April 7, 1925. 1,532,856

B. T. ANDREN ET AL

PRESSURE RELIEVING MEANS FOR DRAWING PRESSES

Filed Oct. 17, 1924

Fig. 1.

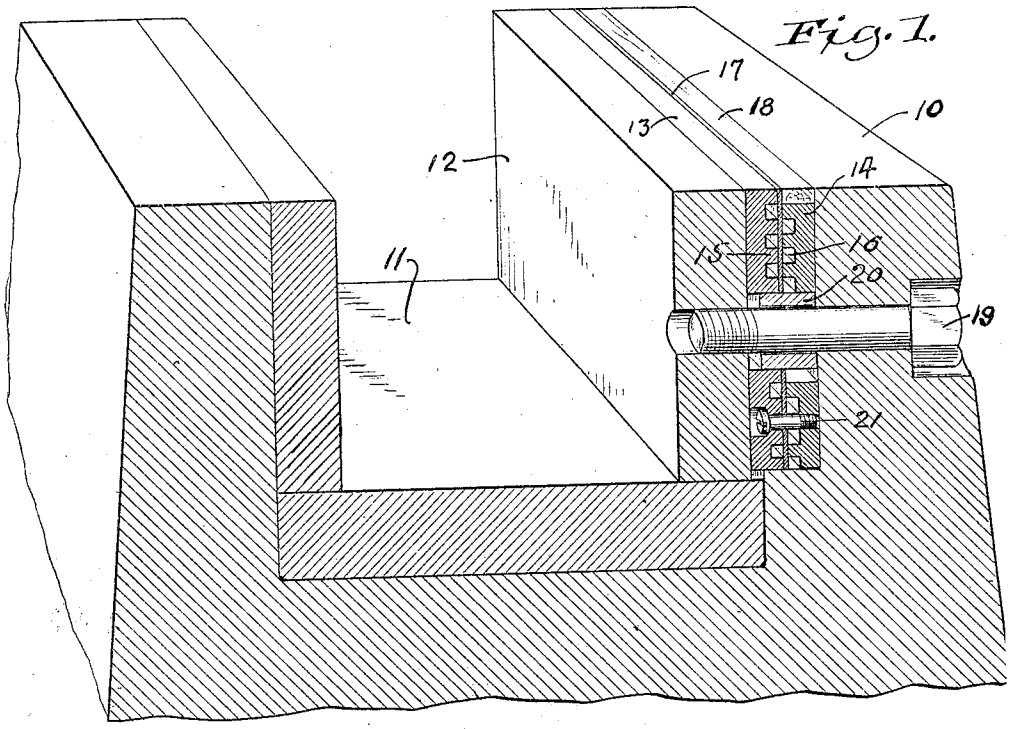
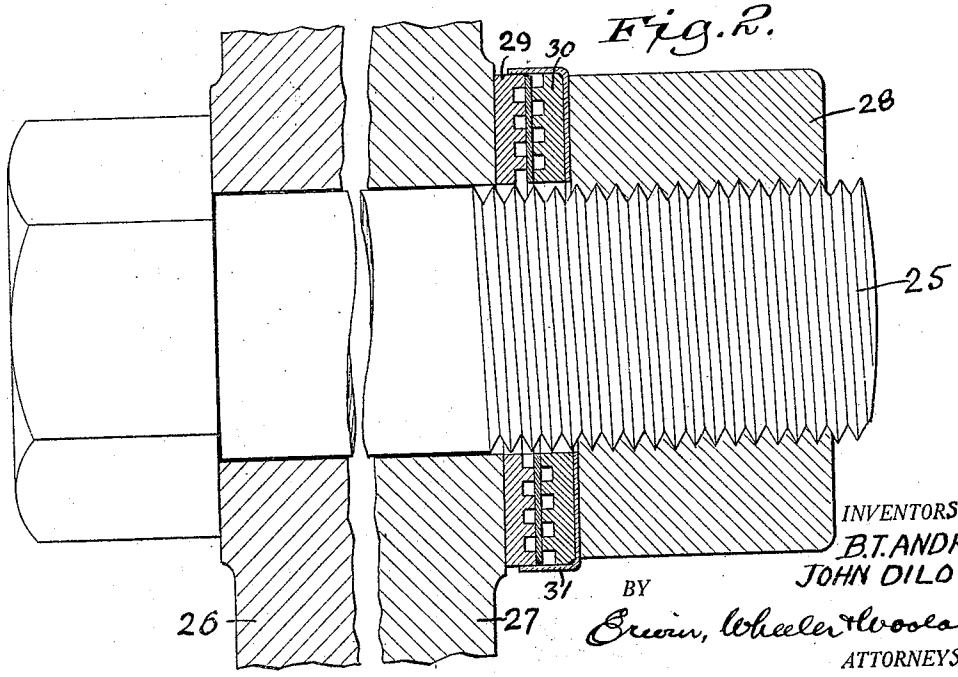


Fig. 2.



INVENTORS:
B.T. ANDREN,
JOHN DILOT.

BY
Brown, Wheeler & Woodard.
ATTORNEYS.

Patented Apr. 7, 1925. 1,532,856

UNITED STATES PATENT OFFICE.

BIRGER T. ANDREN AND JOHN DILOT, OF MILWAUKEE, WISCONSIN, ASSIGNORS TO A. O. SMITH CORPORATION, OF MILWAUKEE, WISCONSIN, A CORPORATION OF NEW YORK.

PRESSURE-RELIEVING MEANS FOR DRAWING PRESSES.

Application filed October 17, 1924. Serial No. 744,097.

To all whom it may concern:

Be it known that we, BIRGER TORVALD ANDREN and JOHN DILOT, subjects of the King of Sweden, but each having declared an intention of becoming a citizen of the United States, and both being residents of the city of Milwaukee, county of Milwaukee, and State of Wisconsin, have invented certain new and useful Improvements in Pressure-Relieving Means for Drawing Presses; and we do declare the following to be a clear, exact, and complete description thereof, such as will enable others skilled in the art to which the invention pertains to make and use the same, reference being had to the accompanying drawing for an illustration of some constructional forms in which our improvement has been embodied.

In the operation of presses for drawing sheet-metal contoured blanks of thick gage into shape as channels or other forms, it sometimes happens that by reason of the inelasticity of the metal sheet, the forming die forces the latter into the matrix of the press with difficulty, the resistance to compression of the metal sheet creating a very great frictional or wedging engagement with the die and matrix, which can be overcome only by the exertion of excessive power. This action imposes severe strains upon the mechanism of the press, and damage sometimes results, the repair of which is costly.

Our invention is designed to overcome the objections referred to, and by making use of such invention, the requirement for the employment of such excessive power is avoided, and the consequent liability to damage to the drawing press is eliminated.

These desirable results we achieve by constructing the matrix of the press so that one wall thereof will yield when the resistance encountered in the drawing operation exceeds the maximum of power necessary to the proper operation of the press. Such construction includes the arrangement of a pressure relieving or give-way device between the outer side of one wall of the matrix and the adjacent parallel wall of the channel of the bed of the press in which the matrix is placed.

The give-way device referred to is composed of two plates provided on their opposed faces with tongues and grooves which are adapted to register and engage with each other, but which plates are normally maintained in separated position by an interposed plate formed of a metal designed to enable it to ordinarily resist the strains occurring in the normal operation of the press, but to yield when the resistance becomes excessive.

The character and composition of the interposed plate are such that when the normal maximum resistance of the metal blank then being drawn is exceeded, the tongues of the opposed plates will act with a shearing action upon the interposed plate and sever the same, so that the tongues of the oppositely arranged plates may enter the grooves aligned therewith, so as to permit the movable wall of the matrix to recede from its fixed, operative position, and thereby relieve the press of the injurious strains sometimes incident to its operation.

The formation of the interposed plate will be determined by the ascertained maximum strains which it will be required to resist before the shearing action referred to takes place.

The invention in some of its embodiments will now be specifically described, and the novelty thereof will be pointed out in the appended claims.

Referring now to the drawing which accompanies this specification:

Figure 1 is a transverse vertical sectional view of the bed of a drawing press, in perspective, and showing one form of our invention in its operative relation thereto; and Fig. 2 is a longitudinal sectional view showing another form of the invention as applied to a straining rod, the function and operation, that of resisting expansive strains, being the same in each case.

In the drawing, the numeral 10 represents the bed of a drawing press, which may be provided with a sunken matrix 11, one wall 12 of which is mounted so as to have a slight outward yielding movement when excessive resistance arises in connection with the operation of forcing the sheet metal blank into the matrix by means of the customary forming die.

In order to provide for this arrangement, the channel in the bed of the press which receives the matrix is widened so as to permit the insertion of a yielding or give-way device between the movable wall of the ma-

trix and the adjacent portion of the bed of the press.

This yielding or give-way device which serves as a means for relieving the pressure is composed of two hardened metal plates or members 13 and 14, matched on their opposing faces so as to provide sharp cornered tongues 15 and grooves 16, designed to interlock with each other, but normally separated by the interposition of a softer metal plate 17. The nature and characteristics of the said plate will be such as to enable it to resist the normal strains exerted in the drawing operation, and so sustain the matched plates 13 and 14 in their separated positions. However, when the strain encountered in the drawing operation exceeds the normal strain above referred to, the cutting corners of the tongues 15 of the opposed plates will act with a shearing action upon the interposed plate 17, and by severing the same will bring about a release of the excessive pressure, and thus free the press from liability to the damage heretofore encountered when the resistance is excessive. A compressible wooden strip 18 may be placed in the groove on the uppermost tongue of the plate 14, to close the gap and prevent lodgment therein of foreign matter.

The bed of the press may be bored laterally at one side for the reception of a bolt 19, which passes through perforations in the plates 13 and 14, and is threaded into a perforation in the movable wall 12 of the matrix, so as to retain the said wall in a relatively fixed position, but permit the same to move outwardly when excessive pressure is exerted. A loose sleeve or bushing 20 may be inserted in registering openings in the plates 13 and 14, and the shank of the bolt 19 may pass through such sleeve or bushing. Also the plates 13 and 14 and the interposed plate 17 may be connected so as to form a unit by means of screws 21, free to move in a perforation in one of the plates and threaded into the other, the said screw being passed through registering perforations in the interposed plate 17. The number of screws 21 will be such as may be desirable to constitute the unit construction of the pressure relieving devices.

In Fig. 2 we have shown a modification in the application of our device. In this figure the numeral 25 indicates a straining rod joining parts 26 and 27 of a press. Between the part 27 and the nut 28 a yielding or give-way device formed of hardened metal discs 29 and 30, the opposed faces of which are constructed with matched tongues and grooves, arranged in concentric circles, is provided. A washer or cap 31 may be placed between the yielding device and the nut 28. The operation of this construction will be understood from what has been said in relation to the contruction shown in Fig. 1.

It is obvious that the invention may be used in other relations than those illustrated.

Having thus described our invention, what we claim and desire to secure by Letters Patent of the United States, is:

1. Pressure relieving means comprising hardened metal plates provided upon their opposed faces with cutting edges, in combination with a plate of softer metal disposed between the hardened plates and subjected to shearing action when the pressure upon the hardened plates exceeds the normal resistance of the interposed plate.

2. Pressure relieving means comprising hardened metal plates provided with registering tongues and grooves upon their opposed faces, in combination with a plate of softer metal arranged between the hardened plates and subjected to shearing action when the pressure exerted upon the hardened plates exceeds the normal resistance of the interposed plate.

3. In a drawing press, a bed provided with a channel forming a matrix, one wall of which latter is movable in the channel, and a pressure relieving device arranged between the movable wall and the adjacent channel wall, such pressure relieving device comprising hardened metal plates provided on their opposed faces with cutting edges, in combination with a plate of softer metal arranged between the hardened plates and subjected to shearing action when the pressure exerted upon the hardened plates exceeds the normal resistance of the interposed plate.

4. In a drawing press, a bed provided with a channel forming a matrix, one wall of which latter is movable outwardly of the channel, a pressure relieving device arranged between the movable wall and the adjacent channel wall, such pressure relieving device comprising hardened metal plates provided on their opposed faces with cutting edges, in combination with a plate of softer metal disposed between the hardened plates and subjected to shearing action when the pressure upon the hardened plates exceeds the normal resistance of the interposed plate, and means for restraining the inward movement of the movable wall of the matrix.

In testimony whereof, we have signed our names at Milwaukee, this 10th day of October, 1924.

B. T. ANDREN.
J. DILOT.

Witness:
W. F. WOOLARD.