawing which illustrates an exemplary rotary anvil construction which is designated generally by the reference numeral 10 and such construction is adapted to be used with an associated rotary cutter or cylinder (now shown) having cutting blades thereon. The construction 10 serves as a back-up allowing the blades of such

rotary cutter to be urged against a workpiece such as a sheet of either plain or corrugated paper or other sheet material which is to be cut to enable cutting thereof sharply and without jagged edges.

The rotary anvil construction 10 comprises a rotary anvil or cylinder 11 having an outer substantially cylindrical surface 12 and having a pair of spaced holding surfaces 13 extending inwardly from the surface 12 and the surfaces 13 define opposite side walls of a longitudinal groove 14 which extends along the full length of the cylinder 11 in substantially parallel relation to the central longitudinal axis of such cylinder. The cylinder 11 may be made of any suitable manner and is preferably made of rigid highstrength material such as metal.

The construction 10 includes a die-cutting mat 15 which has opposite end portions 16 provided with a pair of identical locking lips or flanges 17. Each flange 17 extends from the terminal end of its associated end portion 16 and is received within the groove 14.

The construction 10 has a wedge 20 which is installed in position using the improved tool of this invention which is designated generally by the reference numeral 21 and once wedge 20 is installed in position, it serves to urge the flanges 17 tightly against the holding surfaces 13 and thereby tighten and lock the mat firmly against the outside cylindrical surface 12 of cylinder 11. In addition to locking flanges 17 and hence mat 15 in position, the wedge 20 moves the outer edges (which may be either straight or slightly beveled) of such mat against each other to provide a single line junction or contact 19 therebetween.

As seen particularly in FIG. 2 of the drawings, the tool 21 has an elongated main structural body 22 which is preferably made of a rigid high-strength material such as metal and such body has oppositely arranged end surfaces 23 and 24 with surface 23 being considered the front or forward operating surface which defines a bearing surface. The tool 21 has a substantially right circular cylindrical pin 25 supported by the body 22 and extending outwardly of the bearing surface 23 and such pin has a cross-sectional configuration which corresponds to the cross-sectional configuration of a longitudinal opening 26 provided in at least one end portion of the wedge 20 so that the pin 25 may be easily inserted within opening 26 for installation or removal of the wedge 20 in a manner to be subsequently described. The pin 25 shown in FIGS. 1 and 2 is provided as a separate member and is fixed within a cooperating bore 27 in body 22, as shown at 28 in FIG. 2, by any suitable means such as welding, or the like.

The tool 21 has handle means comprising a first handle 30 fixed to one end portion of the body 22 closely adjacent the bearing surface 23 and a second handle 31 fixed to the opposite end portion of the body 22 and closely adjacent end surface 24. The handles 30 and 31 are arranged transverse the main body 22 enabling a person using tool 21 to grasp the handles 30 and 31, one in each hand, to thereby enable application of forces by the bearing surface 23 substantially parallel to the pin 25, i.e., parallel to the longitudinal axis of such pin, as well as transverse such pin to thereby enable easy installation and removal of the wedge 20.

The handle 30 comprises a substantially U-shaped member having a bight 32 and a pair of arms 33 extending perpendicularly outwardly, i.e., upwardly, from opposite ends of the bight. A grasping member 34 is provided and is suitably fixed in position adjacent the ter-

minal outer ends of the arms 33 and the diameter of the member 34 and the length thereof is such that it may be easily and comfortably grasped with one hand. The handle 30 is fixed to body 22 using any suitable technique such as by welding of the central portion of the bight 32 against body 22.

The handle 31 is a rod-like handle which extends substantially perpendicular to the body 22 and approximately parallel to the outwardly extending arms 33 of the handle 30. The handle 31 has a reduced diameter central portion 36 which defines a roughly hourglass configuration and such reduced diameter enables easy grasping thereof by wrapping the fingers of one hand around such handle so they surround a vertical longitudinal axis through such handle. The handle 31 may be suitably fixed against the main body 22 using any suitable technique and in the embodiment of the handle illustrated in FIG. 2, the 31 handle is preferably welded against the body 22.

The handle 31 may be modified to facilitate fixing thereof against the body 22 and a modified handle is illustrated in FIG. 3 and also designated generally by the reference numeral 31. The handle of FIG. 3 is substantially identical to the handle 31 shown in FIGS. 1 and 2 with the exception that it has a bifurcate lower end portion 37 defined by a pair of parallel arms 40 which are arranged on opposite sides of the body 22 to enable easier fastening of such handle against the body in a high-strength manner. Once the handle 31 of FIG. 3 is positioned with its arms 40 as shown it may be suitably welded against body 22 or a fastening pin may be extended through aligned openings in the body 22 and arms 40.

The main body 22 may be of any suitable cross-sectional configuration; however, in this disclosure of the invention the body 22 has a roughly rectangular cross-sectional configuration at any position along its length thereby defining bearing surface 23 as a roughly rectangular bearing surface. Further, with the main body 22 having a rectangular cross-sectional configuration, a comparatively large planar surface area 41 is provided for supporting the bottom surface of the bight 32 of handle 30 and a comparatively large planar surface area 42 is provided for supporting the bottom surface of the handle 31.

The main body 22 also has an angled configuration and as shown at 43 in FIG. 1 and such angled configuration allows the top portion of handle 31 to be positioned in a different horizontal plane than the top portion of handle 30 to thereby enable easier grasping of the tool 21 for installation and removal of an associated wedge 20. In this example, the top portion of handle 31 is arranged in a horizontal plane above the horizontal plane of the grasping member 34 of handle 30.

As stated above the main body 22 of the tool 21 has a rectangular cross-sectional configuration; however, it will be appreciated such body may have any other suitable cross-sectional configuration such as circular, for example, and as shown in FIG. 4. In FIG. 4 the pin 25 is provided as an extension of the body 22 as a single piece construction.

Having described the detailed construction of the improved tool 21 of this invention, the detailed description will now proceed with a presentation of the manner in which such tool is used to install and remove the mat 15. To install such mat, one of its flanges 17 is installed within the groove 14 whereupon the mat is

wrapped around the cylindrical surface 12 and the other flange 17 is then inserted into position within the groove 14 in the manner illustrated in FIG. 1 whereby associated channels provided in the flanges 17 are arranged in aligned relation and are ready to have the wedge 20 placed in position therein. The wedge 20 is then inserted axially through these aligned channels by inserting the pin 25 within opening 26 while using both hands to grasp the handles 30 and 31 whereupon the bearing surface 23 is urged against the end of the wedge 20 so that a substantial force may be transmitted through the handles 30 and 31 to the main body 22 and in turn to the bearing surface 23 while the pin 25 holds the tool firmly in position within the opening 26.

The wedge 20 is moved axially along the cylinder 11 until its terminal outer end is near the closely adjacent end of such cylinder. It has been found, however, that it is more difficult to install the wedge 20 the final increment of travel, i.e., the distance represented by the outwardly projecting portion of the wedge 20 in FIG. 1. To enable easier installation over this final increment a suitable instrument such as a hammer H may be employed and the construction of the tool 21 is such that the hammer H may be used to strike surface 24 of the main body 22 to thereby drive the wedge axially along the cylinder 11 until its terminal outer end is flush with the associated near end of such cylinder.

It is a simple matter to remove the mat 15 and to accomplish such removal, the pin 25 is inserted within opening 26 in the end of the wedge 20 whereupon the tool is pulled outwardly in a direction indicated by the arrow 46 in FIG. 1 which is roughly parallel to the handle 31. This movement causes compression of flanges 17 a sufficient amount to allow the wedge 20 to be moved away from cylinder 11 in a direction transverse the longitudinal axis of the cylinder 11 whereupon the flanges 17 may be extracted from within groove 14. During this outward movement, the grasping member 34 of the handle 30 may be used with optimum advantage because it extends substantially perpendicular to the pin 25 and is arranged practically directly above such pin. It will also be appreciated that the provision of handles 30 and 31 allow the tool 21 to be pivoted, as desired, to enable easier removal of wedge 20.

The wedge 20 of this example is shown as having a circular cross-sectional configuration and its opening 26 also has a circular cross-sectional configuration. However, it will be appreciated that such wedge and opening may have any desired cross-sectional configuration and the pin 25 provided on the tool 21 preferably has a configuration which corresponds to the opening 26; therefore, the opening 26 and pin 25 may have either circular or non-circular cross sectional configurations, as desired.

While present exemplary embodiments of this invention, and methods of practicing the same, have been illustrated and described, it will be recognized that this invention may be otherwise variously embodied and practiced within the scope of the following claims.

We claim:

1. A tool for installing and removing an elongated wedge between flanges of a die-cutting mat to thereby enable urging said flanges tightly against associated holding surfaces provided on an associated rotary anvil supporting said mat, said tool comprising an elongated main structural body, a bearing surface on said body, a pin supported by said body and extending outwardly

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of said bearing surface, said pin being adapted to be received within a longitudinal opening in said wedge, and handle means fixed to said body and extending transverse thereto enabling easy grasping of said tool and the application of forces by said bearing surface substantially parallel to said pin and the application of forces by said pin transverse thereto to enable said installing and removing, said handle means comprising a first handle fixed to one end of said body and a second handle fixed to the opposite end of said body.

2. A tool as set forth in claim 1 in which said body has oppositely arranged end surfaces, one of which defines said bearing surface, said pin extending perpendicularly outwardly from said bearing surface.

3. A tool as set forth in claim 2 in which said pin is made as an integral part of said main body as a single piece construction.

4. A tool as set forth in claim 2 in which said pin is a separate member which is fixed to said body.

5. A tool as set forth in claim 2 in which said first handle comprises a substantially U-shaped member having a bight fixed transversely of said body closely adjacent said bearing surface and having a pair of arms extend-

ing outwardly from opposite ends of said bight with a grasping member being fixed adjacent the terminal outer ends of said arms.

6. A tool as set forth in claim 5 in which said second handle comprises a rod-like handle extending substantially perpendicular to said main body and approximately parallel to the outwardly extending arms of said first handle and having a reduced diameter central portion.

7. A tool as set forth in claim 5 in which said second handle comprises a rod-like handle having a bifurcate lower end portion defined by a pair of parallel arms arranged on opposite sides of said body.

8. A tool as set forth in claim 1 in which said body is made of metal and has a roughly rectangular cross-sectional configuration at any position therealong.

9. A tool as set forth in claim 1 said body has an angled configuration, the top portion of one of said handles being positioned in a different plane than the top portion of the other of said handles during normal use of said tool.

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