

(No Model.)

2 Sheets—Sheet 1.

H. C. JONES.

MACHINE FOR PUNCHING FLANGE PLATES.

No. 477,899.

Patented June 28, 1892.

FIG. 3.

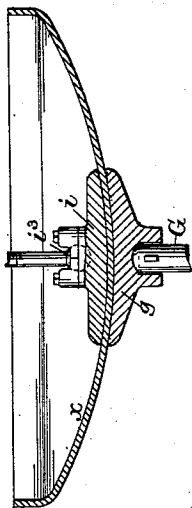
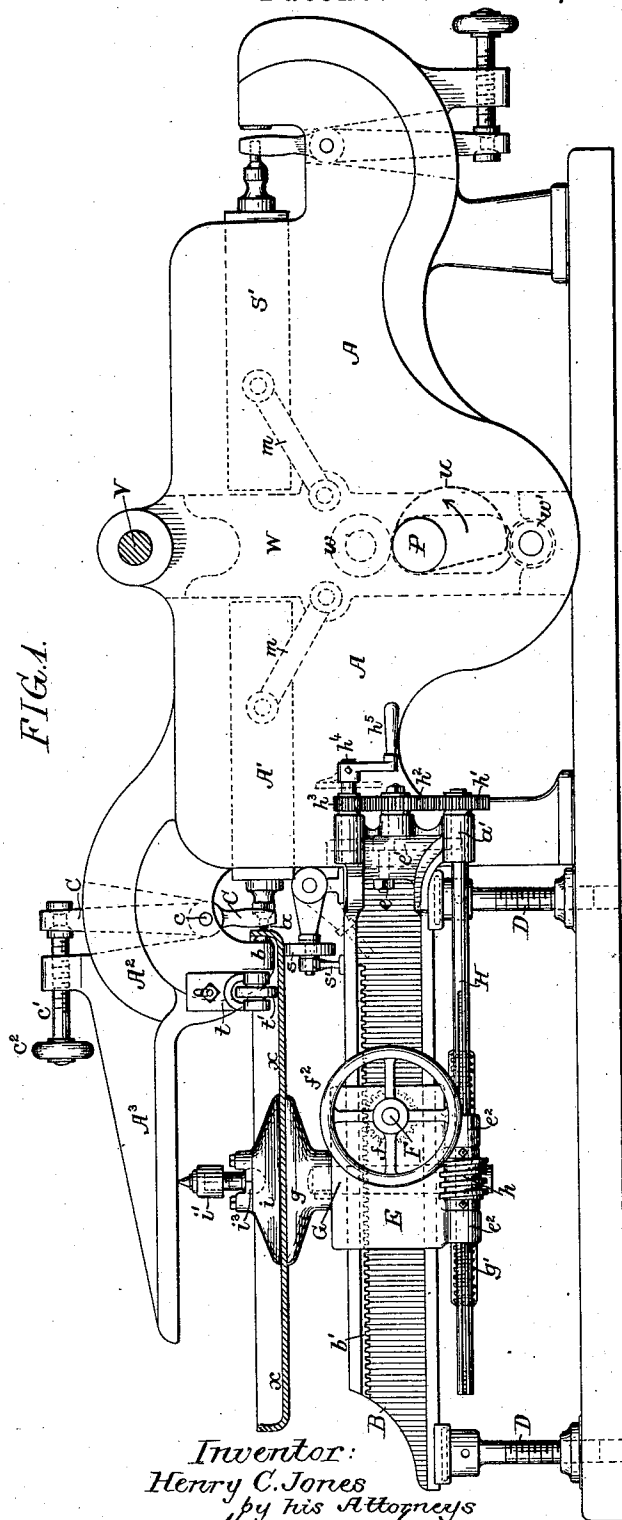


FIG. 1.



Witnesses:

R. Schleicher

Will A. Barr

Inventor:  
Henry C. Jones  
by his Attorneys  
Howson & Howson

(No Model.)

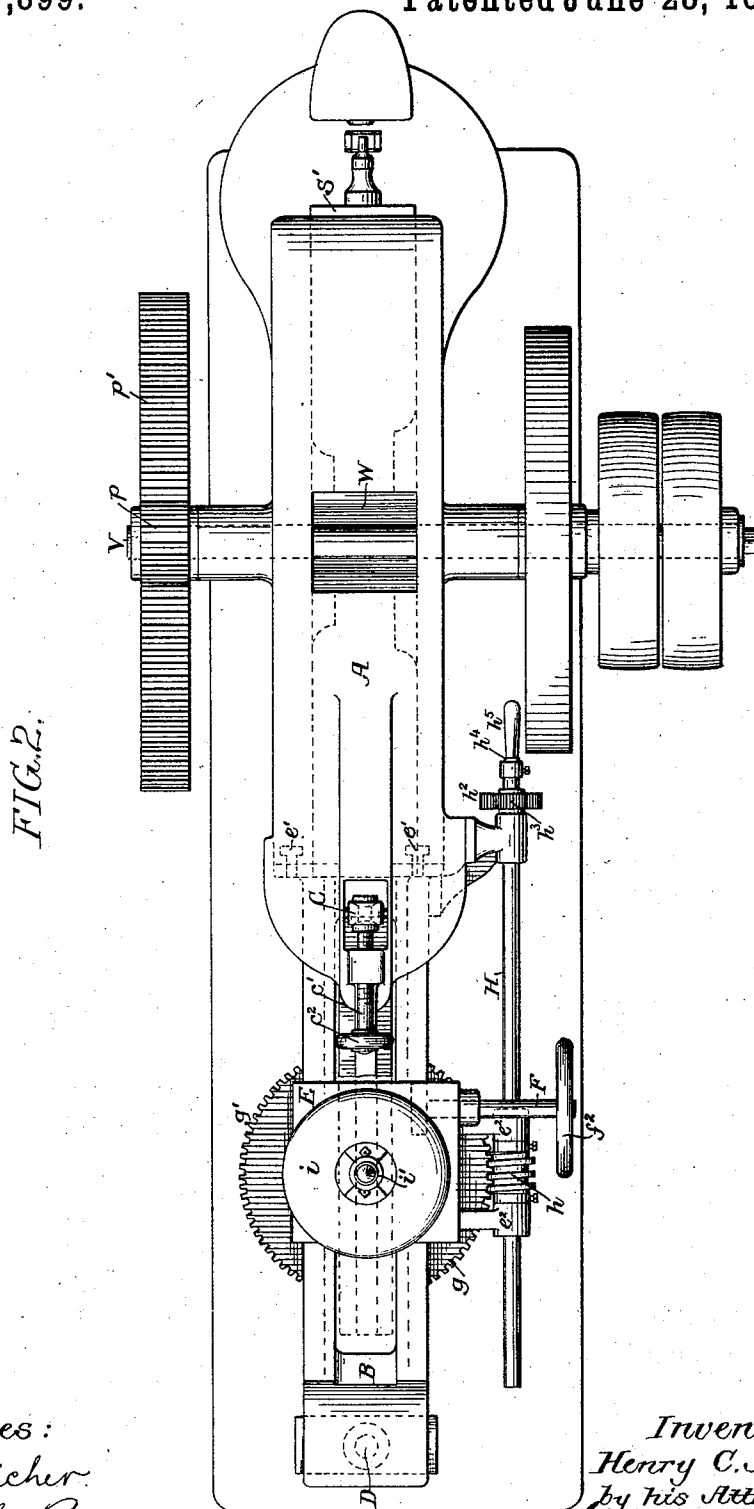
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# UNITED STATES PATENT OFFICE.

HENRY C. JONES, OF WILMINGTON, DELAWARE.

## MACHINE FOR PUNCHING FLANGE-PLATES.

SPECIFICATION forming part of Letters Patent No. 477,899, dated June 28, 1892.

Application filed February 25, 1892. Serial No. 422,771. (No model.)

*To all whom it may concern:*

Be it known that I, HENRY C. JONES, a citizen of the United States, and a resident of Wilmington, New Castle county, Delaware, have invented certain Improvements in Machines for Punching Flange-Plates, of which the following is a specification.

The object of my invention is to punch the holes in the flanges of flanged plates in an accurate and rapid manner. This object I attain as follows, reference being had to the accompanying drawings, in which—

Figure 1 is a side view of my improved punching-machine. Fig. 2 is a plan view, and Fig. 3 shows a method of clamping a dished flanged head.

My invention is especially applicable for punching holes in the flanges of boilers, tanks, and metal drums; and the object of my invention is not only to punch the holes rapidly, but to also properly space them.

A is the frame of an ordinary punching-machine, having a reciprocating punch-carrier A',  $\alpha$  being the punch.

A<sup>2</sup> is a bracket, arched over the space to receive the flange to be punched. This bracket carries the die  $b$ , into which the punch is projected.

C is an adjustable stripper passing around the punch and acts to relieve the punch from the plate as it is withdrawn. This arm can be adjusted to different thicknesses of plate.

Projecting from the face of the frame is a bed B, formed, preferably, of a casting, as shown in Fig. 2. The bed is secured to the frame A by bolts  $e$ , having heads adapted to vertical T-ways  $e'$  in the frame, so that the bed can be raised or lowered to accommodate different forms of plates. The bed is supported by screw-jacks D D, on turning the screws of which the bed can be raised or lowered.

Sliding on the bed B is a carriage E, and adapted to bearings in this carriage is a shaft F, having a pinion  $f$ , which meshes with a rack  $b'$  on the bed B. The shaft F has a hand-wheel  $f^2$ , by which it is turned, so as to move the carriage toward and from the punch to accommodate plates of different diameters.

Mounted in the carriage is a vertical spindle G, having at its upper end a disk  $g$ , upon which the plate to be punched rests. At the

opposite end of this shaft is secured a worm-wheel  $g'$ , meshing with a worm  $h$ , which slides upon but turns with a feed-shaft H, it being splined thereto, as shown in Fig. 1. The worm  $h$  is confined between two bearings  $e^2$  on the carriage E, which support the outer end of the shaft H, so that the carriage E can travel toward and from the punch, but will always be in gear with the feed-shaft. The inner end of the feed-shaft is adapted to a bearing  $a'$ , and has a gear-wheel  $h'$  at its inner end meshing with an intermediate wheel  $h^2$ , which in turn meshes with a pinion  $h^3$  on a shaft  $h^4$ , adapted to bearings carried by the bed B. This shaft has a handle  $h^5$ , by which it is turned. The gearing can be changed, so as to give more or less feed to the feed-shaft H, and consequently more or less movement to the vertical spindle G, carrying the plate to be punched.

The flanged plate  $x$  to be punched is placed in position on the disk  $g$ , and a clamp-disk  $i$  is placed upon the plate, as shown clearly in Fig. 1. This disk carries the center post  $i'$ , which rests against the under side of the extension A<sup>3</sup> of the bracket A<sup>2</sup>. The center post is coupled to the clamp-disk by a ball-and-socket joint  $i^2$  and is made of two parts, one screwing upon the other, so that it can be adjusted to accommodate different thicknesses and shapes of plates. The object of the ball-and-socket joint is to allow the plate to turn in the event of the clamping-disk not being arranged in line with the shaft G.

In Fig. 3 I have shown the faces of the two disks  $g$  and  $i$  curved to correspond with the curve of the plate to be punched.

In order to hold large plates in proper alignment with the punch, I mount a friction-wheel  $s$  upon a stud  $s^2$ , pivoted to a bearing  $s^3$ . A sliding bracket  $s$  holds the outer end of the stud up under the plate to be punched. Thus the wheel  $s$  supports the outer edges of the plate, and in order to keep the edges in proper line I mount on each side of the bracket a vertically-adjustable carrier  $t$  for a friction-roller  $t'$ , which bears upon the upper side of the plate. If necessary, there may be more than two of these rollers, and it will be understood that plain guides may be substituted for the friction-rollers.

The operation of the machine is as follows:

The diameter of the plate is first ascertained and the carriage moved the proper distance from the punch. The flanged plate is then secured in position between the two disks, and the proper gearing is placed between the shaft  $h^4$  and the feed-shaft II, so that one turn of the handle will feed the disk the proper distance on its axis. If, for instance, the holes are to be punched two inches apart, gearing is introduced by which the plate at the flange is moved two inches with one turn of the shaft  $h^4$ . Consequently between each reciprocation of the punch-plunger the plate will be moved two inches and the holes will be punched two inches apart. In some instances a dial  $N^6$  may be placed in position so that a pointer on the shaft  $h^4$  or on other parts of the feed mechanism may be used as an indicator when required. I have shown a dial in dotted lines in Fig. 1. The supporting-roller  $s$  and its bearing  $s'$  can be dropped, as shown by dotted lines in Fig. 1, during the time a plate is being mounted upon or removed from the machine. I preferably round the upper end of the vertical spindle  $G$  and loosely connect the disk  $g$  thereto, so that the disk will be free to accommodate itself to the plate to be punched; but it is so keyed to the shaft that it must turn with the shaft.

When a flanged head has a manhole or tube-openings in it, I may clamp the head to the disk  $g$  in the ordinary manner through the hole or holes, dispensing with the clamping devices shown for the upper disk.

I will now describe the punching-machine proper. Guided in ways in the frame  $A$  is a vertically-moving slide  $W$ , having a hardened roller  $w$  at one end and preferably a smaller roller  $w'$  at the opposite end.

$V$  is the driving-shaft, geared to the cam-shaft  $P$  by gears  $p p'$ . This cam-shaft has a cam  $u$ , which acts upon the rollers  $w w'$ . Also sliding in the frame  $A$  are plungers  $A'$  and  $S'$ , connected to the vertical slide  $W$  by links  $m$ . The plunger  $A$ , as before remarked, carries the punch  $a$  for punching flanged plates, while the plunger  $S'$  carries a punch for ordinary flange-punching. The cam-shaft is moved in the direction of the arrow, Fig. 1, and acts upon the roller  $w$  (which is preferably of hardened steel) to punch, and acts upon the roller  $w'$  to withdraw the punches if the weight of the slide is not sufficient. The slide has two extended bearing-surfaces within the frame. Consequently both punches can be used at once when necessary.

The stripper  $C$  is in the form of a lever pivoted at  $c$ , the short arm of the lever extending over the punch, and the long arm of the lever is attached to a feed-screw  $c'$ , provided with a handle  $c^2$ . The feed-screw is adapted to a threaded orifice in the bracket  $A^2$ , so that on turning said screw the stripper can be adjusted toward or from its work. I preferably provide each punch with this adjustable stripper.

I claim as my invention—

1. The combination, in a machine for punching flanged plates, of the frame, a horizontally-reciprocated plunger, a punch carried by said plunger, an overhanging bracket, a die therein for receiving the plunger, a bed, a carriage on said bed on which is mounted the flanged disk to be punched, and mechanism for revolving said disk, substantially as described.

2. The combination of the frame, the punch, a bed, mechanism for vertically moving said bed so as to raise and lower it in respect to said punch, a carriage on said bed, mechanism for moving said carriage toward or from the punch, and a plate-carrier adapted to bearings on the carriage, substantially as described.

3. The combination, in a punching-machine, of the punch, a vertically-movable bed, a carriage mounted on said bed, mechanism for moving said carriage toward and from the punch, and a plate-carrier mounted on said carriage, with mechanism for turning said plate-carrier, substantially as described.

4. The combination of the frame, a punch-plunger and its punch, a bracket, an extension on said bracket, a bed, a carriage on said bed, a plate-carrier carried by said carriage, composed of a vertical spindle and disk, and a clamping disk above the plate-carrier, with a device for clamping said disk between the plate and the extension of the bracket, substantially as described.

5. The combination of the frame, a punch-plunger, a bracket carrying the punch-die, a vertically-movable bed, a carriage thereon, mechanism for moving said carriage on the bed, a vertical spindle in the carriage, a plate-supporting disk on said shaft, a feed-shaft geared to said vertical shaft, and a feed-handle with intervening change gearing between the feed-handle and the shaft, substantially as described.

6. The combination, in a machine for punching flanged plates, of the frame, the horizontal punch-plunger therein, a bracket arched over the punch, a die in said bracket, an extension of said bracket, a vertically-adjustable bed, a carriage adjustable on said bed toward and from the punch, a plate-carrier, mechanism for giving the plate-carrier a positive motion, and clamping mechanism for the plate, situated between the plate and the extension, substantially as described.

7. The combination of the frame, a punch-plunger, a bracket, a die therein, the bed, a carriage thereon, and a plate-carrier adapted to revolve in said carriage, with a supporting device for supporting the plate at the punch, said supporting device being adjustable, so that it can be moved to allow the plate to be arranged in respect to the punch, substantially as described.

8. The combination of the frame, a punch, a bracket, a die therein, a bed, a carriage thereon, a plate-carrier adapted to revolve on the said carriage, and a support for the plate at

the punch, with adjustable pressers adapted to hold the plate down upon the support, substantially as described.

9. The combination of the punching mechanism, the bed, a carriage thereon, the vertical spindle rounded at its upper end, a disk g, loosely mounted on said spindle, but connected so as to positively turn therewith, with mechanism for clamping the plate on the disk, and mechanism for holding the plate in proper relation to the punch, substantially as described.

10. The combination, in a punching-machine, of the frame, the vertically-guided slide,

projections thereon, a cam working between said projections, mechanism for driving said cam, the punch-plunger connected to said slide by links, and punches carried by said plunger, with dies for each punch, substantially as set forth.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

HENRY C. JONES.

Witnesses:

WILLIAM D. CONNER,  
HENRY HOWSON.