Feb. 12, 1924. 1,483,204

D. STRAND

DIE CUSHION

Filed April 11, 1918

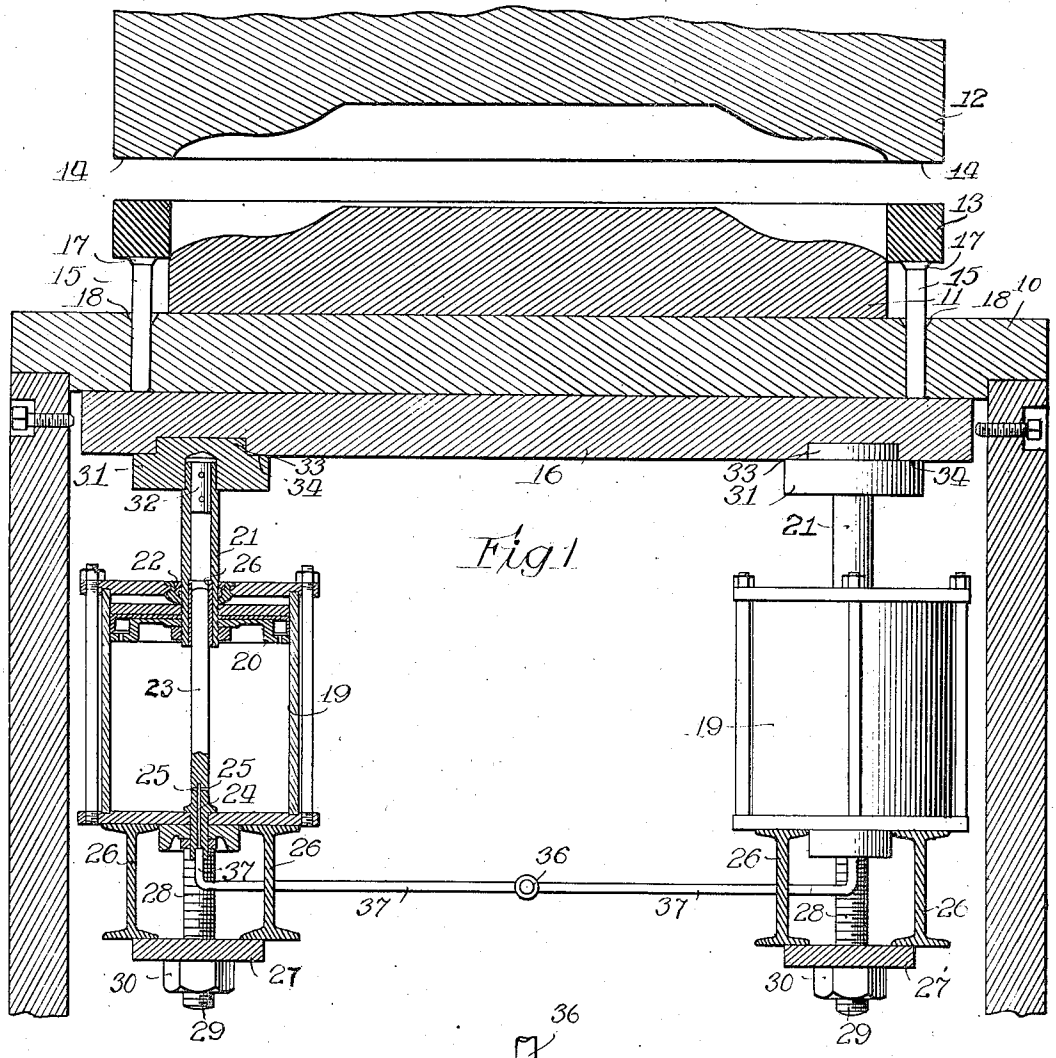


Fig 1

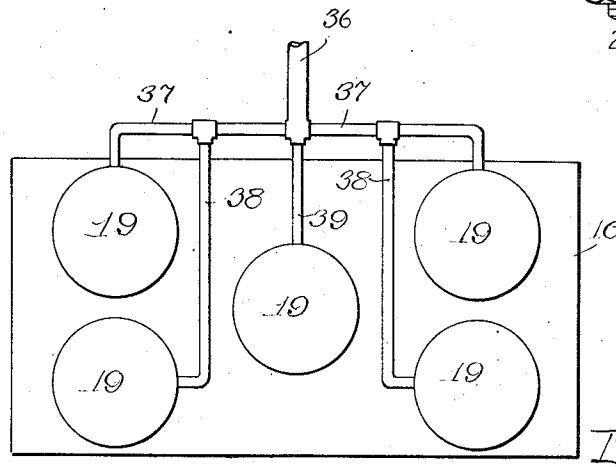


Fig 2

Inventor
David Strand
By: J. F. Jochum & Atty.

Patented Feb. 12, 1924.

1,483,204

UNITED STATES PATENT OFFICE.

DAVID STRAND, OF CHICAGO, ILLINOIS, ASSIGNOR, BY MESNE ASSIGNMENTS, TO MARQUETTE TOOL & MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

DIE CUSHION.

Application filed April 11, 1918. Serial No. 227,940.

To all whom it may concern:

Be it known that I, DAVID STRAND, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Die Cushions, of which the following is a specification.

This invention relates to improvements in die cushions particularly of the fluid pressure type.

In large sheet metal presses, such as are used for stamping or shaping automobile bodies or work of equally large dimensions, heretofore the means usually employed for exerting a pressure on the gripper plate of the die were coil springs, such as are used on railroad cars. Two or more lengths of these springs are placed one under the other and sometimes as many as twenty or thirty springs on one die are employed. It is evident that it is mechanically impossible to tighten these springs so that they will all exert the same pressure at all points upon the gripping means to which they are attached, because of the different temper in the steel and by reason of other mechanical imperfections. Furthermore, there is no way of determining the pressure exerted on the gripping means when the spring is tightened.

To overcome these difficulties and objections fluid pressure cushions are employed instead of the springs and it is possible to control the pressure mechanically and positively. A further advantage of this invention is that once the pressure necessary on the die is determined, all experimenting as to the pressure such as is always necessary in the employment of springs is eliminated, because the same pressure can mechanically, easily and positively be repeated which saves considerable time and experiment in setting up the die.

A further object of the invention consists in the application of a plurality of fluid pressure cushions in a single machine, and means whereby the cushions may be supplied with a fluid preferably from a common source of supply and which fluid is adapted to flow from and back to the source during the operation of the cushions.

To the attainment of these ends and the accomplishment of the other new and useful objects as will appear, the invention consists in the features of novelty in substantially the construction, combination and arrangement of the several parts hereinafter more fully described and claimed and shown in the accompanying drawing, illustrating this invention and in which;

Figure 1 is a view partly in vertical section and partly in side elevation of a portion of a die press having die cushions constructed in accordance with the principles of this invention applied thereto.

Figure 2 is a diagrammatic view showing one method of introducing a fluid into the cushions.

Referring more particularly to the drawing, the numeral 10 designates generally a bolster plate supported upon a suitable structure and upon which plate a male die member 11 is adapted to be secured and which die may be of any desired size and configuration. Co-operating with the male member 11 is a female die member 12, which is given a reciprocating movement in a manner usual in presses of this character. Surrounding the die member 11 is a gripping member 13 and with which gripping member the portions 14 of the female die member are adapted to co-operate to grip the material as the die member 12 descends. The gripping member 13 is controlled by a plurality of pins 15 which pass through the bolster plate 10 and engage and rest upon a pin plate 16 and in order to prevent the pins 15 from becoming disengaged from the bolster plate 10, when the pin plate 16 passes out of engagement with the ends of the pins, the pins may be provided with heads 17 adapted to enter sockets 18 in the bolster plate.

A plurality of fluid pressure cushions are connected with the machine so as to control the operation of the pressure plate, and as the construction and operation of each of the cushions is the same, the description of one will apply equally as well to them all. The cushion consists essentially of a cylinder 19 of any desired size and configuration within which a piston 20 is adapted to reciprocate and this piston may also be of any suitable construction and is connected preferably with a tubular piston rod 21 which extends through a suitable packing or bushing 22. Secured to the end of the cylinder is a guide rod 23 which is of a length to extend into the tubular portion 22 and this guide rod 23 is provided with an inlet

passage 24 leading from the outside of the cylinder and communicates with discharge openings 25 leading into the interior of the cylinder. If desired a suitable bearing or packing ring 26 may be provided in the tubular piston 21 and against which the guide rod 23 has a bearing.

In the present form of the invention, the cylinder 19 is supported by means of suitable eye beams 26, upon which the cylinder rests and the eye beams in turn are held in position by means of a suitable washer or collar 27 through which tie rods or bolts 28 pass and have a threaded extremity 29 upon which a suitable nut 30 is threaded. The other end of the tie bolts are secured to any fixed part of the machine.

A bearing block or element 31 may be connected with the end of the piston 21 which latter is preferably closed by means of a suitable plug 32 to prevent the escape of the fluid and the bearing block 31 is preferably provided with a reduced portion 33 to form a shoulder 34 and which reduced portion 33 is recessed into the pin plate 16 so that the pin plate will rest upon the shoulder 34 to be supported thereby.

Thus it will be manifest that when the piston and cylinder are given a relative reciprocating movement, the pin plate 16, together with the pins 15 and the pressure member 13 will rise or fall according to the relative movement of the piston and cylinder.

In the present form of the invention the fluid is supplied to the cylinders from a suitable source such as by means of a pipe 36 having branches 37 leading therefrom and connected with some of the cushions and branches 38 leading from the branches 37 and connected with others of the die cushions and if desired, another pipe connection 39 may lead from the supply pipe 36 to still another die cushion.

It will thus be manifest that during the relative reciprocating movement of the cylinder and piston, the fluid will flow into and out of the cylinder from and back to the source and by regulating the pressure of the fluid, it will be manifest that the cushions will all exert a uniform and substantially unvarying pressure at all points upon the pressure member 13. Obviously any number of these cushions may be employed and may be arranged in any desired or suitable manner and may be arranged at any convenient or desired points with respect to the pin plate 16 so that a uniform pressure will be exerted at all points on the pressure member 13.

It will also be manifest that after the desired pressure has been obtained, it is not necessary to readjust the parts after each operation, as they will maintain their constant and unvarying pressure.

Furthermore by the use of this improved attachment it is possible to convert an ordinary power punch press into a sheet metal drawing press while maintaining the press in tact for its original designed purposes. This converting or changing of the press for different kinds of work is accomplished in the following manner.

As shown in the drawing the press is in condition for a drawing operation and shows this improved die cushion active for operation, the ram of the press not being illustrated in the drawing, it being understood that the die member 12 is connected with the ram.

The parts located above the bolster plate 10, that is, the elements 11, 12, and 13, as well as the elements 15, do not constitute a part of the press proper but do constitute parts of the die, and therefore by the statement that a punch press may be changed or converted into a sheet metal drawing press, is meant that the drawing die embodying the elements 11, 12, and 13, as well as the pins 15, are to be removed from the press and replaced by another die for performing the desired operation. At the same time, the pressure is removed from the cushion.

It will thus be seen that the press will then be adapted for the punching work, or the work for which it was originally designed.

What is claimed as new is:—

1. Means for converting an ordinary power punch press into a sheet metal drawing press while maintaing the press in tact for its original designed purposes, said means embodying a cushion, the said cushion embodying a plurality of pressure cushions, and gripping means for the material carrying projecting operating and guiding means, a plate engaged by such projecting means, and with which plate the cushions are operatively connected, whereby a substantially unvarying pressure will be exerted by the cushions upon the gripping means, said cushions and the mechanism responsive to the operation thereof being adapted to be rendered inactive at will, while the remaining parts of the press remain active.

2. Means for converting an ordinary power punch press into a sheet metal drawing press while maintaining the press in tact for its original designed purposes, said means embodying a cushion, the said cushion embodying a plurality of pressure cushions, gripping means for the material carrying projecting operating and guiding means, a plate engaged by such projecting means, and with which plate the cushions are operatively connected, whereby a substantially unvarying pressure will be exerted by the cushions upon the gripping means, said cushions and the mechanism responsive thereto being adapted to be rendered in-

active at will while the remaining parts of the press remain active, and a common source of supply for distributing the fluid to the cushions.

3. Means for converting an ordinary power punch press into a sheet metal drawing press while maintaining the press in tact for its original designed purposes, said means embodying a cushion, the said cushion embodying a plurality of fluid pressure cushions, gripping means for the material carrying projecting operating and guiding means, a plate engaged by such projecting means, and with which plate the cushions are operatively connected, whereby a substantially unvarying pressure will be exerted by the cushions upon the gripping means, said cushions and the mechanism responsive to the operation thereof being adapted to be rendered inactive at will, while the remaining parts of the press remain active, and a common source of supply for distributing the fluid to the cushions, the said supply embodying means whereby the fluid pressure will be equally distributed to all of the cushions.

In testimony whereof I have signed my name to this specification on this 6th day of April, A. D. 1918.

DAVID STRAND.