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Rebsamen et al.

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[54] **LUBRICATING SYSTEM FOR METAL FORMING DIE**

[75] Inventors: **John A. Rebsamen,** Philadelphia; **Thomas A. Nordon,** Dreshertown, both of Pa.

[73] Assignee: **The Budd Company,** Philadelphia, Pa.

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Related U.S. Application Data

[63] Continuation of Ser. No. 32,797, April 29, 1970, abandoned.

[52] **U.S. Cl.** **72/23,** 72/45

[51] **Int. Cl.** **B21j 3/00**

[58] **Field of Search** 72/23, 41, 42, 43, 72/44, 45, 201, 344

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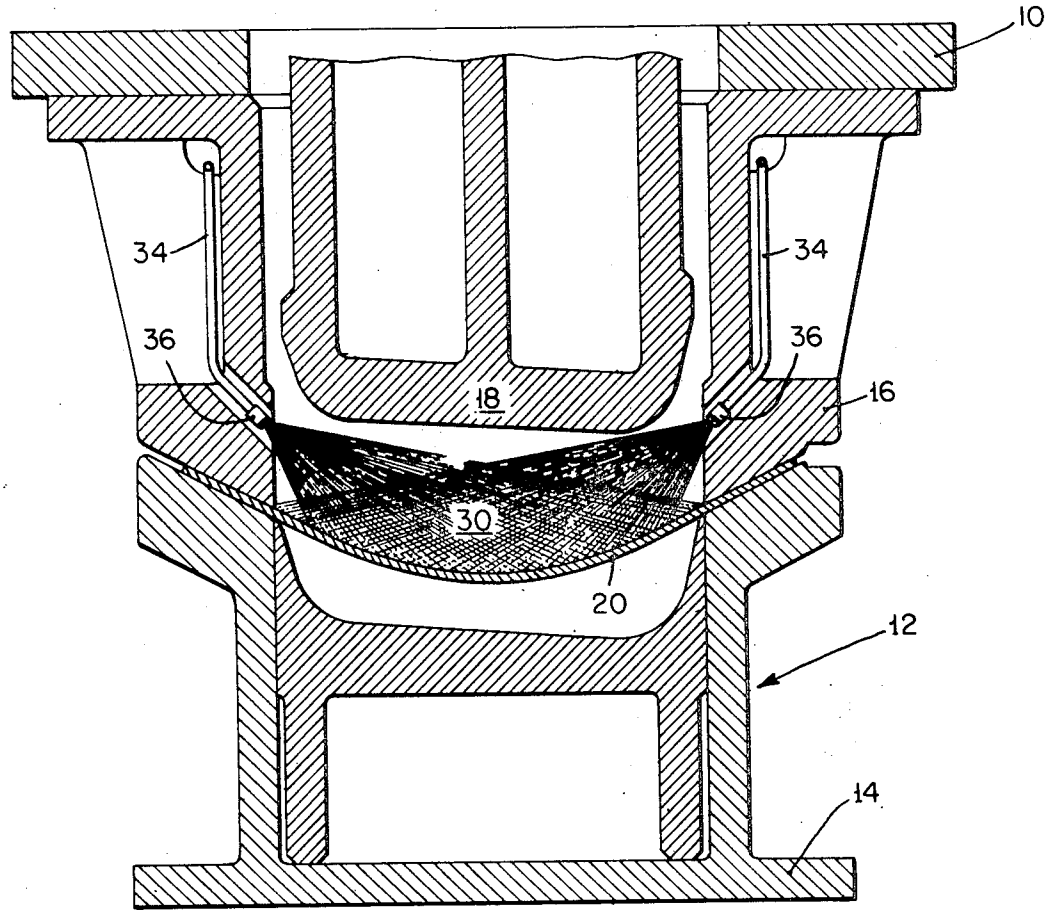
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Primary Examiner—Charles W. Lanham
Assistant Examiner—E. M. Combs
Attorney—Thomas I. Davenport, Alford L. Trueax, Jr. et al.

[57] **ABSTRACT**

A lubricating system for applying a lubricant spray to a metal blank after the blank has been positioned and held in a forming die.

5 Claims, 4 Drawing Figures



2 Sheets-Sheet 1

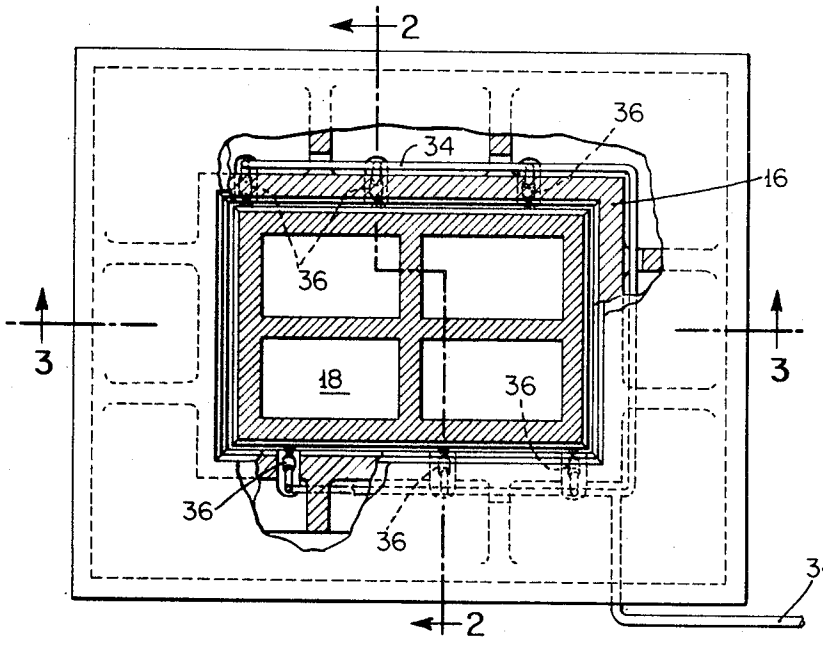


Fig.1

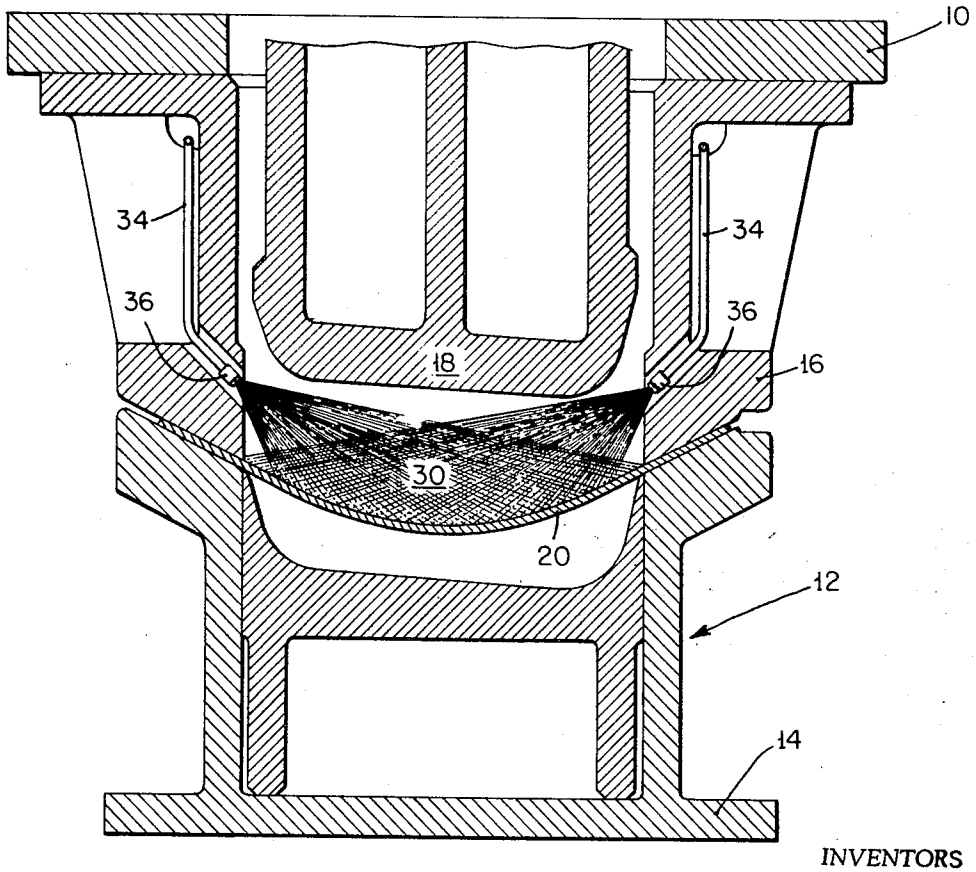


Fig.2

INVENTORS
THOMAS A. NORDON
JOHN A. REBSAMEN
BY
G. L. Truax, Jr.
ATTORNEY

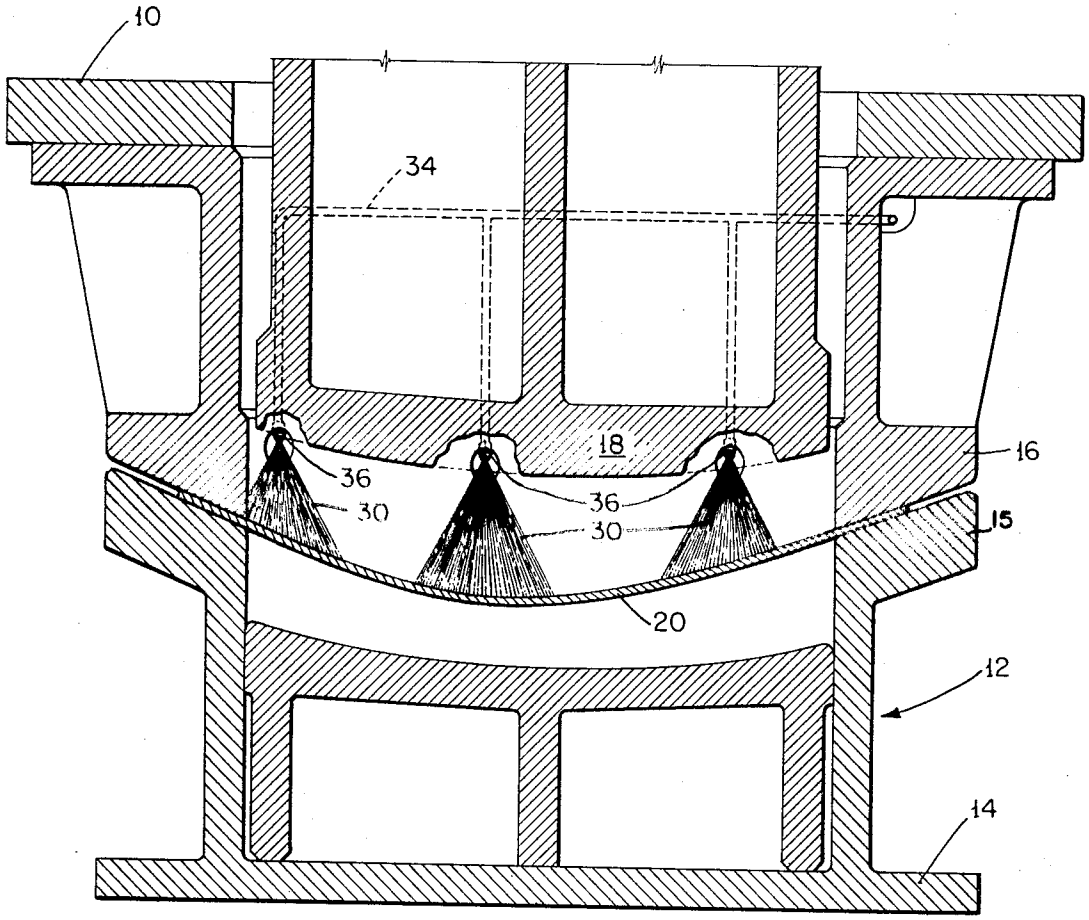


Fig.3

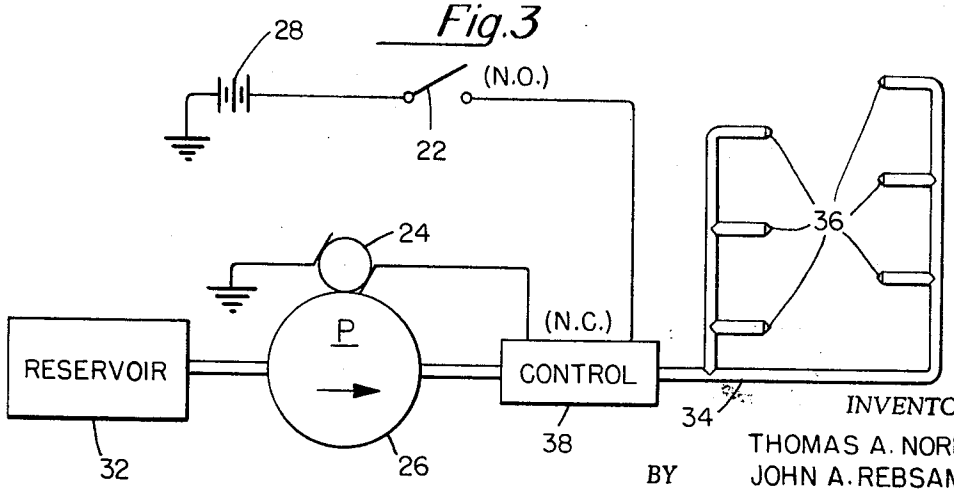


Fig.4

INVENTORS
THOMAS A. NORDON
BY JOHN A. REBSAMEN
A. L. Truesdale, Jr.
ATTORNEY

LUBRICATING SYSTEM FOR METAL FORMING DIE

This is a continuation of application Ser. No. 32,797, filed Apr. 29, 1970, now abandoned.

This invention relates to a die set in a metal forming press and more particularly to a lubricating system incorporated in a double action die set to apply a lubricant to the metal blank placed therein for forming.

Prior to this novel invention, the metal blank was sprayed with a lubricant prior to placing the blank in the press. This method required a man to operate the spray and also presented a health hazard in the area of the spray operation. It is an object of this invention to provide a lubricating system for a metal blank formed in a double-action draw die that eliminates a man from the production line and provides more efficient lubricating of the metal blank being formed.

Another object of this invention is to provide automatic lubricating of the metal blank while held in place in a confined space in the draw die, thus reducing a health hazard on the production line by substantially eliminating the lubricant vapors from over spray.

A further object of this invention is to provide a more uniform lubricating of the metal blank and reduce the amount of lubricant used by metering the lubricant applied to each blank processed.

These and other objects of this invention will become apparent as reference is made to the following specification and drawings.

FIG. 1 is a plan view, with sections broken away, showing the positioning of the spray system in the die;

FIG. 2 is a view in the direction of the arrows, substantially along line 2—2 of FIG. 1, illustrating the spray patterns and position of the punch after the blank holder has secured the blank in the die;

FIG. 3 is a view in the direction of the arrows, substantially along the line 3—3 of FIG. 1, showing the side and vertical location of the nozzles to provide adequate surface coverage of the blank by the sprayed lubricant;

FIG. 4 shows in schematic diagram, the electrical control circuit and lubricant piping system.

Referring now to the drawings, as best seen in FIGS. 2 and 3, mounted in a double-action press 10 is a double-action draw die 12 having a base 14, a blank holder 16 and a punch 18. The double-action die 12 is secured in the press 10 in a conventional manner.

A precut sheet metal blank 20 is positioned in the draw die 12 by hand or mechanical feed methods with the die in the open position.

Referring now to FIG. 4, a schematic diagram illustrates this novel lubricating system. A micro switch 22 is controlled by the initial movement of the press 10 and closes a circuit that actuates a motor 24 for the pump 26 by connecting it to a power source 28. The pump 26 pumps lubricant 30 from a reservoir 32 through the piping 34 to the nozzles 36 mounted in the blank holder 16.

The amount of lubricant 30 to be sprayed on the blank 20 may be controlled by timing the length of time the pump 26 operates or metering the amount of lubricant passing through the piping 34. The schematic illustration uses a metering control 38 mounted between the pump 26 and the nozzles 36 and connected into the motor circuit to disconnect the motor 24 from the power source when the predetermined amount of lubricant 30 has been pumped to the nozzles. Such devices are well known in the art and are commercially available.

The sequence of operation generally consists of the following steps:

1. The blank 20 is positioned in the open die 12.

2. The press 10, in the open position, is actuated and the initial movement secures the blank 20 between the blank holder 16 and the base 14 with the die in the intermediate position. Such movement of the press 10 closes the micro switch 22 which actuates the lubricating system and sprays lubricant 30 on the blank 20 within the confined space between the punch 18, the blank 20 and the blank holder 16.

3. The press 10 completes the stroke by moving the die to the strike position with the punch 18 in contact with the blank 20 and forming the blank 20 in the die 12.

4. The press 10 and die 12 are returned to the open position.

5. The formed sheet metal part is removed from the die.

It can be seen that the application of the lubricant to the metal blank in the intermediate position before the forming operation is done automatically during the press forming operation, thus eliminating a man from the press line.

Since the lubricant is applied to the blank within the confined space between the punch and the blank and surrounded by the blank holder, none of the lubricant spray can escape into the atmosphere and air polution on the press line is reduced, thus providing a more healthful place for the men on the press line to work.

While but one embodiment of this invention is shown and explained, it is obvious to one skilled in the art that parts can be modified within the scope of the following claims.

We claim:

1. A double-action die for deforming a sheet metal blank and having a lubricating system operably mounted in a double-action press, said die including a base, a blankholder and punch; said die having an open position, an intermediate position and a strike position and being movable therebetween; said open position of said die for unloading a formed sheet metal part therefrom and loading said metal blank on said base, said intermediate position for securing said metal blank between said blankholder and said base, and said strike position for forming said metal blank between said punch and said base; a closed lubricating chamber for applying lubrication to said metal blank being formed at said intermediate position by said metal blank, said blankholder and said punch; said lubricating system including a plurality of nozzles positioned in said blankholder and movable therewith for applying lubricant to said metal blank in said closed lubricating chamber when said die is positioned at said intermediate position, said nozzles secured in said blankholder being movable between said open position and said intermediate position with said blankholder and being properly located relative to said metal blank by said blankholder for properly applying the lubricant to said metal blank, a source of lubricant under pressure, a piping system operably connecting said nozzles to said source of lubricant, and control means for releasing a predetermined amount of lubricant from said source to said nozzles for application of said metal blank when said die is in said intermediate position.

2. The lubricating system as claimed in claim 1 having said nozzles positioned in said die for providing spray patterns that cover substantially all the surface of said metal blank surrounded by said blank holder.

3. The lubricating system as claimed in claim 1 wherein said control means includes a control switch actuated by movement of said die to said intermediate position for actuating said lubricating system and a metering device for controlling the amount of lubricant released and inactivating said lubricating system when the predetermined amount of lubricant has been released.

4. A double-action die for deforming a sheet metal blank and having a lubricating system operably mounted in a double-action press, said die including a base, a blankholder for securing the edges of said blank on said base and a punch for moving said blank against the base for forming a formed sheet metal part, said lubricating system including a source of lubricant under pressure, a control means for releasing a predetermined amount of said lubricant on command, a nozzle mounted in said blankholder for movement therewith and positioned by said blankholder for spraying said lubricant on said sheet metal blank, a closed chamber being formed when said blankholder has secured the edges of said blank on said base for confining the sprayed lubricant in said chamber, and a piping system operably connecting said nozzle to said source of lubricant.

5. The lubricating system as claimed in claim 4 wherein said control means includes a control switch for actuating a release to permit the predetermined amount of lubricant to flow through said piping system to said nozzle, said control switch being controlled by the movement of said blankholder to secure said blank against said base.

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