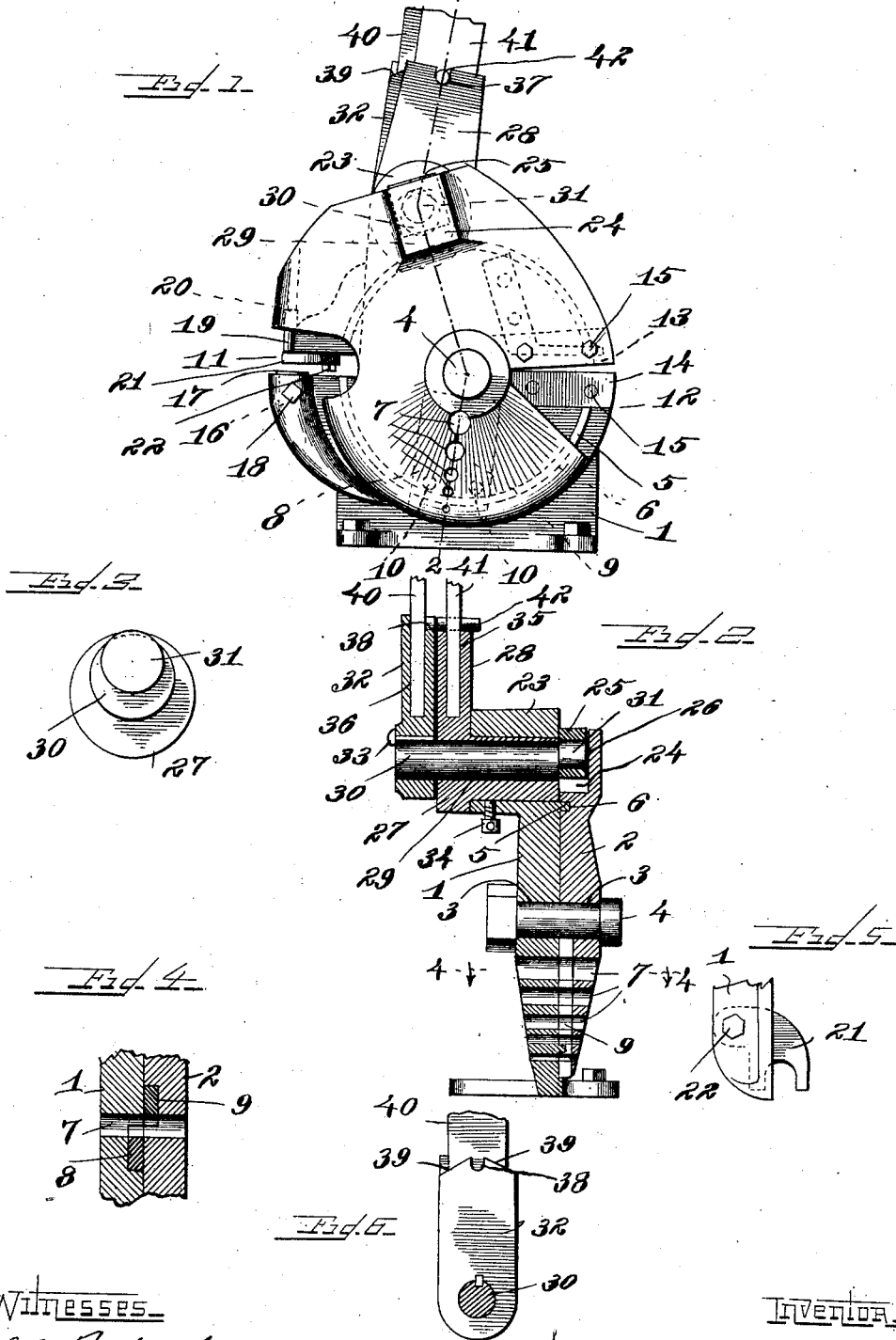


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G. J. BLUM.
PUNCHING AND SHEARING MECHANISM.
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Witnesses.

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PUNCHING AND SHEARING MECHANISM.

No. 833,294.

Specification of Letters Patent.

Patented Oct. 16, 1906.

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To all whom it may concern:

Be it known that I, GEORGE J. BLUM, 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 Punching and Shearing Mechanism, of which the following is a specification.

This invention relates to such tools as punches, shears, &c., and refers particularly to an improved means for obtaining a great leverage in the movement of the punch or other moving part of the tool.

The invention further refers to the general construction of such a tool whereby great strength and rigidity are combined with lightness and portability.

The invention further refers to various improvements in detail hereinafter more particularly specified.

In the accompanying drawings, Figure 1 is a side elevation of a combined punch and shear embodying the features of my invention. Fig. 2 is a transverse section on dotted line 2 2 of Fig. 1. Fig. 3 is an end view of the eccentrics for moving the punch and shear, illustrating the relative positions of said eccentrics. Fig. 4 is a transverse sectional view through the rod-shear on dotted line 4 4 of Fig. 2. Fig. 5 is a detail view illustrating the movable stripper for the punch. Fig. 6 is a fragmental detail view of one of the actuating-levers and its supporting socket member.

In the present embodiment of this invention I have constructed a combined punch and shear having also a separate means for shearing-rods. In this embodiment I provide two members having a pivotal connection. One of these members carries an eccentric adapted to have an engagement with the other member to move the same, and this eccentric is carried by another eccentric for changing the relation of the eccentric first mentioned to said movable member. Each eccentric is provided with an operating-lever, which levers are movable together, separately, or alternately. By a movement of the eccentrics with relation to each other different degrees of leverage may be obtained.

Referring to the drawings, 1 designates the stationary member or standard of this punch and shear, and 2 the movable member, both

in general of a circular outline. These members are provided with central openings 3 and are held firmly together by means of a pivotal bolt 4. The meeting faces of the members are substantially flat, save that the standard 1 carries a concentric rib 5, adapted to lie within a corresponding concentric groove 6 of the movable member. Below the central pivotal openings 3 said members are provided with coinciding rod-openings 7 of sizes decreasing regularly from the one nearest the pivotal center outwardly. Adjacent to said rod-openings 7 the meeting faces of the members 1 and 2 are recessed to provide seats for the rod-shears 8 and 9, each of which shears is secured within its recess by means of the countersunk screws 10. At opposite points in their peripheries said members 1 and 2 are cut away to form the throatway 11 and 12 for the punch and the shear, respectively. Adjacent to the throatway 12 the meeting faces of the members 1 and 2 are also radially recessed to form seats for the two shear-blades 13 and 14, which blades are secured within their recesses by means of the tap-screws 15, passing through suitable openings in said members and entering screw-threaded openings in said blades. In the throatway 11 the member 1 is provided with a pocket 16 for receiving the punch-die 17, which die is held in position in said pocket by means of the set-screw 18. In a position to coincide with said punch-die the member 2 carries a punch 19, seated in a counter-bored opening 20, the smaller portion of which opening extends upward to the periphery of said member 2. The punch is seated in the larger end of the counterbored opening, but may readily be driven out of said opening by means of a small hand-punch inserted into the upper end of said opening 20.

A stripper 21 is pivotally mounted upon the member 1 and extends into the throatway 11 of the punch. By means of its pivotal bolt 22 it may be set in its position with relation to said punch or by loosening said bolt may be swung outward from said throatway to clear the latter of all obstructions.

Near its upper side the member 1 is provided with an outwardly-extending tubular hub 23, and at a point coinciding with said hub the movable member 2 is provided with

a radial recess 24 to receive a bearing-block 25, having a central opening 26. The tubular hub 23 carries a stud 27, having the integral radially-extending socket-arm 28. The stud 27 is provided with the opening 29 eccentric with relation to said stud, and said eccentric opening receives a shaft 30, carrying upon its inner end a pin 31 eccentric with relation to its said shaft 30. The pin 31 is adapted to lie within the opening 26 in the bearing-block 25. At its outer end the shaft 30 is provided with a socket-arm 32, secured to said shaft by means of a key 33. To regulate the frictional engagement between the stud 27 and its bearings, a friction-screw 34 is provided, the end of which is adapted to bear upon the periphery of said stud. The socket-arms 28 and 32 are provided with lever-sockets 35 and 36, respectively, also, respectively, with the transverse notches 37 and 38. The outer corners of the socket-arm 32, upon the inner face thereof, are cut away to form inclined approaches 39 to the notch 38 in said arm. Levers 40 and 41 are adapted to be inserted into the sockets 35 and 36, the former being the operating-lever, and therefore quite long, the latter the setting-lever, and consequently comparatively short. The setting-lever 41 has a transverse pin 42 adapted to lie within the notch 37 of its socket-arm, and on one side of the lever said pin 42 projects sufficiently far to extend into the notch 38 of the socket-arm 32. When it is desirable to move the levers together, the setting-lever is inserted into its socket so that the pin 42 extends into the notch 38 of the socket-arm 32 of the operating-lever 40. When it is desirable to operate the levers separately, the setting-lever 41 is lifted from its socket and its other face turned toward said operating-lever, in which position the pin 42 does not project into the path of the operating-lever. The levers may be thrown to either side of the vertical position, accordingly as the punch or the shear is to be operated. Assuming that it is desirable to operate the punch, the setting-lever 41 may be first moved downward and the punch forced through the work by a movement of the operating-lever 40. However, if the punch is large or the material being operated upon thick a greater leverage is desirable, and to obtain this the operating-lever is moved over a certain distance, after which the punch is brought into contact with the work by means of the setting-lever. This latter expedient places the eccentric-pin 31 in such position that its throw for the remainder of the effective movement of the operating-lever is very slight and its power consequently very great. When the operating-lever has been moved to its downward limit and the punch has been advanced into the work, the operating-lever is raised again and the setting-lever moved downward slightly.

This again places the pin 31 in the advantageous position just mentioned, and another movement of the operating-lever further advances the punch into the work. Repeated alternate movements of the operating and the setting lever carry the punch step by step through the work. The shear and the rod-shear are both operated in the manner just described.

The weight of the setting-lever, together with the frictional resistance in its bearing, is ordinarily sufficient to counterbalance the upward pressure placed upon it by a movement of the operating-lever when work is being done. However, in practice both levers are operated successively, and the operator usually retains a hold upon both, grasping the operating-lever in his right hand and the setting-lever in his left. The pivotal and concentric rib connections between the two members 1 and 2 hold them firmly together. The concentric rib 5 relieves the pivotal bolt 4 of almost all of the strain placed upon it in the operation of the tool. When rods are to be cut, they are thrust through the openings 7 and are cut, as will readily be understood, between the blades 8 and 9 by the movement of the movable member 2. When light work is being done upon the machine, the setting and operating levers are usually locked together by turning the setting-lever so that the long end of the pin 42 extends toward the operating-lever 40, said pin projecting into the notch 38 of the socket-arm 32. When the setting-lever is in this position and the levers are separated, they may be locked together by merely moving them into coincidence, the pin 42 riding up on one of the approaches 39, thereby raising the setting-lever a little distance in its socket and finally permitting the pin 42 to drop into the notch 38.

It is apparent that the operating mechanism herein shown might be used in other connections and that many changes might be made in the construction of this tool, wherefore I desire to have it understood that I do not limit myself to the particular application, the embodiment, or the details of construction herein shown and described, but claim said invention broadly.

I claim as my invention—

1. In a punch or similar tool, in combination, a stationary member; a pivoted member; a crank for oscillating said pivoted member; a lever for moving said crank; an eccentric adapted to support said crank; and a lever for oscillating said eccentric.
2. In a punch or similar tool, in combination, a stationary member; a pivoted member; a crank for oscillating said pivoted member; an eccentric adapted to support said crank; and means for moving said crank and said eccentric simultaneously or successively.
3. In a punch or similar tool, in combination,

tion, a stationary member; a pivoted member; a crank for oscillating said pivoted member; a lever for moving said crank; an eccentric adapted to support said crank; a lever for oscillating said eccentric; and means for locking said levers together.

4. In a punch or similar tool, in combination, a relatively stationary member; a co-acting member pivotally mounted on said stationary member; a stud rotatably mounted on said stationary member, said stud having an opening extending eccentrically through it; a shaft in said eccentric opening; a pin fixed to said shaft in a position eccentric with relation thereto, said pin being connected with said pivoted member; and means for oscillating said stud and said shaft to move said pivoted member.

5. In a punch or similar tool, in combination, a relatively stationary member; a movable member; means for pivotally connecting said members, one of said members being provided with a concentric rib and the other with a corresponding groove; an eccentric for moving said movable member; and means for changing the position of the rotative center of said eccentric.

6. In a punch or similar tool, in combination, a relatively stationary member; a movable member; means for pivotally connecting said members, one of said members being provided with a concentric rib and the other with a corresponding groove; an eccentric for moving said movable member; and a second eccentric for changing the position of said first-mentioned eccentric.

7. In a punch or similar tool, in combination, a relatively stationary member; a movable member; means for pivotally connecting said members, one of said members being provided with a concentric rib and the other with a corresponding groove; an eccentric for moving said movable member; and a second eccentric for carrying said first-mentioned eccentric.

8. In a punch or similar tool, in combination, a relatively stationary member; a movable member; a stud rotatably mounted on said stationary member, said stud having an opening concentric to its oscillatory center; a shaft rotatably mounted in said eccentric opening; a pin fixed with relation to said shaft and eccentric therewith; means for transmitting the movement of said pin to said movable member; a lever for oscillating said stud; a lever for oscillating said shaft; and means for connecting the levers.

9. In a punch or similar tool, in combination, a relatively stationary member; a movable member; a tubular hub fixed with relation to said stationary member; a stud adapted to lie within said hub, said stud having an opening eccentric to its oscillatory center; a shaft rotatably mounted in said eccentric opening; a pin fixed with relation to said

shaft; and eccentric therewith; a bearing-block for said pin, having an engagement with said movable member; a lever for oscillating said stud; and a lever for oscillating said shaft.

10. In a punch or similar tool, in combination, a relatively stationary member; a movable member; means for pivotally connecting said members; a recess in one of said members; a rotatable stud fixed with relation to said other member, said stud having an opening eccentric to its oscillatory center; a shaft rotatably mounted in said eccentric opening; a pin fixed with relation to said shaft and eccentric therewith; a bearing-block for said pin, said block being adapted to lie in said recess; means for oscillating said stud; and separate means for oscillating said shaft.

11. In a punch or similar tool, in combination, a relatively stationary member; a movable member; said members being conformed to provide a throatway; means for pivotally connecting said members; a punch in one of said members; a die in said other member; a stud rotatably mounted on one of said members, said stud having an opening eccentric to its oscillatory center; a shaft rotatably mounted in said eccentric opening; a pin fixed with relation to said shaft; and eccentric therewith; and separate means for oscillating said stud and said shaft.

12. In a punch or similar tool, in combination, a relatively stationary member; a movable member; means for pivotally connecting said members; a stud rotatably mounted on said stationary member, said stud having an opening eccentric to its oscillatory center; a shaft rotatably mounted in said eccentric opening; a pin fixed with relation to said shaft and eccentric therewith; means for transmitting a movement of said pin to said movable member; a lever for oscillating said stud; a lever for oscillating said shaft; and a pin projecting from one of said levers into the path of the other lever to engage said last-mentioned lever and cause the levers to move together.

13. In a punch or similar tool, in combination, a stationary member; a member pivotally mounted on said stationary member, throatways being formed through said members at opposite sides of the pivotal connection of said members; coacting operating devices on said members in each of said throatways; a crank for pivotally moving said pivoted member in either direction to actuate the operating devices in either throatway; and means for varying the effective throw of said crank.

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