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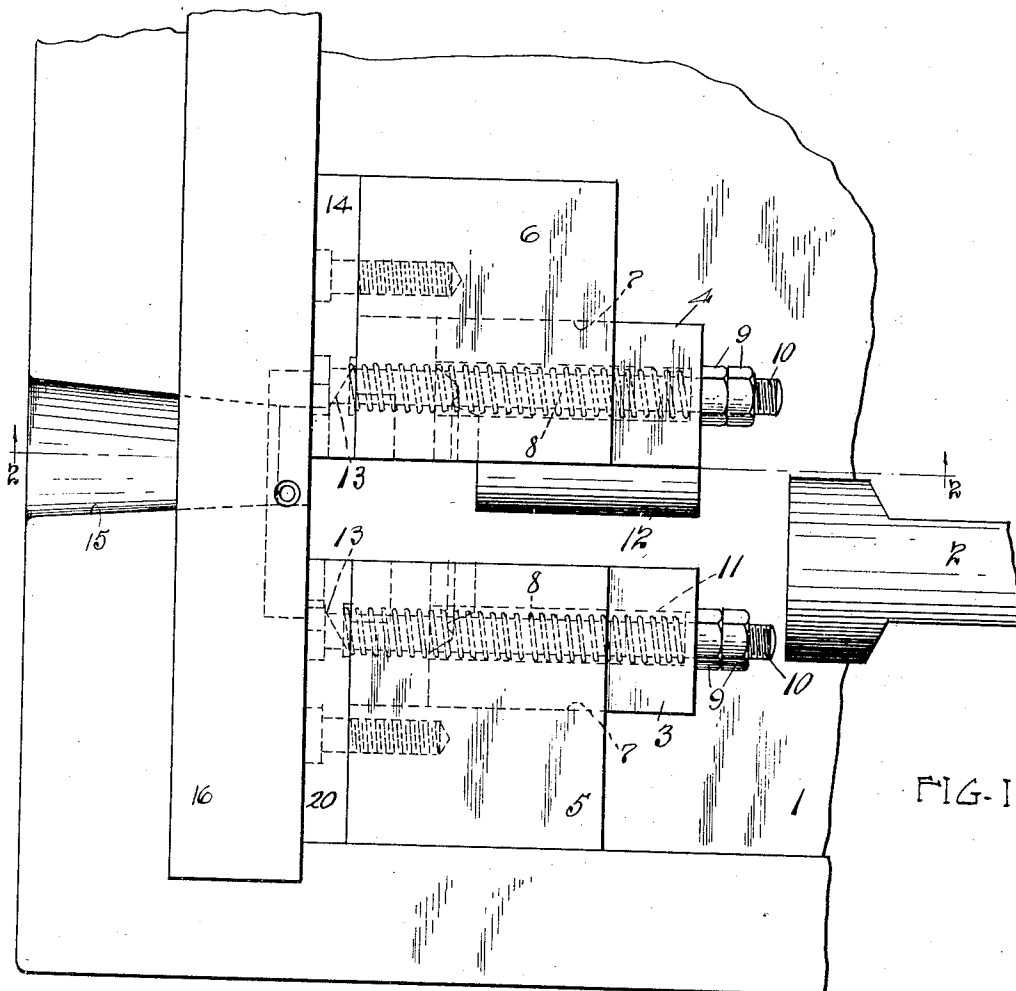
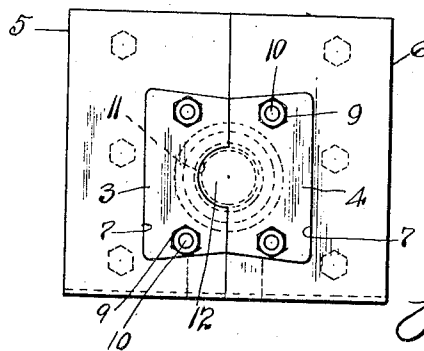


FIG. 1

FIG. 5-



WITNESSES

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John P. Blakeslee

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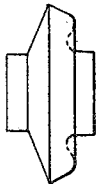
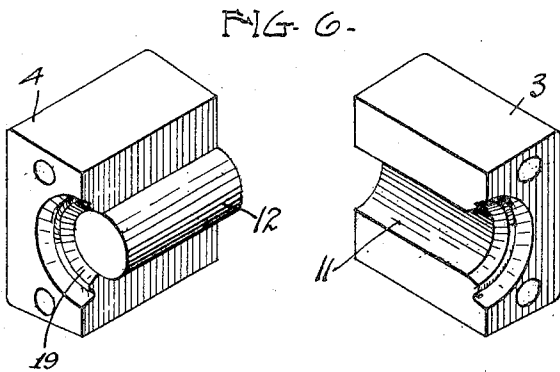
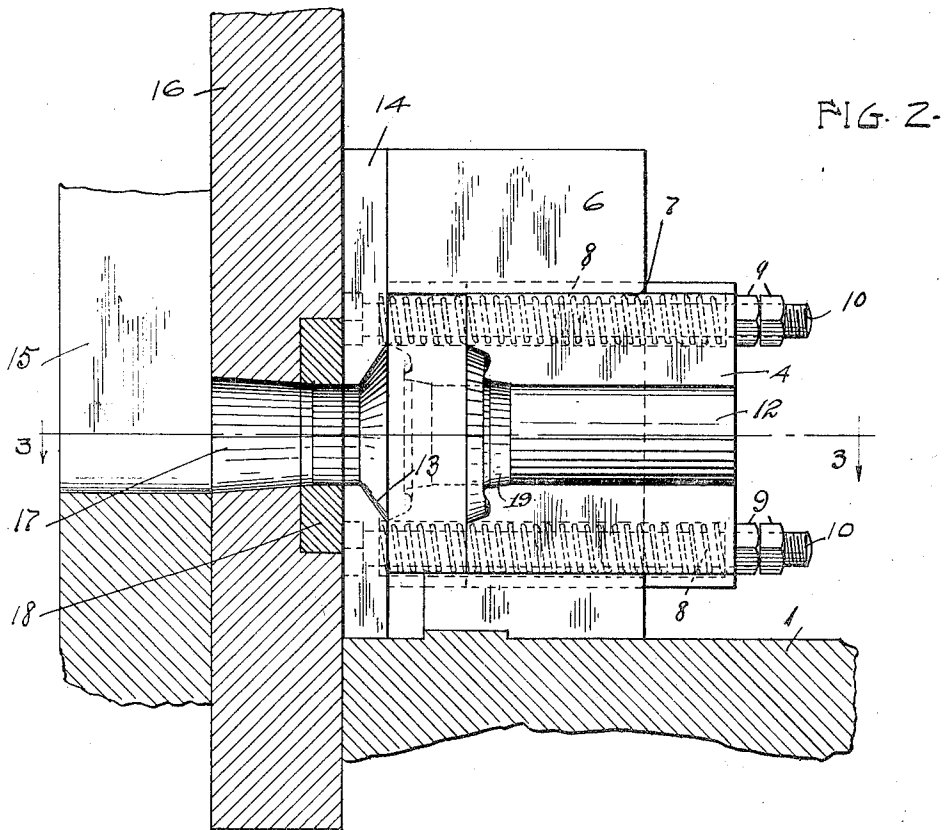
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APPLICATION FILED JUNE 14, 1911.

1,053,471.

Patented Feb. 18, 1913.

3 SHEETS—SHEET 2.



WITNESSES:

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FIG. 7.

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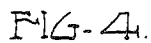
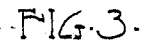
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

JOHN R. BLAKESLEE, OF CLEVELAND, OHIO, ASSIGNOR TO THE AJAX MANUFACTURING COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

FORGING MECHANISM.

1,053,471.

Specification of Letters Patent.

Patented Feb. 18, 1913.

Application filed June 14, 1911. Serial No. 633,014.

To all whom it may concern:

Be it known that I, JOHN R. BLAKESLEE, a citizen of the United States, and a resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented a new and useful Improvement in Forging Mechanism, of which the following is a specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

The present invention, relating as indicated to forging mechanism, has regard more especially to mechanism of this kind designed for the formation of articles, such as gear blanks and the like, characterized by having an intermediate upset portion larger than its ends.

The object of the invention is the provision of mechanism for the handling of work of this kind, whereby such articles may be formed complete in a single operation from a rod, or bar, or like continuous section of stock.

To the accomplishment of these and related ends, the invention, then, consists of the means hereinafter fully described and particularly pointed out in the claims.

The annexed drawings and the following description set forth in detail certain mechanism embodying the invention, such disclosed means constituting, however, but one of various mechanical forms in which the principle of the invention may be used.

In said annexed drawings:—Figure 1 is a plan view of a portion of an upsetting, or forging, machine embodying my present improvements; Fig. 2 is a vertical section thereof taken on the line 2—2, Fig. 1; Fig. 3 is a horizontal section thereof taken on the plane indicated by the line 3—3, Fig. 2, and showing the parts in a different operative position from that in which they appear in Fig. 1; Fig. 4 is a sectional view corresponding with that of Fig. 2, but showing the parts in question in a third position; Fig. 5 is a rear end elevation of a portion of the mechanism, the parts involved being shown in the position in which they appear in Fig. 4; Fig. 6 is a perspective view of two such parts removed from the rest of the mechanism; and Fig. 7 represents a gear blank such as the mechanism is adapted to form.

The general construction and operation of the present machine is the same as that

usually observed in forging machines of the type illustrated for example in Patent No. 737,065, issued to John R. Blakeslee, dated August 25, 1903. In other words, the present machine is provided with a header slide (not shown) reciprocably mounted on the bed 1 of the machine and carrying a suitable tool 2, corresponding with the header tool ordinarily used in forging operations. The present header tool, however, is blunt, terminating in a flat face that is adapted to cooperate with the die parts presently to be described. These die parts are two in number, each comprising a suitable holder and a die-member. The two die-members 3 and 4 are shown in perspective in Fig. 6 and are so mounted on their respective holders as to have their common center line alined with the header tool, in the final upsetting operation. Of the two holders 5 and 6 carrying die members 3 and 4 respectively, the first is designed to be stationarily supported on the bed of the machine, while the other 6 is reciprocable in a direction transverse to the line of movement of the header slide. The two die members are similarly supported in their respective holders in dovetailed recesses 7 formed in the contiguous faces of said holder parts, the arrangement being such that said die members may move conjointly forwardly and backwardly in said holders, movement forwardly being effected by the heading tool, previously referred to, coming up against the rear ends of the members, while compression springs 8 move said members rearwardly and normally retain the same in the positions in Figs. 1, 2 and 3, movement beyond such positions being limited by nuts 9 on the outer ends of longitudinally disposed bolts 10. Adjustment of the normal position of either die member in its holder may obviously be secured by adjusting such nuts along the bolts.

The die members 3 and 4, which have just been described, are provided, the one with a longitudinally extending recess 11 of semi-cylindrical form, the other with a corresponding tongue or projection 12, whereby said members, when brought into laterally contacting position are more or less securely locked together. Said die members are designed to define one end and a portion only of the main body of the die space, the remainder of such die-space being defined by

complementary recesses 13 in two plates 14 and 20 which are secured to the forward ends of the respective die holders 6 and 5 and in effect constitute a part of the same.

5 These plates, furthermore, serve to support the forward ends of the bolts 10 which hold in place the expansion springs 8 and carry the nuts 9 that limit the rearward movement of the die members. The recesses in these plates, together with those in the two die members, when the latter are brought laterally together and then forced forwardly tightly against said plates, give the desired form which the finished article is to assume, whether gear blank, as in the present case, or of other form.

The stock which, in the present case, will preferably be a rod of circular cross section, is fed in between the die members through the usual feed opening 15 in the forward end of the machine, first passing however, through a backing plate 16 which is disposed in front of the die holders 5 and 6, or rather in front of the plates 14 secured to said holders. This plate 16 is provided with an aperture 17 of suitable size and form to accommodate the stock being used, the inner portion of such aperture being formed in a cutter 18 of hardened steel, or like material that is inset in the plate so as to lie flush with its inner face. This opening 17 in the backing plate is located to one side of the center line of the die space in the final operative position of the members, it being along this line that the header tool advances, as has already been explained. Furthermore the transverse reciprocable movement of the die holder 6 is sufficient to withdraw the die member 4 carried thereby beyond this feed opening, when such holder is in its retracted position, as shown in Fig. 1. Movement of such holder, however, to bring the die member carried thereby laterally into contact with the complementary die member mounted in the stationary holder, will carry the plate 14 that is secured to the front face of such first holder entirely across the feed opening in the backing plate. The section of stock, accordingly, that has been introduced through such opening between the die members, will be cut off by the shearing action of the moving plate across the hardened cutter in the backing plate.

The complete operation of the mechanism may now be set forth.

Assuming the parts to be in the position illustrated in Fig. 1, the stock is advanced through the feed opening in the backing plate until its forward end abuts against the cylindrical projection 12 formed on the inner face of the die member carried by the movable holder. Such forward end of the stock will now rest on the ledge 19 in the die member that forms the corresponding end of the die space, the size of the stock

being selected to substantially fill such portion of the space. The movable holder is next closed up, the first part of its transverse movement shearing off the portion of the stock that lies beyond the cutter plate and carrying such sheared-off portion into a position in alinement with the center of the dies and header tool. In this position (see Fig. 3) such piece of stock will obviously be held with its respective ends located in the reduced end portions of the die space formed by the die members, and the plates secured to the forward ends of the holders. The final operation consists in advancing the die members forwardly under the pressure of the header tool, thereby closing the longitudinally movable die members completely upon such stock, as shown in Fig. 4; the stock is thus upset and forced to fill the die space which now assumes its final definitive form. The stock, of course, is suitably heated before being introduced into the mechanism, so that this upsetting operation may be properly accomplished. The adjustment of the die members in the holders, furthermore, is such as to allow the introduction of just the proper length of stock to provide metal enough to fill the die space completely, when the parts are brought into their final operative positions. After the upsetting step is thus completed, the withdrawal of the header tool permits the retraction of the die members longitudinally, as a result of which the article, just formed, is left free to drop downwardly from the die; thereupon the movable holder is withdrawn to permit of the introduction of a fresh section of stock, and the operation repeated as before.

It will be seen from the foregoing description that a single operation forms the completed article, which is automatically removed so as to leave the place clear for the next article to be formed. At the same time no undue complexity of parts is involved, such as would render the mechanism liable to get out of order, or cause trouble in any other way in dealing with metal in a heated condition, and frequently of considerable dimensions where the articles to be upset or forged are of a large size.

Other modes of applying the principle of my invention may be employed instead of the one explained, change being made as regards the mechanism herein disclosed, provided the means stated by any one of the following claims or the equivalent of such stated means be employed.

I therefore particularly point out and distinctly claim as my invention:—

1. In mechanism of the class described, the combination with a die-member movable in one direction; of a second die-member movable conjointly with said first die-member and also in a direction transverse to the di-

rection of such conjoint movement; and means coöperative with the second die-member on its transverse movement to sever a section from a piece of stock, said second die-member being adapted, during the remainder of its transverse movement, to carry said section into operative position between the two die members.

2. In mechanism of the class described, the combination with a die-member movable in one direction; of a second die-member-movable conjointly with said first die-member and also in a direction transverse to the direction of such conjoint movement; and means coöperative with said second die-member on its transverse movement to sever a section from a piece of stock, said second die-member being formed with a ledge whereby it will support and carry said section, during the remainder of its transverse movement, into operative position between the two die-members.

3. In mechanism of the class described, the combination with a die-member movable in one direction; of a second die-member movable conjointly with said first die-member and also in a direction transverse to the direction of such conjoint movement, the contiguous faces of such members being formed with a recess and with a complementary projection respectively, said projection forming a gage for a piece of stock; and means coöperative with said second die-member during its transverse movement to sever a section from said stock, said second member being formed with a ledge whereby it will support and carry said section during the remainder of its transverse movement into operative position between the two die-members.

4. In mechanism of the class described, the combination of a die-part comprising a stationary holder provided with a recess forming part of the die-space and a die-member mounted on said holder so as to be movable toward and from such recess; and a second die-part comprising a holder movable toward and from said first holder in a direction transverse to that of the die-member mounted thereon, said second holder being provided with a recess complementary to the one on said first holder, and another die member mounted on said second holder, said second die-member being complementary to said first member and movable conjointly with the same toward and from the recess on said second holder.

5. In mechanism of the class described, the combination of a die-part comprising a stationary holder provided with a recess forming part of the die-space and a die-member mounted on said holder so as to be movable toward and from such recess; and a second die-part comprising a holder movable toward and from said first holder in a

direction transverse to that of the die-member mounted thereon, said second holder being provided with a recess complementary to the one on said first holder; another die-member mounted on said second holder, said second die-member being complementary to said first member and movable conjointly with the same toward and from the recess on said second holder; and a cutter, said second holder being adapted upon transverse movement to coöperate with said cutter to cut off a section of stock and said second die-member being adapted thereupon to receive and carry such section into proper position to be upset between said two die-members.

6. In mechanism of the class described, the combination of a die-part comprising a stationary holder provided with a recess forming part of the die-space and a die-member mounted on said holder so as to be movable toward and from such recess; and a second die-part comprising a holder movable toward and from said first holder in a direction transverse to that of the die-member mounted thereon, said second holder being provided with a recess complementary to the one on said first holder; another die-member mounted on said second holder, said second die-member being complementary to said first member and movable conjointly with the same toward and from the recess on said second holder; a plate disposed in front of said die-parts and having a feed opening located to one side of the center line of the same when closed; and a cutter secured in said feed opening, said second die-part being adapted upon transverse movement to shear off a section of stock projecting through such feed opening and said second die-member being adapted thereupon to receive and carry such section into proper position to be upset between said two die-members.

7. In mechanism of the class described, the combination of a die-part comprising a stationary holder, a plate secured thereto and provided with a recess forming part of one end of the die-space, and a die-member mounted on said holder so as to be movable toward and from said plate; and a second die-part comprising a holder movable toward and from said first holder in a direction transverse to that of the die-member mounted thereon, a plate secured to said second holder and provided with a recess complementary to the recess in said first plate, and another die-member mounted on said second holder, said second die-member being complementary to said first member and movable conjointly with the same toward and from the plate on said second holder.

8. In mechanism of the class described, the combination of a die-part comprising a

stationary holder, a plate secured thereto and provided with a recess forming part of one end of the die-space, and a die-member mounted on said holder so as to be movable
5 toward and from said plate; a second die-part comprising a holder movable toward and from said first holder in a direction transverse to that of the die-member mounted thereon, a plate secured to said second
10 holder and provided with a recess complementary to the recess in said first plate, and another die-member mounted on said second holder, said second die-member being complementary to said first member and mov-

able conjointly with the same toward and 15 from the plate on said second holder; and a cutter, the recessed plate on said second holder being adapted upon transverse movement of the latter to cut off a section of stock and said second die-member being 20 adapted thereupon to receive and carry such section into proper position to be upset between said two die-members.

Signed by me this 10th day of June, 1911.

JOHN R. BLAKESLEE.

Attested by—

MYRTLE K. SCHUEH,
JNO. F. OBERLIN.