

Sept. 23, 1952

K. JANISZEWSKI

2,611,435

DIE SET

Filed May 24, 1946

2 SHEETS—SHEET 1

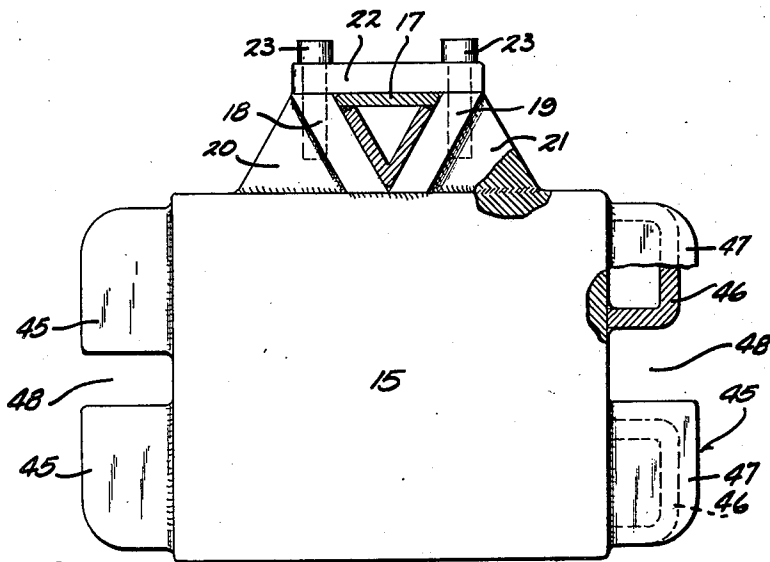


Fig. 1

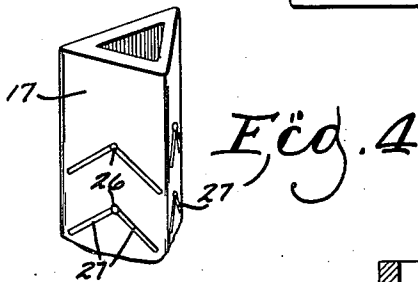


Fig. 4

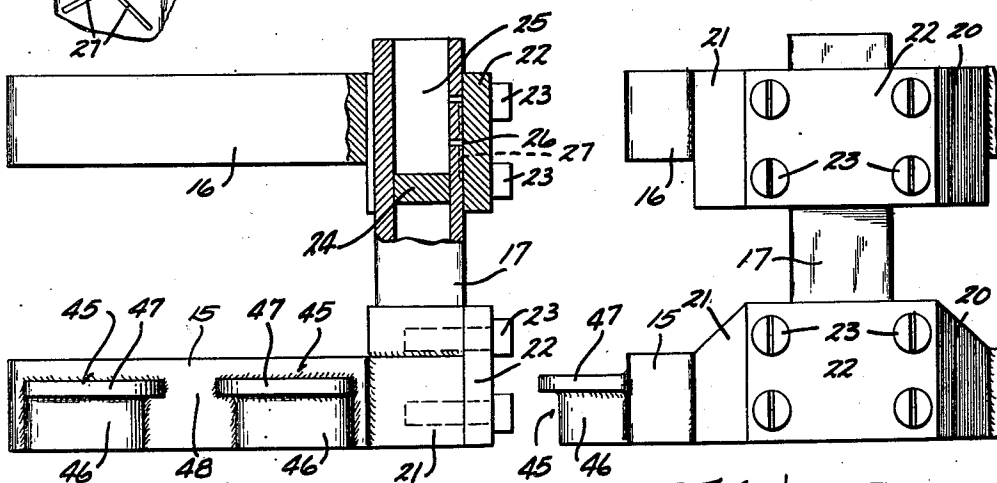


Fig. 2

Fig. 3

INVENTOR
KASIMIR JANISZEWSKI
BY
Wheeler, Wheeler & Wheeler
ATTORNEYS

Sept. 23, 1952

K. JANISZEWSKI
DIE SET

2,611,435

Filed May 24, 1946

2 SHEETS—SHEET 2

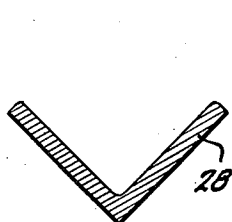


Fig. 5.

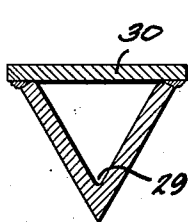


Fig. 6.

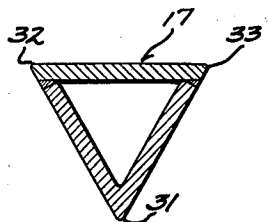


Fig. 7.

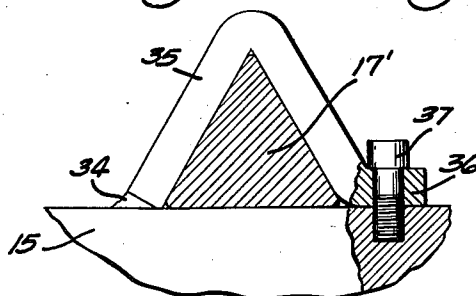


Fig. 8.

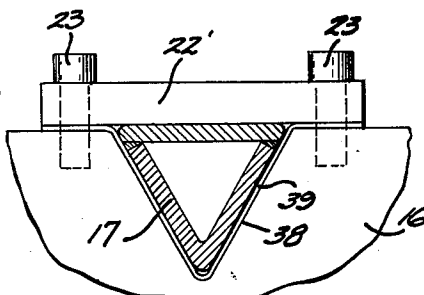


Fig. 9.

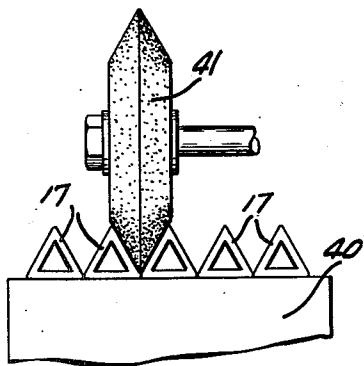


Fig. 10.

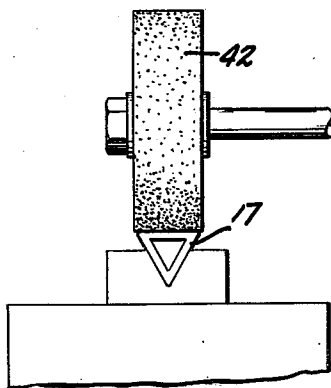


Fig. 11.

INVENTOR
KASIMIR JANISZEWSKI
BY
Wheeler, Wheeler & Wheeler
ATTORNEYS

UNITED STATES PATENT OFFICE

2,611,435

DIE SET

Kasimir Janiszewski, Milwaukee, Wis., assignor to
Superior Steel Products Corp., Milwaukee, Wis.,
a corporation of Wisconsin

Application May 24, 1946, Serial No. 672,053

7 Claims. (Cl. 164—118)

1

This invention relates to improvements in die sets.

It is a primary object of the invention to provide increased accuracy of guidance between the punch carrying platen and the bed plate of a die set, while reducing cost of manufacture.

Increased accuracy is attributable to the fact that according to the present invention the leader pin and bushing are polygonal in cross section (preferably triangular) thereby providing flat bearing surfaces as distinguished from the line bearing contact between cylindrical pins and bushings.

Economy is attributable to the following facts: First, the polygonal form of the leader pin and bushing makes it possible, in a small die set, to use a single leader pin rather than two or more. Secondly, the die set may be fabricated with considerable saving in material cost and labor as compared with conventional methods of cutting plates and forming and mounting leader pins and bushings. Thirdly, the present invention contemplates means whereby adjustments may be made to compensate for wear so that the life of the die set may be indefinitely prolonged. Fourth, my improved leader pin construction lends itself to mass production as distinguished from the individual attention required by leader pins previously used. Fifth, my improved die set may be readily salvaged and converted to a different usage.

A further object of the invention is to provide a new and improved lubricating arrangement for the surfaces of the leader pin and bushing.

Still another object of the invention is to provide novel and improved means for handling the die set or bed plate made in accordance with the present invention. Other objects will be apparent to those skilled in the art upon analysis of the following disclosure.

In the drawings:

Fig. 1 is a plan view of the die plate of the die set embodying the present invention, the leader pin being shown in section and portions of the bed plate being broken away.

Fig. 2 is a view partially in side elevation and partially in section through a completed die set including the bed plate shown in Fig. 1.

Fig. 3 is a fragmentary view in rear elevation of the die set shown in Fig. 2.

Fig. 4 is a fragmentary detail view in perspective showing the leader pin employed in the die set of Figs. 1, 2 and 3.

Fig. 5 is a view in plan of the end of a piece of angle stock from which my improved leader pin may be formed.

2

Fig. 6 is a plan view showing an intermediate step in the process of making the leader pin.

Fig. 7 is a view in horizontal cross section through the completed leader pin.

Fig. 8 is a view partially in plan and partially in section showing a modified embodiment of leader pin mounted in the die set.

Fig. 9 is a plan view of a further modified leader pin arrangement.

Fig. 10 is a view partially in end elevation and partially in section showing a grinding operation performed in the completion of leader pins in accordance with the present invention.

Fig. 11 is a view similar to Fig. 10 showing a further grinding operation.

While a die set embodying the present invention may be provided with any desired number of leader pins, I have selected as an embodiment of the invention a die set using a single leader pin to exemplify the fact that the invention makes it possible to use a single leader pin in place of two or more as heretofore required.

The shoe or bed plate 15 and the punch carrier or platen 16 are guided for relative reciprocation by the leader pin 17 which, for purposes of the present invention, is polygonal in cross section. I have found it desirable to employ a leader pin of triangular cross section, as shown, in preference to the various other polygonal forms which I have tested, as the triangular form gives great stability combined with maximum bearing surface area so disposed in a minimum number of plane surfaces as to resist torsion or displacement of plates 15, 16, in the course of their relative movement.

While the leader pin is ordinarily fixed to the bed plate, the platen being slidable thereon, the manner in which the respective plates are connected to the leader pin may be very similar.

The upper and lower plates 15 and 16 of the die set are both provided with receptacles corresponding in cross section to the selected polygonal form of the leader pin. Each receptacle preferably has a removable wall whereby the leader pin 17 may be clamped, in the case of the bed plate, and slidably positioned with respect to the movable plate or platen. In the construction shown in Fig. 1, the receptacle is fabricated by welding end bars 18, 19 and gussets 20, 21 to the rear margin of the bed plate 15, the bars meeting each other at an acute angle and providing surfaces complementary to two surfaces of the leader pin 17. The third wall of the receptacle is provided by a closure plate 22 held by cap screws 23 in clamping relation to the third side of the leader pin 17.

3

As shown in Figs. 2 and 3, the receptacle in which the leader pin slides during vertical reciprocation of the platen 16 may be made identically and connected with the platen 16 identically in the manner above described, the only difference between the two receptacles being in the provision of sufficient clearance between leader pin and the bearing surfaces of one of the receptacles to permit freedom of sliding movement. This may be done in the machining of the rear margins of the receptacle forming walls 18, 19 or, if these parts are identical as between the platen and bed plate, shims may be inserted for the support of the closure plate 22 of the receptacle at the rear of the platen.

In any event, it will be apparent that the bearing pressure or clamping pressure, developed by the closure plate 22 will be applied uniformly to the three sides or faces of the leader pin 17 and the entire areas of the leader pin within the receptacle may readily be made subject to uniform bearing contact, the device being thereby sharply distinguished from a cylindrical surface in which only line contact is possible. Because of the large areas in contact a single leader pin will suffice for a small die set as shown in Fig. 1 and will resist torsional displacement of the platen and assure free sliding movement of the platen vertically with respect to the bed plate.

Assuming the leader pin 17 to be hollow, as shown, it may very conveniently be lubricated by inserting a plug 24 in its hollow interior and putting oil or other lubricant into a wick 25 supported by the plug. Openings at 26 communicating with grooves 27 in the exterior faces of the leader pin permit the oil to flow as needed to the bearing surfaces of the receptacle.

The leader pin may be solid as indicated at 17' in Fig. 8, but is preferably fabricated. Starting with the piece of 90° angle stock shown at 28 in Fig. 5, I form the angle in a die to reduce it to 60° as shown at 29 in Fig. 6. Thereupon I weld the back plate 30 to the margin of the angle so that the resulting hollow bar has the interior section of an isosceles triangle. The sides are then surfaces to include the projecting corners and to make up the leader pin 17 as shown in Fig. 7, the apices at 31, 32 and 33 preferably being slightly relieved by being rounded as shown.

The receptacle for any type of leader pin need not be fabricated in the manner shown in Fig. 1, but may comprise, in whole or part, surfaces of the bed plate 15 or the die carrying shoe 18, as the case may be. For example, I have shown in Fig. 8 a receptacle made by welding at 34 to the plate 15 a strip of metal 35 bent to the shape of an inverted V and having an offset end 36 held by screw 37 to plate 15. The release of screw 37 relaxes the pressure of the strip of metal 35 upon the leader pin 17', thereby permitting insertion or replacement of such pin. Tightening of screw 37 firmly clamps the pin to plate 15, the edge of the plate forming one lapped face of the triangular clamp in which the leader pin 17' is held.

Another example is shown in Fig. 9 where the die carrying shoe plate 16 is provided with a V-shaped notch at 38 preferably equipped with a hardened liner 39 for the leader pin 17. The closure plate 22' is bolted to the shoe 16 across the notch, thereby completing a triangular bearing which serves as a bushing but provides three

4

planiform bearing surfaces slidable upon the leader pin 17.

In Figs. 10 and 11, I have shown operations in the grinding of leader pins embodying this invention. The flat faces of these pins facilitate fabrication, machining and finishing. In Fig. 10, a number of the leader pins 17 are carried side by side on a fixture 40 and a grinding wheel 41 having a pair of angularly beveled faces is simultaneously finishing the opposing faces of two of the leader pins. If it be desired to finish the faces of the leader pins individually, this may be done by the cylindrical wheel 42, as shown in Fig. 11. Whatever the method of production used, the fact that the leader pins are polygonal in cross section assures large areas of contact and the triangular cross section is particularly desirable because the bearing pressure may, by a variety of mechanical expedients, be closely regulated to give accurate guidance for the relative reciprocation of the die plates with no more friction than is required for accuracy.

To facilitate the anchorage as well as the transportation of my improved die set, I prefer to provide the plate 15 with fabricated ears 45 which are spaced in pairs at opposite ends of the plate, as best shown in Fig. 1. Each of these ears is made by bending a piece of bar stock into a broad U, as indicated at 46, welding its ends to the ends of the plate 15 and thereafter welding to the plate and the bar a cover member 47. This cover member preferably overhangs its hollow support 46 in the manner shown in Figs. 1, 2 and 3, thereby facilitating the introduction of a T-headed lifter beneath flanges 47. At the same time, the space at 48 between the pairs of ears receives a tension bolt by means of which the bed plate may be firmly anchored on its bench or frame.

I claim:

1. As a new article of manufacture, a die set plate provided with a leader pin receptacle having flat interior surfaces arranged in polygonal outline, said receptacle comprising at least one relatively movable wall providing one of said flat surfaces, a portion of said receptacle, including at least the said movable wall, being outside of the outline of said plate.

2. As a new article of manufacture, a die set plate provided with a leader pin receptacle having flat interior surfaces arranged in polygonal outline, said plate having surfaces providing at least one of the faces of said receptacle, other faces of said receptacle being provided by a bar welded at one end to said plate and having a releasable screw connection at its other end with said plate.

3. As a new article of manufacture, a die set plate provided with a leader pin receptacle having flat interior surfaces arranged in polygonal outline, said receptacle comprising two angularly related faces notched into said plate and a closure spanning the notch and providing a third face for said receptacle, said closure having means connecting it with said plate.

4. A die set comprising relatively movable plates, a single prismatic leader pin fixed to one of said plates, the other plate being provided with a receptacle having flat faces complementary to said leader pin and in flat face bearing contact with said leader pin whereby said single pin provides guidance for the relative reciprocation of said plates and resists torsional displacement of one of said plates respecting the other, said leader pin and receptacle being of triangu-

5

lar cross section and said receptacle comprising one relatively movable wall, and means for tightening said wall toward said leader pin whereby to establish bearing contact on all three faces of the leader pin.

5. A die set comprising in combination a leader pin of triangular section and a receptacle of complementary section having first and second walls and a third relatively adjustable wall, together with means for tightening the relatively adjustable wall toward at least one of said other walls, whereby to develop pressure bearing contact ensuring the bearing of all three faces of the leader pin against all three faces of the receptacle.

6. The combination set forth in claim 5 in which the receptacle is provided with a liner.

7. A die set comprising in combination a leader pin member of triangular cross section and a receptacle member of complementary triangular cross section, said receptacle member having wall portions relatively adjustable, and one of said members being relieved at its corners whereby

6

bearing pressure developed by the adjustment of the movable portion of the receptacle will be distributed between all of the bearing faces of the leader pin and receptacle.

KASIMIR JANISZEWSKI.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
99,149	Burke	Jan. 25, 1870
312,643	Knox	Feb. 24, 1885
1,423,917	Dismont	July 25, 1922
1,568,017	Danly	Dec. 29, 1925
1,921,421	Marsilius	Aug. 8, 1933
2,422,775	Connor	June 24, 1947

FOREIGN PATENTS

Number	Country	Date
752,539	France	Sept. 25, 1933