C. D. McDONALD & C. E. ENNES.

DIE PRESS MECHANISM OR THE LIKE.

APPLICATION FILED JUNE 16, 1913.

1,121,271.

Patented Dec. 15, 1914.

4 SHEETS—SHEET 1.

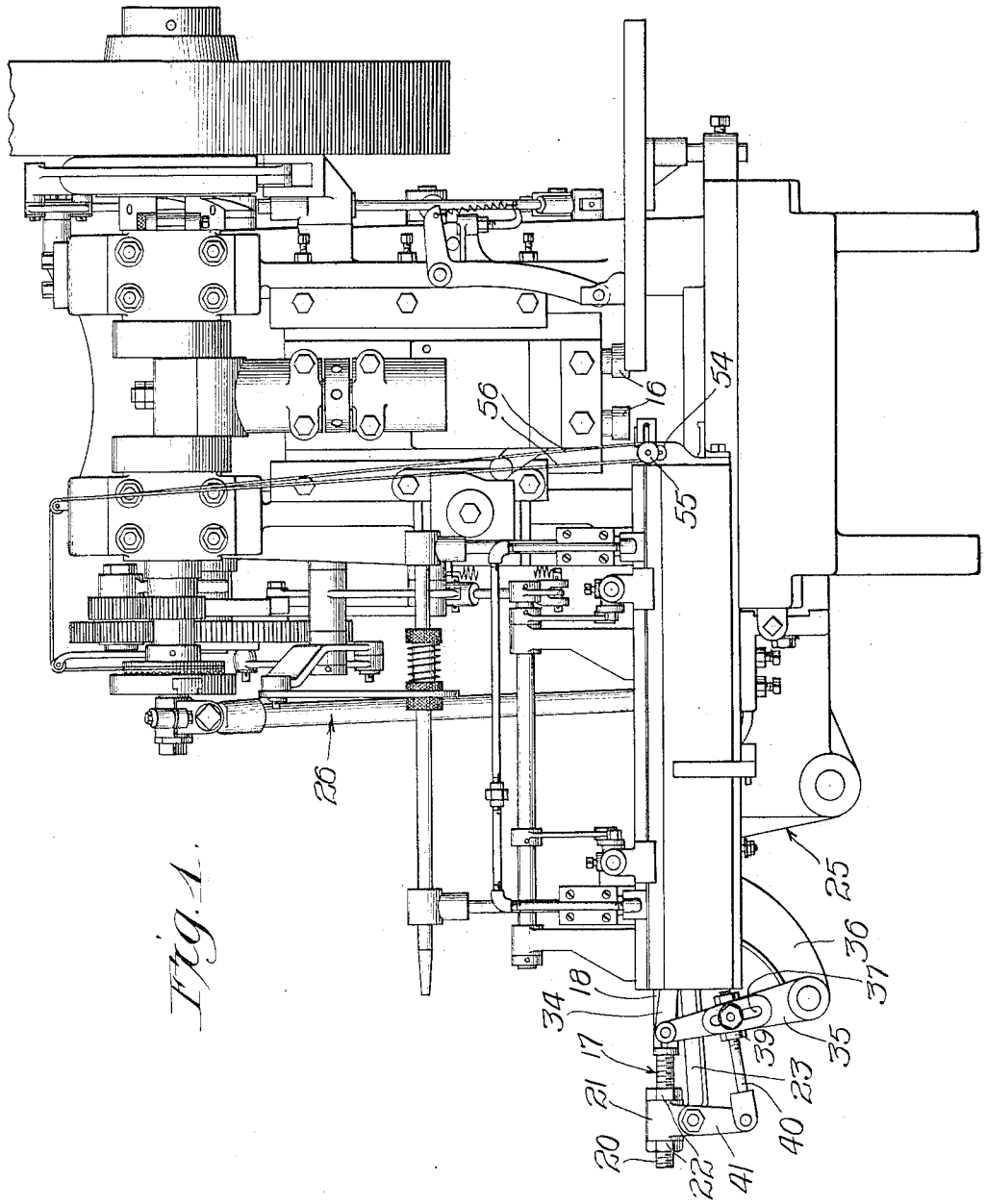


Fig. 1.

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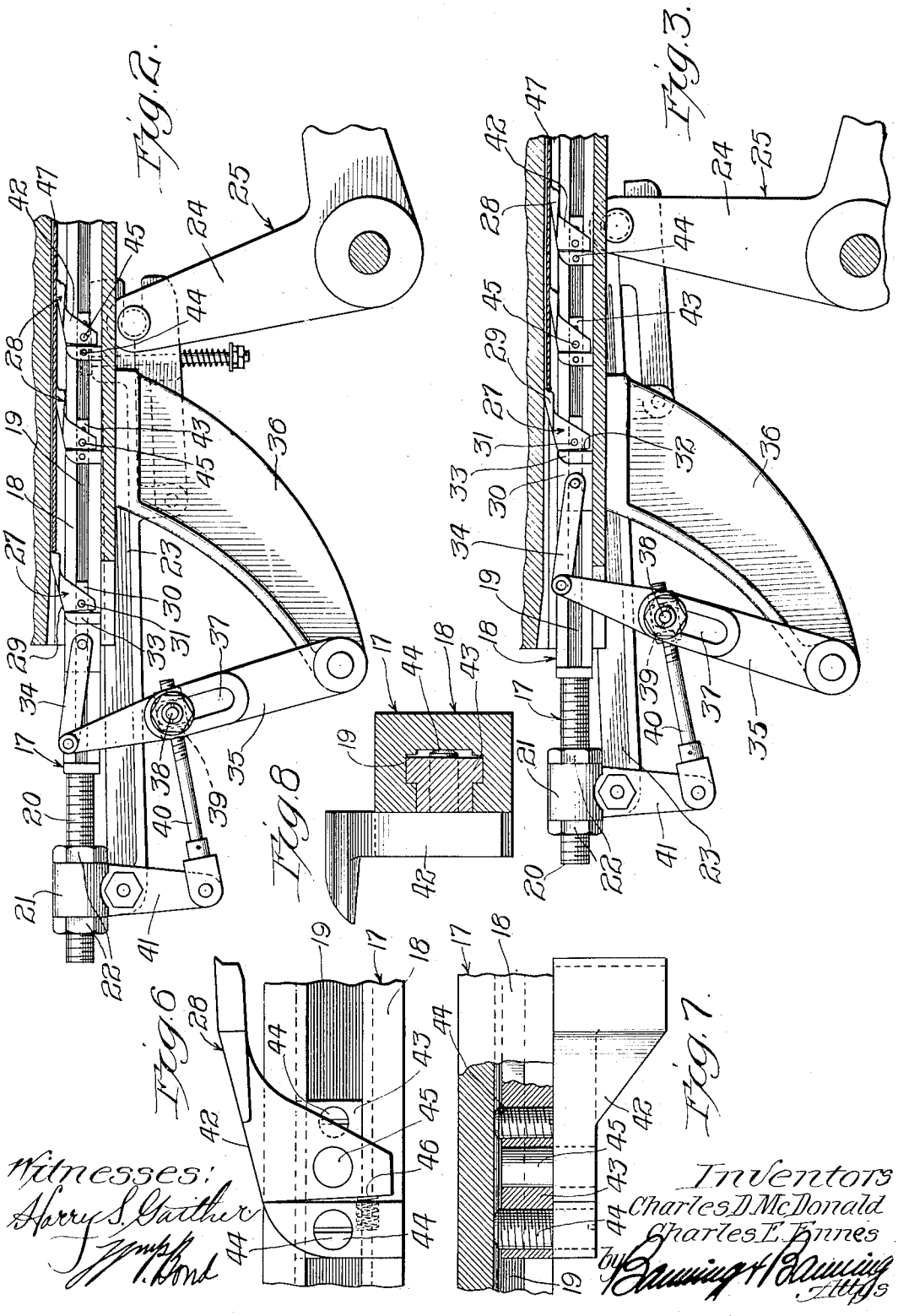
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4 SHEETS—SHEET 2.



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4 SHEETS—SHEET 3.

Fig. 4.

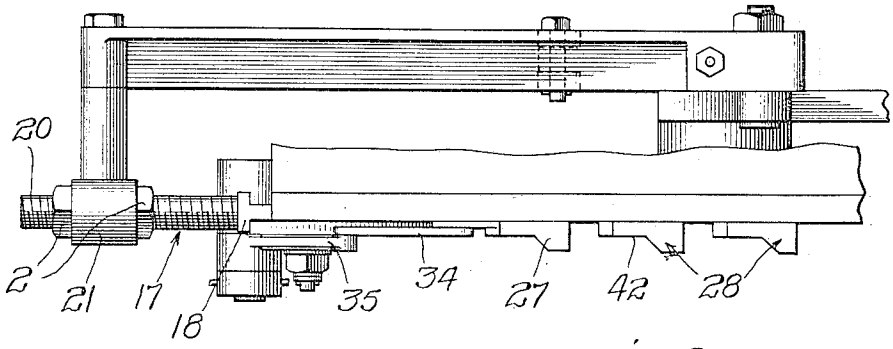


Fig. 9.

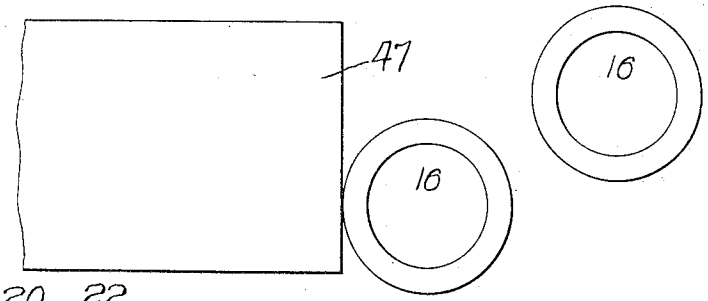


Fig. 5.

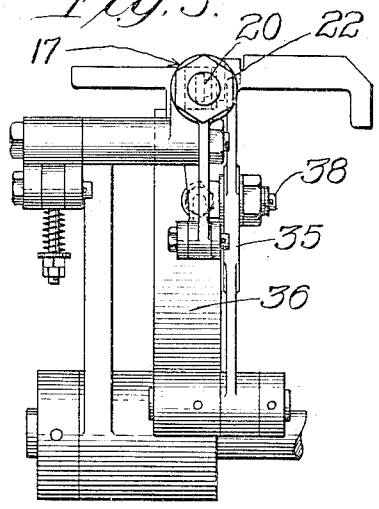


Fig. 10.

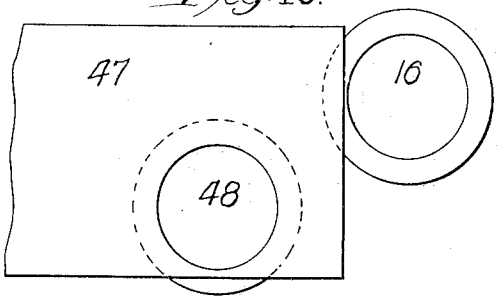
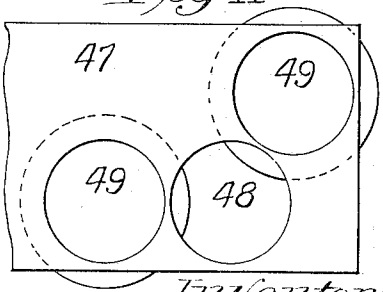


Fig. 11.



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4 SHEETS-SHEET 4.

Fig. 12.

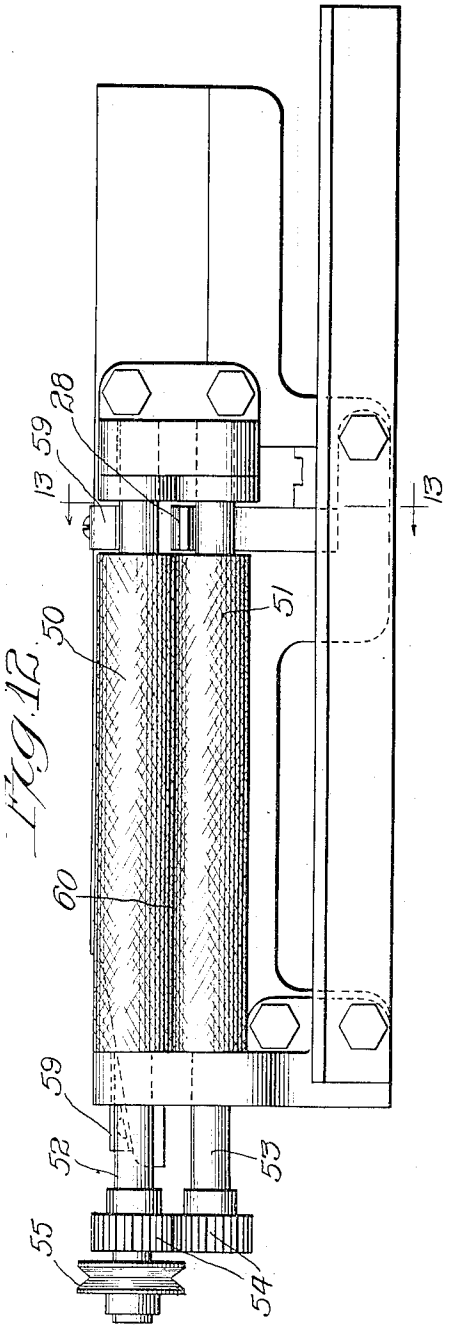


Fig. 15.

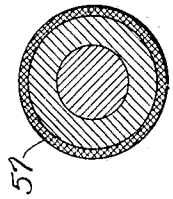


Fig. 13.

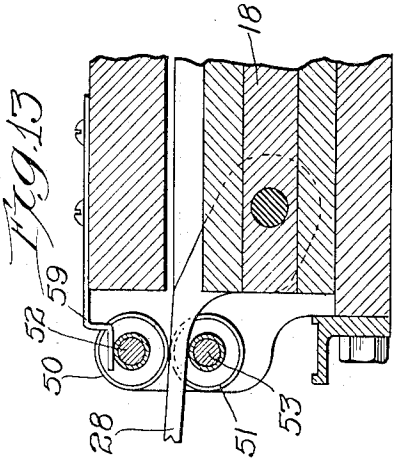
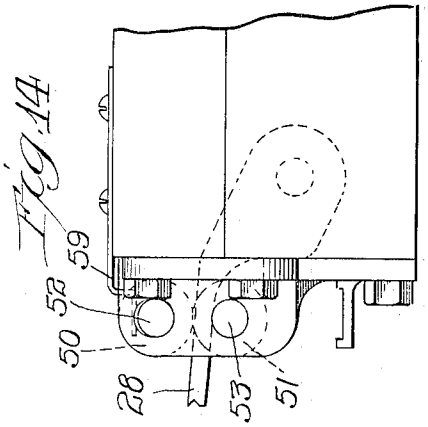


Fig. 14.



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UNITED STATES PATENT OFFICE.

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DIE-PRESS MECHANISM OR THE LIKE.

1,121,271. Specification of Letters Patent. Patented Dec. 15, 1914.

Application filed June 16, 1913. Serial No. 774,067.

To all whom it may concern:

Be it known that we, CHARLES D. McDONALD and CHARLES E. ENNES, both citizens 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-Press Mechanisms or the like, of which the following is a specification.

The present invention relates to certain parts or attachments for an automatic die press, and is capable of use with single or double acting presses equipped with one or more dies.

The objects of the present invention are to provide a feed mechanism for carrying the work into position to be acted upon by the dies, which mechanism will impart to the work an initial feed movement greater than the subsequent feed movements; to bring about this increased movement by an amplification of the normal movement of the feed mechanism: and to provide means for placing oil over the surface of the work prior to the operation of the dies upon the work.

The invention further consists in the features of construction and combination of parts hereinafter described and claimed.

In the drawings: Figure 1 is a front elevation of a die press equipped with the mechanism of the present invention; Fig. 2 an enlarged detail of the rear portion of the feed bar showing the initial feeding member in position to commence the feeding operation; Fig. 3 a view similar to Fig. 2 showing the position that the parts assume after the initial feeding member has completed its feeding operation; Fig. 4 a detail plan view of the parts shown in Figs. 2 and 3: Fig. 5 an end view of the parts shown in Figs. 2 and 3; Fig. 6 an enlarged detail showing a side elevation of one of the feeding members; Fig. 7 a plan view of the parts shown in Fig. 6 with certain portions partially broken away; Fig. 8 a cross section of the feed bar and feeding member; Fig. 9 a diagrammatic view showing the relative position between the work and dies prior to the commencement of the feeding operation; Fig. 10 a view similar to Fig. 9 showing the relative position between the die and the work upon the completion of the initial feeding movement; Fig. 11 a view similar to Figs. 9 and 10 showing the relation between the dies and the work upon the completion of a subsequent feeding movement; Fig. 12 a face view of the mechanism for spreading the oil over the surface of the work; Fig. 13 a section on line 13—13 of Fig. 12 looking in the direction of the arrow; Fig. 14 a view looking at one end of the parts shown in Fig. 12; and Fig. 15 a cross section through one of the rolls shown in Fig. 12.

The novel arrangement of the feeding mechanism is very applicable for use with multiple die presses, for the reason that, in feeding the work to the dies, a relatively long initial feeding movement must be given the same, which will carry it across the surface of the first die and up to the edge of the second die; after this, the work is fed with a step by step movement, a distance a trifle greater than the diameter of the cutting edge of the die. The present invention deals with a mechanism for carrying out a feeding operation as above described, which will so operate as not to bend or mutilate the edge of the work by reason of the long initial feeding stroke. That portion of the present invention relating to the placing of oil on the surface of the work is not limited in any way to use with double die presses, but is adapted for use with any style of press desired. The oiling operation eliminates any tearing or defacing of the work, when the work is subjected to a drawing operation, which is an operation that will bend the work, as, for instance, form a flange when an article, such as a cap, is being formed, and is of benefit when the work has a printed or decorative surface, or when a deep draw is made, as in such cases it has been found that the surface of the die in passing over the surface of the work to perform the drawing operation will stick, tearing the work in case of a deep draw, or marring the decorative surface of the work, the latter being true whether the draw be deep or shallow.

Referring to the drawings, and particularly to Fig. 1, a die press is therein illustrated which is similar to the die press shown in Patent No. 1,039,565, issued September 24, 1912, to Charles D. McDonald, for metal working machines. The present invention deals more particularly with the feeding and surface oiling mechanisms of the press, and it is not deemed necessary to describe any other details of construction

than those which may relate to the above mechanisms. The press, as illustrated, is of a double die type, and consists of companion die members 16 operated by any suitable mechanism. For the purpose of feeding the work up into position to be acted upon by these die members, we employ a feed bar 17, best illustrated in Figs. 2 to 8 inclusive. This bar consists of a body portion 18 provided with a T-shaped slot 19, and the bar terminates at its forward end in a threaded stem-like portion 20, to which is secured a sleeve 21, which sleeve is locked in place upon the stem-like portion by suitable locking members 22. This sleeve is connected by a link or bar 23 to an arm 24 of a crank 25, which is operated by a connection 26, best shown in Fig. 1, from the main drive shaft. The connection between the drive shaft and the feed bar is such that the rotary motion of the drive shaft will communicate and impart a reciprocating movement to the feed bar.

The feed bar has mounted thereon an initial feed member 27 and what may be termed a series of subsequently acting feed members 28. The initial feed members consist of a finger 29 mounted on a block 30, which block has its under face configured to conform to the T-shaped configuration of the slot 19, and this block 30 is at all times freely movable in the slot 19. The finger 29 is pivoted as at 31, and is normally held at a slight upward inclination by a spring 32. A lug or abutment 33 is formed on the block 30, which serves to arrest and limit the movements of the finger about the pivot 31. Connected to this block 30 is a link 34, which in turn is attached to one end of an arm 35 pivotally secured to a bracket 36. The arm 35 is provided with a slot 37, through which extends a pin 38, and mounted to rock upon this pin is a bearing 39 for one end of a threaded stem 40. This stem 40 has its other end pivotally attached to an ear 41 secured to the sleeve 21.

The feeding members 28 are each alike in configuration, and are illustrated more in detail in Figs. 6, 7, and 9. Each consists of a finger 42 mounted on a block 43. This block is T-shaped in cross section, as will be seen from Fig. 8, and is of similar formation to the block 30. The blocks 43, however, are not intended to have free movement within the slots 19, and are locked in fixed relation to the bar 17 by suitable screws 44 or other means. These locking means are, however, releasable, so that the finger may be adjusted in any position desired with respect to the bar. Each block 43 carries a pin 45 about which the finger 42 has a pivotal movement, and a spring 46 similar to the spring 32 serves to hold the finger 42 normally at a slight upward inclination as in Fig. 6.

The operation of this portion of the device is as follows: Upon motion being imparted to the crank 25, the feed bar 17 is reciprocated. By means of the connection consisting of the ear 41, the stem 40, arm 35, and link 34, this reciprocating movement is communicated from the feed bar to the initial feeding movement 27, but, as will be obvious, this movement is amplified owing to the nature of the connection, and thus, when the feed bar travels a stroke of, say, three inches, a movement of, say, four and a half inches, might be imparted to the initial feeding member. It is, of course, understood that these distances are merely given for illustrative purposes, the idea intended to be conveyed is that the initial feeding member will be given a movement greater than the normal movement of the feed bar. Thus, upon the first stroke of the feed bar, the work is fed by the initial feeding member a distance greater than the normal feeding stroke, so that the work, in double die presses, on the first feeding movement is carried clear across the first die, and up to the cutting edge of the second die. After this movement the work is fed by the action of the subsequent feeding members 28. These members are fixedly held with respect to the feeding bar, and, of course, move the same distance as the feed bar. Thus, after the initial feeding operation, the work is fed forward with a step by step movement, each step being slightly greater than the diameter of the cutting face of the die and equal to the stroke of the feed bar. By arranging the connection between the stem 40 and the arm 35 a greater or less movement can be imparted to the initial feed members. It is obvious that, as the connection is moved toward the lower end of the slot 37, the power will be applied closer to the fulcrum of the arm 35, and thus a greater degree of movement is imparted to said arm.

The various positions assumed by the work with respect to the die will be clearly understood by reference to Figs. 9, 10, and 11. In Fig. 9, which shows the position prior to the initial feeding movement, the work 47 is located slightly to the rear of the first of the dies 16. In Fig. 10, which shows the position after the initial feeding movement, it will be seen that the work has been forced clear across the first of the dies 16, and up to within a short distance of the cutting edge of the second of the dies 16, and a hole 48 has been produced by the action of the first die. Now by referring to Fig. 11, which shows the position of the second feeding movement, it will be seen that the work has been pushed across the second die, and holes 49 are cut by the first and

second dies, which cutting takes place by a simultaneous action. Thereafter two holes are cut each time in the same relation to one another as the holes 49.

Now referring to that portion of the invention dealing with the means for placing oil on the surface of the work, this part of the invention is illustrated in connection with the other mechanism in Fig. 1, and as shown, is located at the terminus of the slot to which the work is pushed by the feed bar, and acts on the work just before it is placed on the table of the die mechanism. The device, as shown, consists of two rollers, an upper roller 50 and a lower roller 51, each of which is mounted on a shaft, as best shown in Fig. 12, the roller 50 on a shaft 52, and the roller 51 on a shaft 53. The rollers have secured thereto a pinion 54, and a pulley 55 is attached to the shaft 52, and, as shown in Fig. 1, is driven by a belt 56 which is actuated by the operation of the main driving shaft in any suitable manner. Each of the rollers, as shown in Fig. 15, is provided with a cover 57 of an absorbent nature, which covering is saturated with oil or grease, and the work in passing between these rollers has its surface covered with the oil from said cover. At this point it should be stated that wherever the term "oil" is used, it refers to any sort of oily or greasy substance which would be suitable for the purpose intended. These rollers are continuously driven, but do not engage the work with sufficient friction to effect any feeding movement thereof, this latter being done solely by the action of the feeding bar. As shown in Figs. 12, 13, and 14, the last one of the feed members 28 projects through the space between the shafts 52 and 53, and shoves the work from between the rollers 50 and 51. The upper of the rollers is held in place by springs 59, and the bearing in which the shaft 52 is mounted is of an elliptical formation, as shown in Figs. 13 and 14, so that the shaft has a sliding movement in the same. This permits the rollers to accommodate themselves to varying thicknesses of work. The operation of this portion of the device is obvious; the action of the feed members attached to the feed bar forces the work through the space 60 between the rollers, and the rollers by their action spread a surface of grease or oil over the work, so that, when the work is acted upon by the dies, the danger of a printed or other decorative surface becoming damaged during a drawing operation, or the work becoming torn in case of a deep draw is eliminated.

We claim:

1. The combination with double acting die mechanism of means for feeding the work into position to be acted upon by the dies comprising a series of feed members, and means operatively connected for actuating said feed members whereby the work is fed a distance upon the initial movement to carry it across one die and approximately to the cutting edge of the other die and fed upon the subsequent feeding movements a distance at least equal to the diameter of one of said dies, substantially as described.

2. The combination with double acting die mechanism of means for feeding the work in position to be acted upon by the dies comprising a series of feeding members and means operatively connected for actuating said feeding members whereby the work is fed a distance upon the initial feeding movement to carry it across one die and approximately up to the cutting edge of the other die and fed upon the subsequent feeding movements a distance at least equal to the diameter of one of said dies, substantially as described.

3. In die press mechanism or the like, the combination of means for feeding the work into position to be acted upon, comprising a feed bar, a series of feed members carried by said bar, means operatively connected for reciprocating the bar, and means operatively connected for imparting to the initially acting feed member a movement in excess of the normal movement of the feed bar, substantially as described.

4. In die press mechanism or the like, the combination of means for feeding the work into position to be acted upon, comprising a feed bar, a series of feed members carried by said bar, means operatively connected for reciprocating the bar, means operatively connected for imparting to the initial feed member a movement in excess of the normal movement of the feed bar, and means for adjusting the length of movement of the initially acting feed member, substantially as described.

5. In die press mechanism or the like, the combination of means for feeding the work into position to be acted upon, comprising a feed bar, a series of feed members carried by said bar, means operatively connected for reciprocating the feed bar, and means operatively connected and controlled directly by the movements of the feed bar for imparting to the initially acting feed member a movement in excess of the normal movement of the feed bar, substantially as described.

6. In die press mechanism or the like, the combination of means for feeding the work into position to be acted upon, comprising a feed bar, a series of feed members carried by said bar, the initial of said members being normally movable with respect to the feed bar, means for holding the remainder of said members fixed with respect to said bar, means operatively connected for reciprocating the bar, and a connection between said bar and initial feed member for amplifying

the normal movement of the bar and imparting to the initial feed member a movement in excess of the movement imparted to the remaining feed members, substantially as described.

7. In die press mechanism or the like, the combination of means for feeding the work into position to be acted upon, comprising a feed bar, a series of feed members carried by said bar, the initial of said members being normally movable with respect to the feed bar, means for holding the remainder of said members fixed with respect to said bar, means operatively connected for reciprocating the bar, a connection between said bar and initial feed member for amplifying the normal movement of the bar and imparting to the initial feed member a movement in excess of the movement imparted to the remaining feed members, and means for adjusting the degree of movement of the initial feed members, substantially as described.

8. In die press mechanism or the like, the combination of means for feeding the work into position to be acted upon, comprising a feed bar, a series of feed members carried by said bar, the initial of said members being normally movable with respect to the feed bar, means for holding the remainder of said members fixed with respect to said bar, means for reciprocating the bar, and a swinging arm operatively connected to the initial feed member and to the feed bar and serving to amplify the movements of the feed bar, whereby an increased movement is imparted to the initial feed member over that given to the feed bar, substantially as described.

9. In die press mechanism or the like, the combination of means for feeding the work into position to be acted upon, comprising a feed bar, a series of feed members carried by said bar, the initial of said members being normally movable with respect to the feed bar, means for holding the remainder of said members fixed with respect to said bar, means for reciprocating the bar, a swinging arm operatively connected to the initial feed member and to the feed bar and serving to amplify the movements of the feed bar, whereby an increased movement is imparted to the initial feed member over that given to the feed bar, and means for adjusting the connection between said bar and initial feed member for varying the degree of movement imparted to said initial feed member, substantially as described.

10. In die press mechanism or the like, the combination of means for imparting an initiatory feed movement to the work, means for imparting subsequent feed movements to the work, and means for imparting a greater degree of movement to the initiatory feeding means than to the subsequent feeding means, substantially as described.

11. In die press mechanism or the like, the combination of means for imparting an initiatory feed movement to the work, a feed bar, feeding members fixed with respect to said bar and adapted to impart subsequent feeding movements to the work, means for actuating said bar and means operatively connected to said bar actuating means for actuating the initiatory feeding means with a greater movement than the movement of the bar, substantially as described.

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