

J. R. BLAKESLEE.
METAL BENDING AND FORGING MACHINE.
APPLICATION FILED JUNE 4, 1908.

929,073.

Patented July 27, 1909.
2 SHEETS—SHEET 1.

Fig. 1

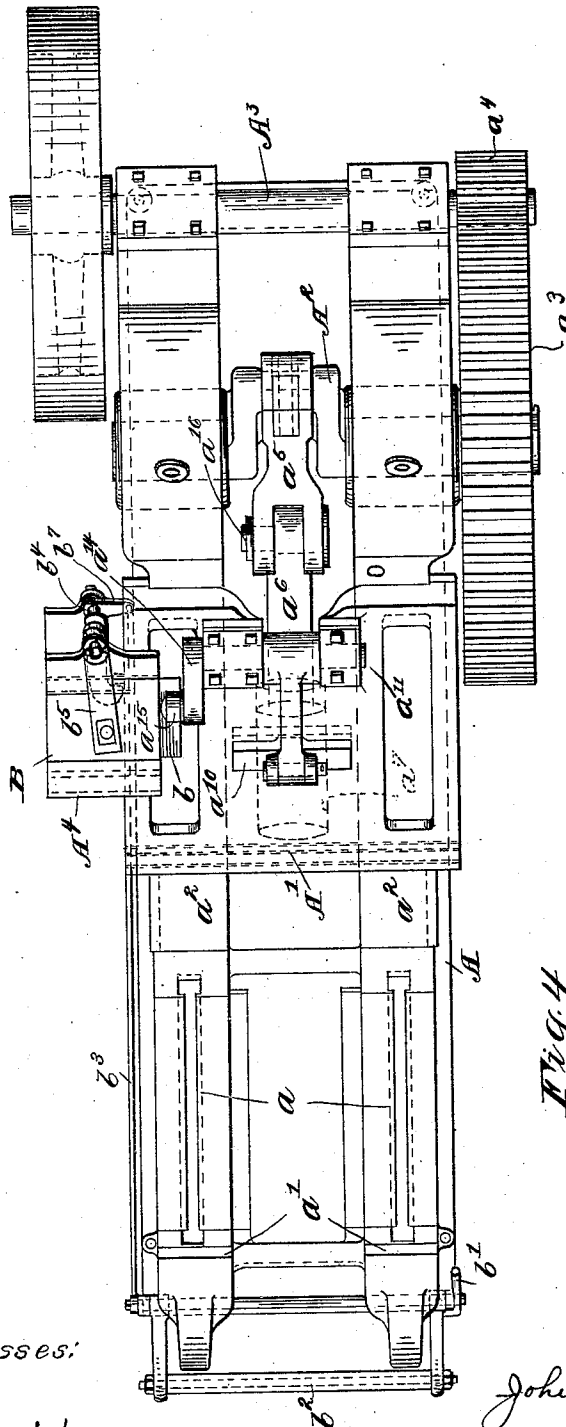
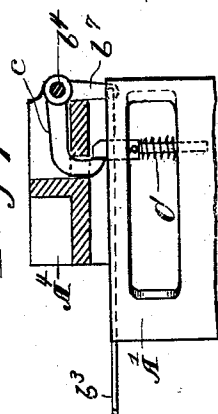


Fig. 4



Witnesses:

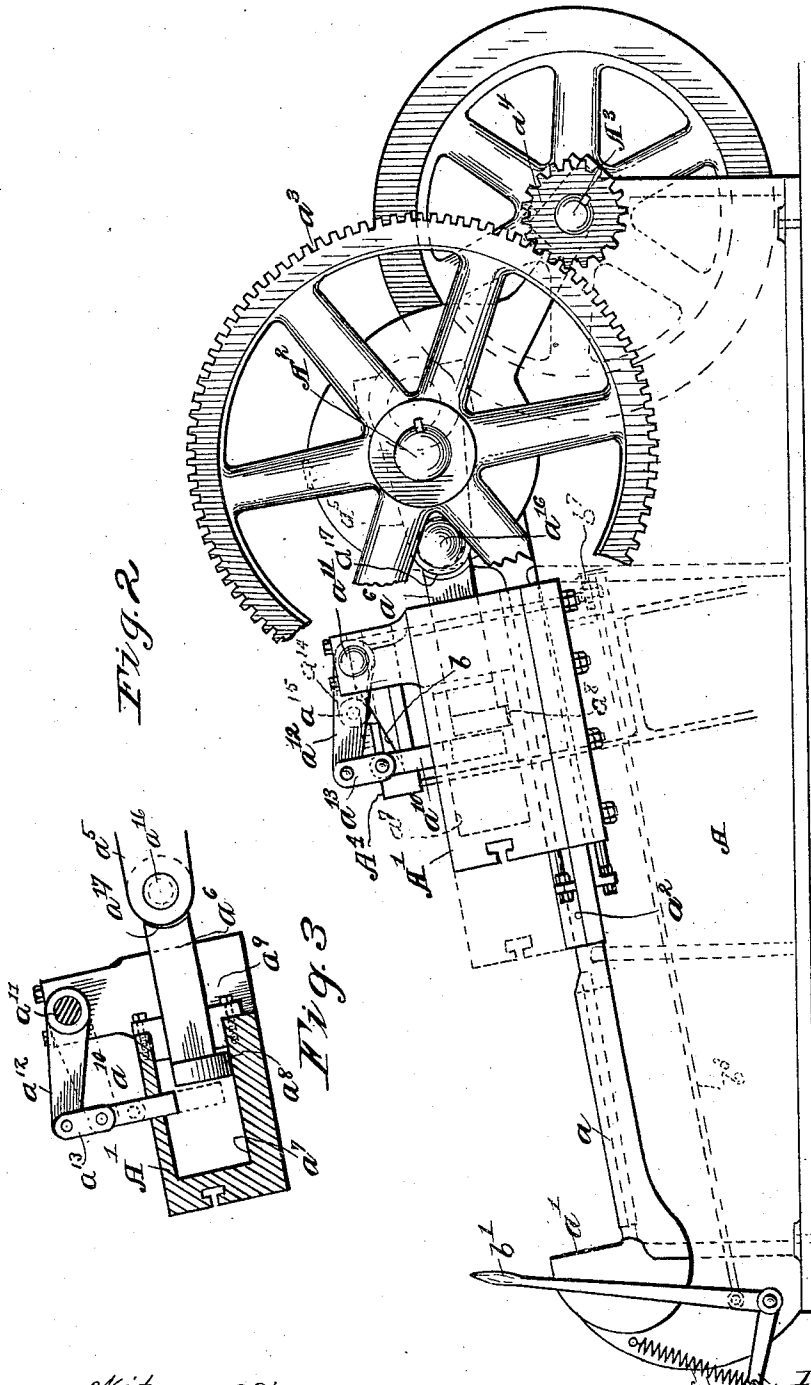
E. R. Rodd.
Jno. F. Oberlin

Inventor:
John R. Blakeslee
by J. B. Fay
Attorney.

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Jno. F. Oberlin

Inventor:

by John R. Blakeslee
J. B. Fay
Attorney.

UNITED STATES PATENT OFFICE.

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

METAL BENDING AND FORGING MACHINE.

No. 929,073.

Specification of Letters Patent.

Patented July 27, 1909.

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To all whom it may concern:

Be it known that I, JOHN R. BLAKESLEE, a citizen of the United States, resident of Cleveland, county of Cuyahoga, and State of Ohio, have invented a new and useful Improvement in Metal Bending and Forging Machines, 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.

This invention relating as indicated to metal bending and forging machines, has more particular regard to the provision, in connection with machines of this general class, of means whereby the reciprocation of the header or up-setting die slide may be more conveniently and certainly controlled than in present types of apparatus, and that, too, without shutting off and turning on the power.

One type of device for interrupting the operation of the slide in a machine of the class in hand is shown in United States Patent No. 737,065, it being there illustrated in connection with a forging machine.

The present arrangement I have chosen to illustrate in connection with a bending machine or bull-dozer, but it scarcely need be remarked that the principle of operation involved is equally applicable to forging machines, or, indeed, any machine wherein it becomes necessary to derive a reciprocatory movement in a head, or the like, from a continuously rotating driving shaft.

Another feature of the present invention, more specific in its reference to bending or bull-dozing machines, is the disposition of the slideway of an incline with marked advantage in the placing and securing of stock on the machine.

Said 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 bending machine, or bull-dozer, wherein has been incorporated my several im-

provements; Fig. 2 is a side elevation of the same, a portion of the gear on the crank-shaft being broken away to more clearly reveal the parts therebehind; Fig. 3 is a central longitudinal section through the cross head or reciprocatory slide, together with appurtenant parts; and Fig. 4 is a partial plan view of such slide and one such part, viz. the latch for retaining the slide in its rear-most position.

In such figures, A will be seen to designate the bed-frame of the machine, which usually is an integral massive casting and is securely mounted upon a solid foundation: either of concrete, or of heavy timbers. Of the upper face of such bed-frame A, something less than half constitutes the die space a which is terminated or bounded at one end by the upturned foot a' of the frame and at the other by the reciprocable cross head A' . Cross head A' is mounted on a suitable slideway a^2 and is shown in the several figures in its retracted or rearmost position, its extreme forward or advanced position being indicated in dotted lines in Fig. 2. Ordinarily, as heretofore constructed, the slideway a^2 whereon the cross-head is thus mounted together with the aligned die space a have been arranged substantially horizontally. In the present machine I have modified this arrangement by inclining such slide and die space forwardly and downwardly as clearly appears from the side elevation shown in Fig. 2. By this construction the work or stock operated upon may be caused to lean against the upturned foot a' of the machine, or the interposed die block attached to such foot, whereby any tendency of such stock to fall from its proper place is eliminated and it will remain in position to receive successive blows of the die slide without special attention on the part of the operator.

Reciprocation of cross head A' is effected by means of a transversely disposed crank-shaft A^2 mounted in suitable bearings at the rear and upper end of the machine, and adapted to be driven from a secondary shaft A^3 through gear a^3 and pinion a^4 , as will be readily understood. The connecting means between the crank-shaft and the cross-head, or die-slide, comprise primarily a pitman a^5 having one end attached to the crank shaft, and a piston, or plunger a^6 , normally freely

reciprocable in a longitudinally extending bore a^7 within the cross-head and having its rear end pivotally attached to said pitman. Such piston is provided at its forward end with an integral head a^8 in the form of an annulus or collar, the upper portion of which, see Fig. 3, is cut off down to a plane even with the body of the plunger proper. Plunger a is held in the bore of the cross-head by means of a split bushing a^9 fitted into the rear end of such bore and firmly attached to the cross-head. The disposition of the parts and the length of the plunger is such that the head of the latter will engage this bushing and thereby effect retraction of the cross-head to its rearmost position upon a complete rotation of the crank shaft being had. Obviously, however, such plunger will normally be ineffective to advance such cross-head. To render plunger a^8 thus effective to advance the cross-head, a slide a^{10} is provided, suitably mounted in a vertical slide-way in the body of the cross-head that intersects the bore a^7 therein just in front of the plunger head when in its rearmost position. This slide a^{10} in its lowermost position will obviously lock the plunger against forward movement, thereby causing the latter, upon being advanced, to force the head with it. The position of the locking slide is controlled through a rock-shaft a^{11} mounted upon the cross head and connected with the slide by a suitable rocker arm a^{12} and link a^{13} , such rock-shaft being in turn actuated through the medium of a second arm a^{14} borne at its one extremity and provided with a roller a^{15} adapted to contact with an inclined way b on the adjacent end of a transversely movable slide B. The latter is mounted in a suitable bracket A^4 provided on one side of the machine bed. Such inclined face of transversely movable slide B acts as a cam to engage the roller bearing arm of the rock shaft and raise the locking slide a^{10} into its inoperative position upon each retraction of the cross-head. Movement of the slide out of the path of the rock arm may be had either through a hand lever b' or foot treadle b^2 both located at the forward end of the machine and connected by means of a rod b^3 with a lever b^7 on the lower end of a vertically mounted shaft b^4 in the bracket A^4 aforesaid, the latter in turn bearing at its upper end a lever b^5 that has sliding pivotal connection with the cam slide B. A spring b^6 , conveniently attached to the treadle as shown, normally retains such cam slide in its inner, or operative, position, with the result already noted.

Where the operative face of the machine including the slide-way and die space are inclined in the manner described there will be a tendency manifested by the slide to leave its rearmost, or retracted, position irrespective of the operation of the plunger. I ac-

cordingly find it desirable to provide a latch for securing such slide in the position in question. Such latch conveniently consists simply of a spring-pressed plunger C transversely mounted in the cross-head and extending a short distance beyond the side of the same into position to be engaged by a hooked lever c on the same shaft b^4 whereon slide-actuating lever b^5 is mounted. In the normal position of this shaft, corresponding with the inner position of the slide B, the hooked lever c will engage plunger C as the cross-head is retracted, and retain the latter in its retracted position. Withdrawal, however, of the slide will evidently be accompanied by a withdrawal of the latch, thus simultaneously leaving the cross-head A' free to be actuated and lowering the locking slide a^{10} in such cross-head into position to engage the plunger a^8 .

Since the work of the cross-head is effected during its forward stroke, I have constructed the pivotal connection between the plunger and pitman so as to relieve the pin a^{16} of all strain during such forward stroke by providing a bearing a^{17} in the plunger against which the pitman presses when it is advancing the cross-head, see Fig. 3. The pin will hence be seen to have only the relatively light duty of withdrawing, or retracting, the cross-head upon the return movement of the pitman.

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 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 a machine of the class described, the combination of a shaft; a slide; means for operatively connecting said shaft and slide, said means including a pitman, a plunger reciprocally held in said slide and pivotally connected with said pitman, said plunger being adapted to engage said slide to retract the latter, a member in said slide movable in front of said plunger and adapted, when thus positioned, to render the latter effective to advance said slide, and a rock-shaft on said slide connected to move said member; and means external to said slide adapted to engage said shaft to rock the same upon reciprocation of said slide.

2. In a machine of the class described, the combination of a shaft; a slide formed with a longitudinal bore; means for operatively connecting said shaft and slide, said means including a pitman, a plunger reciprocally held in the bore of said slide and pivotally connected with said pitman, said plunger being formed with a head adapted to engage said slide to retract the latter, a plate in said

slide vertically movable in front of said plunger and adapted, when lowered, to render the latter effective to advance said slide, and a rock-shaft on said slide connected to raise said plate and provided with a rock arm; and a cam movably mounted to one side of said slide and adapted to engage such arm, and thereby raise said plate, upon retraction of said slide.

3. In a machine of the class described, the combination of a shaft; a slide formed with a longitudinal bore; means for operatively connecting said shaft and slide, said means including a pitman, a plunger reciprocally held in the bore of said slide and pivotally connected with said pitman, said plunger being formed with a head adapted to engage said slide to retract the latter, a plate in said slide vertically movable in front of said plunger and adapted, when lowered, to render the latter effective to advance said slide, and a rock-shaft on said slide connected to raise said plate and provided with a rock arm; a cam movably mounted to one side of said slide and adapted normally to engage such arm, and thereby raise said plate, upon retraction of said slide; and means for withdrawing said cam.

4. In a machine of the class described, the combination of a shaft; a slide; means for operatively connecting said shaft and slide, said means including a pitman, a plunger reciprocally mounted in said slide and pivotally connected with said pitman, said plunger being normally effective to retract, but not to advance said slide; means adapted to engage said plunger and thereby render the same effective to advance said slide; means adapted to render said plunger-engaging means inoperative upon retraction of said slide; and a catch supported externally of said slide and normally positioned to engage and secure the same in its retracted position said catch being movable from such position so as not thus to engage said slide.

5. In a machine of the class described, the combination of a shaft; a slide; means for operatively connecting said shaft and slide, said means including a pitman, a plunger reciprocally mounted in said slide and pivotally connected with said pitman, said plunger being normally effective to retract, but not to advance said slide; means adapted to engage said plunger and thereby render the same effective to advance said slide; means adapted to render said plunger-engaging means inoperative upon retraction of said slide; a spring-pressed plunger transversely mounted in said slide; and a catch movably supported externally of said slide and normally retained in position to engage said spring-pressed plunger to secure said slide in its retracted position.

6. In a machine of the class described, the combination of a shaft; a slide formed with a longitudinal bore; and means for operatively connecting said shaft and slide, said means including a pitman, a plunger reciprocally held in the bore of said slide and pivotally connected with said pitman, said plunger being formed with a head adapted to engage said slide to retract the latter, a plate in said slide vertically movable in front of said plunger and adapted, when lowered, to render the latter effective to advance said slide, and a rock-shaft on said slide connected to raise said plate and provided with a rock arm; a cam movably mounted to one side of said slide and adapted to engage such arm, and thereby raise said plate, upon retraction of said slide; a catch adapted to retain said slide in such retracted position; and means for simultaneously withdrawing said cam and catch.

7. In a machine of the class described, the combination of a shaft; a slide formed with a longitudinal bore; and means for operatively connecting said shaft and slide, said means including a pitman, a plunger reciprocally held in the bore of said slide and pivotally connected with said pitman, said plunger being formed with a head adapted to engage said slide to retract the latter, a plate in said slide vertically movable in front of said plunger and adapted, when lowered, to render the latter effective to advance said slide, and a rock-shaft on said slide connected to raise said plate and provided with a rock arm; a cam movably mounted to one side of said slide and adapted to engage such arm, and thereby raise said plate, upon retraction of said slide; a spring-pressed plunger transversely mounted in said slide; a catch movably supported externally of said slide and normally retained in position to engage said spring-pressed plunger to secure said slide in its retracted position; and means for simultaneously withdrawing said cam and catch.

8. In a machine of the class described, the combination of a shaft; a slide formed with a longitudinal bore; and means for operatively connecting said shaft and slide, said means including a pitman, a plunger reciprocally held in the bore of said slide and pivotally connected with said pitman, said plunger being formed with a head adapted to engage said slide to retract the latter, a plate in said slide vertically movable in front of said plunger and adapted, when lowered, to render the latter effective to advance said slide, and a rock-shaft on said slide connected to raise said plate and provided with a rock arm; a cam movably mounted to one side of said slide and adapted to engage such arm, and thereby raise said plate, upon retraction of said slide; a substantially vertically disposed shaft adjacent to said cam and con-

nected to actuate the same; a spring-pressed
plunger transversely mounted in said slide;
a catch borne by said vertically disposed
shaft and adapted to engage said plunger to
5 secure said slide in its retracted position; a
spring connected with said shaft and nor-
mally retaining said cam and catch in oper-
ative position; and means for rocking said

shaft to simultaneously withdraw the same
from such operative position.

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Signed by me this 2nd day of June, 1908.

JOHN R. BLAKESLEE.

Attested by—

E. R. RODD,
JNO. F. OBERLIN.