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DRAFTSMAN

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No. 626,574.

Patented June 6, 1899.

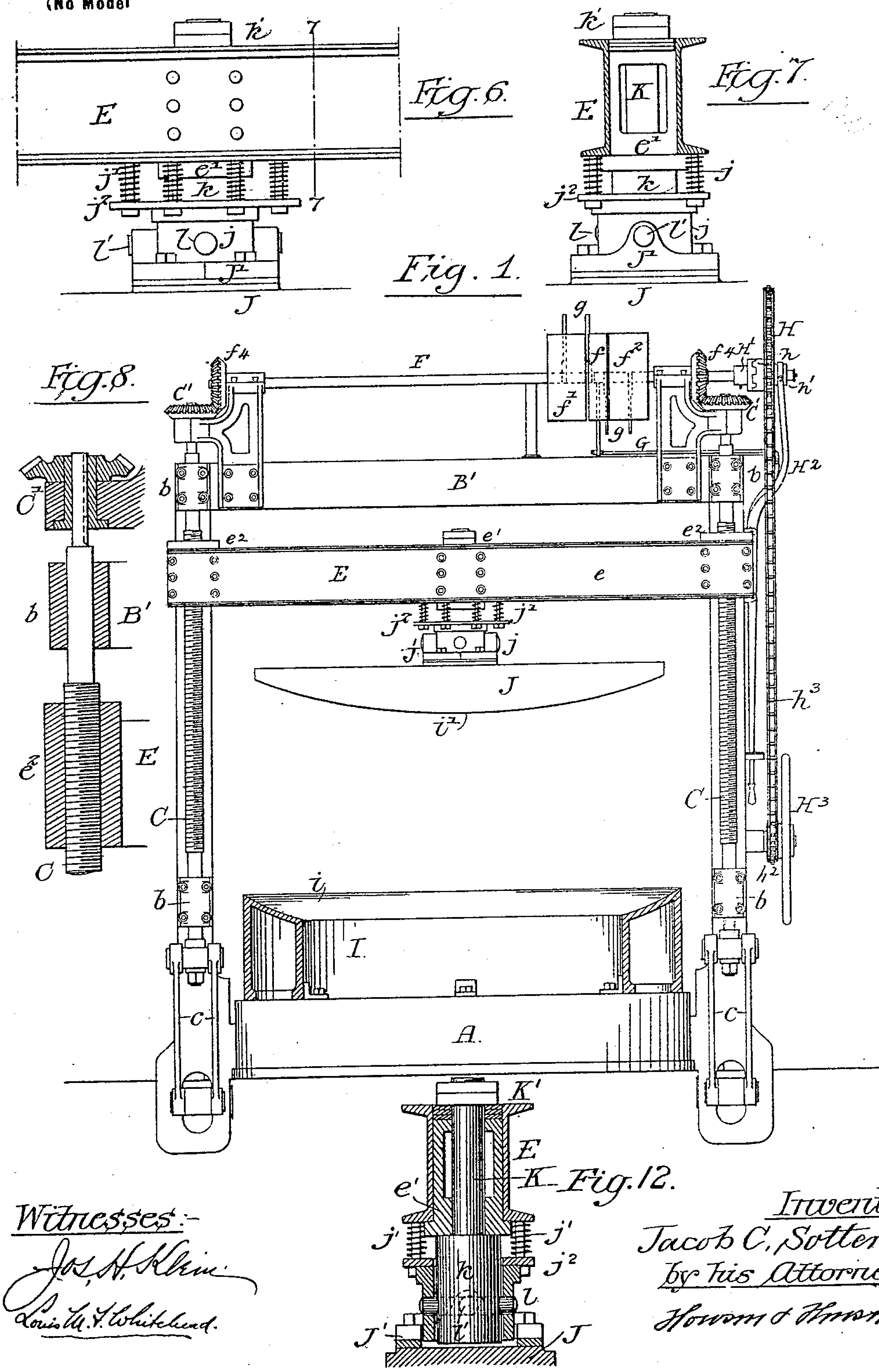
J. C. SOTTER.

MACHINE FOR SHAPING METAL PLATES.

(Application filed Nov. 21, 1898.)

(No Model

3 Sheets—Sheet 1.



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Louis M. F. Whitehead.

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by his Attorneys:
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THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

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(No Model.) 3 Sheets—Sheet 2.

Fig. 11.

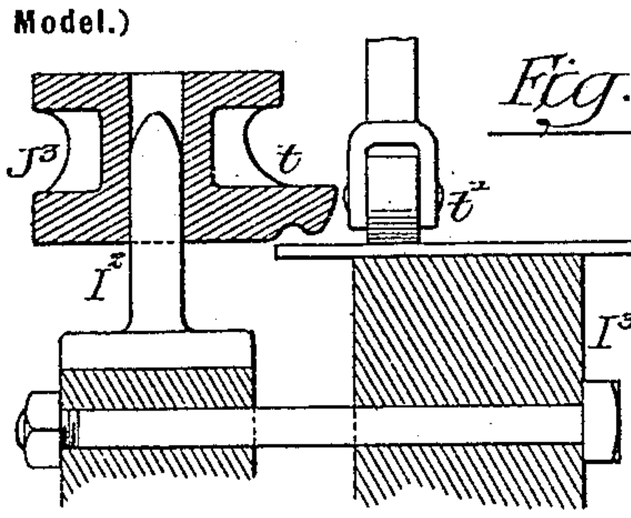

Fig. 10.

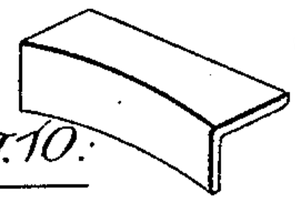

Fig. 9.

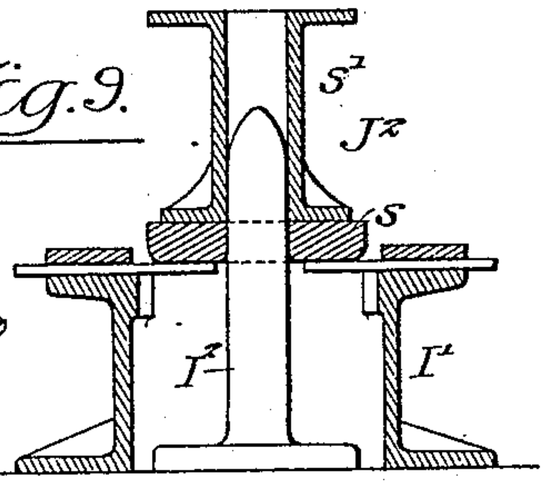

Fig. 4.

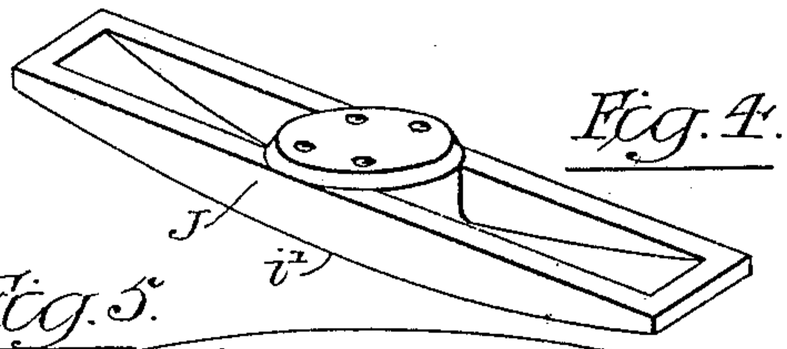

Fig. 5.

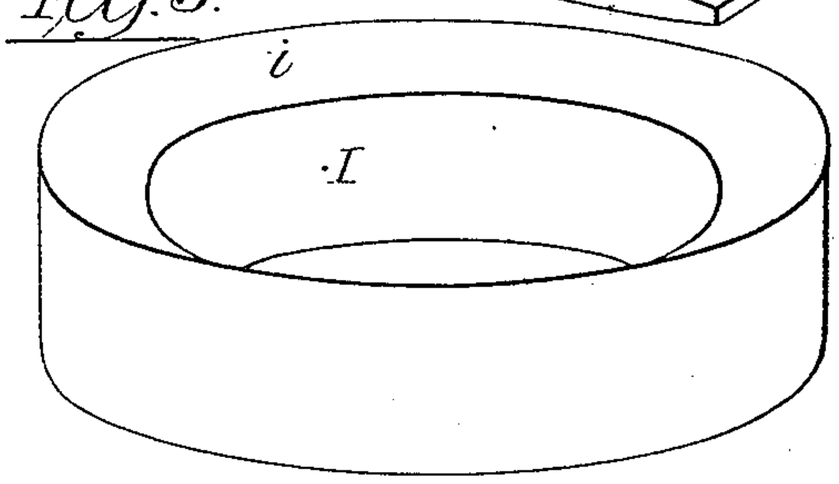

Fig. 2.

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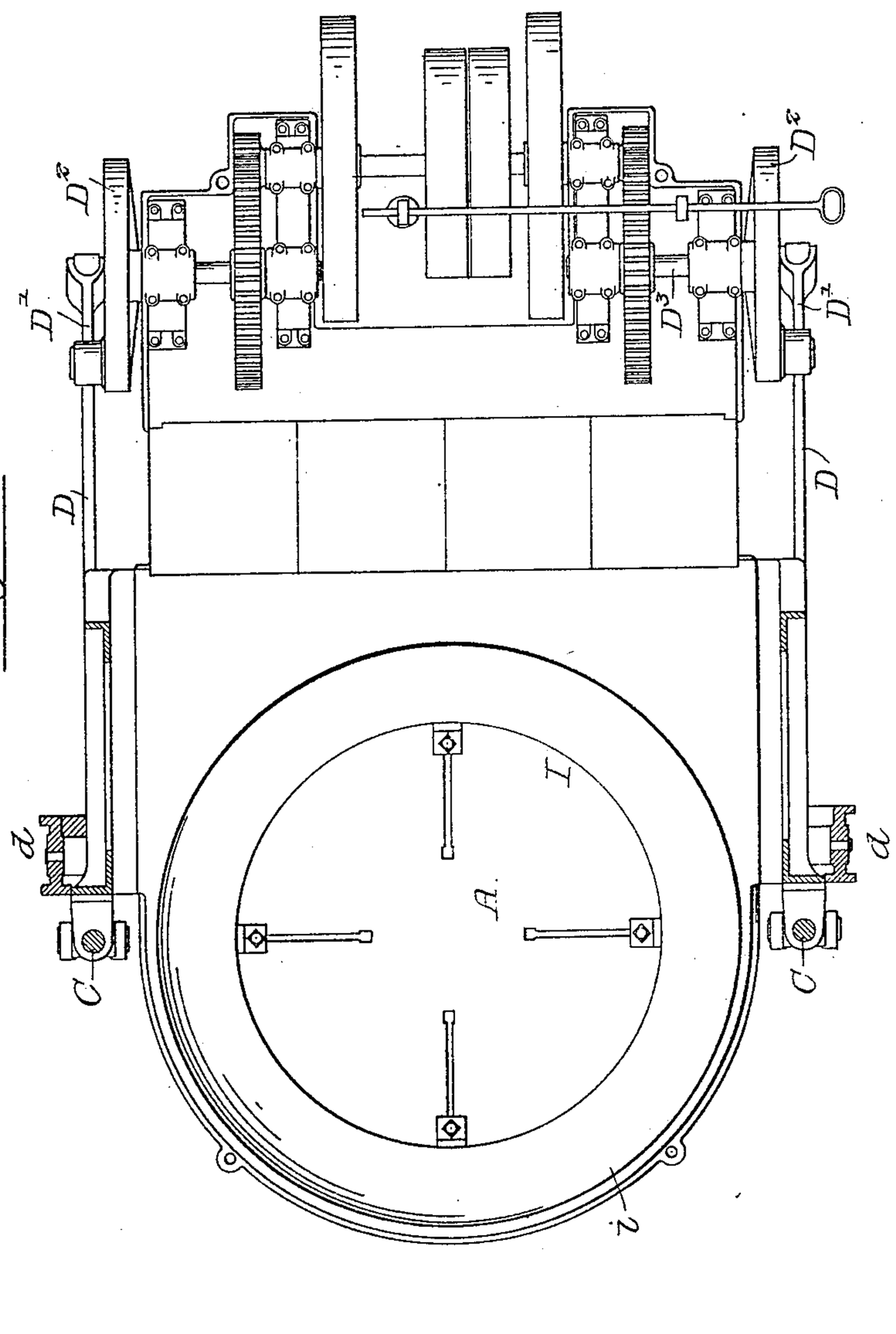
Fig. 3.



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UNITED STATES PATENT OFFICE.

JACOB C. SOTTER, OF POTTSTOWN, PENNSYLVANIA.

MACHINE FOR SHAPING METAL PLATES.

SPECIFICATION forming part of Letters Patent No. 626,574, dated June 6, 1899.

Application filed November 21, 1898. Serial No. 697,064. (No model.)

To all whom it may concern:

Be it known that I, JACOB C. SOTTER, a citizen of the United States, and a resident of Pottstown, Pennsylvania, have invented certain Improvements in Machines for Shaping Metal Plates, of which the following is a specification.

The object of my invention is to construct a machine that will press sheet-metal plates into the desired shape by a succession of strokes, as fully described hereinafter.

My invention relates particularly to a machine for dishing metal plates for use as heads in boilers and tanks; but the invention can be used for flanging and shaping metal plates or bars into other forms as well.

In the accompanying drawings, Figure 1 is a front view of my improved plate-shaping machine. Fig. 2 is a side view. Fig. 3 is a plan view. Fig. 4 is a perspective view of the upper former. Fig. 5 is a perspective view of the lower former. Fig. 6 is an enlarged view of the swivel-coupling for the upper former. Fig. 7 is a section on the line 7 7, Fig. 6. Fig. 8 is a sectional view of part of Fig. 1. Fig. 9 is a view of dies for forming brackets or stays. Fig. 10 is a perspective view of one of the brackets made by the dies, Fig. 9; and Fig. 11 is a view of dies for flanging a straight plate. Fig. 12 is a sectional view through the swivel-coupling, Fig. 6.

A is the base-plate, on which are mounted the two standards B B, one on each side of the machine.

C C are two vertical screw-shafts adapted to slide in bearings *b b* on the standards.

On each side of the machine are levers D D, pivoted at *d* to bearings on the base A. A link *c* connects each lever to its screw-shaft C. The opposite end of each lever D is connected at d' to a connecting-rod D', coupled to a crank-pin d^2 on a disk D^2. The disks are mounted on a driven shaft D^3, so that as the shaft revolves a vertical reciprocating motion is imparted to the screw-shafts C C. Other forms of driving mechanism may be used without departing from my invention.

Carried by the screw-shafts C C is a cross-beam E, made in the present instance by two channel-bars *e e*, a center block *e'*, and end nut-blocks e^2 e^2, through which the screw-shafts pass, so that the beam E will reciprocate with the screw-shafts.

At the top of the machine is a fixed cross-beam B', and above this beam is a shaft F, adapted to suitable bearings on the beam, and on this shaft are tight and loose pulleys *f*, *f'*, and f^2, to which are adapted the driving-belts, one belt being driven in one direction and the other belt in the opposite direction.

In order to control the movements of the belts, I provide a shifter-bar G, having arms *g*, engaging the belts, and attached to one end of the shifter-bar G is a hand-lever G', within easy reach of the operator and adapted to engage with a notched segment *g'*, so that when the lever G' is in the central position the shaft is stationary; but when the lever is moved to one extreme position the belts are shifted so that the shaft F will be driven in one direction and when the lever is moved to the opposite position the shaft F is driven in a reverse direction.

On the shaft F are bevel-wheels f^4 f^4, which mesh with bevel-wheels C' C', mounted in bearings on the cross-beam B'. Each wheel C' is so coupled to its screw C, Fig. 8, that the screw will be driven by the wheel, but will be free to reciprocate therein when moved by the levers D, as described above, so that the cross-beam E not only has a positive reciprocating movement, but also a movement on the screws either up or down, according as the lever G' is shifted.

The shaft F can be moved by hand as follows: Mounted loosely on the shaft is a chain-wheel H, having a clutch-face *h*, and fast on the shaft is a clutch-ring H'. In the wheel H is a grooved hub *h'*, in which is a ring secured to an arm of a lever H^2, pivoted to the side of the standard B within easy reach of the operator. H^3 is a hand-wheel mounted on a stud projecting from the standard B, and on the hub of this hand-wheel is a chain-wheel h^2. A chain h^3 passes around the two chain-wheels H and h^2. When the lever H^2 is moved so as to throw the chain-wheel H in gear with the shaft F, the shaft can be turned in either direction by turning the hand-wheel H^3. Thus the coarse adjustments can be made by power and the fine adjustments by hand. In some instances the chain-wheel h^2 and

hand-wheel H^3 may be dispensed with and a loose chain used.

Mounted on the base between the two standards B B is the die I. In the present instance this die has a concaved surface *i* for the purpose of dishing boiler or tank heads. The die is applied in any suitable manner to the base-plate and can be readily removed, so that other dies of different shapes or different diameters may be substituted therefor.

Hung from the beam E is a former J, of such a width that only a section of the plate is acted upon at each pressing. The center block *e'* is rigidly secured to the bars *e e* of the beam E. Adapted to the block *e'* is a pivot-pin K, having a head *k* at one end and a screw-thread at the opposite end on which are nuts K'. *j* is a ring pivoted to the head by a pin *l*, and the ring is pivoted in turn to the segments J' by pins *l'* at right angles to the pin *l*, so that a swivel-joint is thus formed. Resting on the ring *j* is a plate j^2, and between the plate and the beam E are springs *j'*, held in place by suitable bolts which pass through the springs. Thus the former J can readily swing on its pivot and at the same time it has a limited universal movement, whereby it can accommodate itself to the die, as it will be understood that the former for pressing dished heads is a sectional former and is turned on its pivot by the operator as the plate is pressed.

The operation of the machine is as follows: If the machine is used for dishing plates, then the die and former shown in Figs. 4 and 5 are mounted in position as in Fig. 1. A plate to be shaped or dished is heated to the required degree, placed on the die I, and the mechanism set in motion, so that a reciprocating motion is imparted to the screws, the beam, and former. This motion, as mentioned above, is limited, and the beam and former are moved toward the plate mounted on the die by turning the screws by the mechanism described above, so that the former as it nears the plate presses on it slightly at each reciprocation and gradually presses the center of the plate into the die. The former is turned around on its pivot gradually for half a revolution as it is lowered, and it is gradually lowered by turning the hand-wheel, so that the plate is dished by a gradual pressing operation until it snugly fits the face *i* of the die I and conforms to the face *i'* of the former J, when the former is elevated by turning the screws and the machine stopped and the plate removed.

It will be understood in carrying out my invention that instead of shaping plates or heads for boilers other dies or formers may be used without departing from the main object of my invention, which is to construct a machine the head or former of which will have a limited reciprocating motion and at the same time be capable of independent adjustment toward or from a die. For instance, if it is desired to flange the plate around a man-hole-opening in a boiler or tank a suitable die is substituted for the die I and a corresponding former substituted for the former J. By bringing the two parts together as described above a flange will be readily turned down from the plate around the opening.

If a bracket or stay (illustrated in Fig. 10) is to be made from a flat plate, I may use a die I', Fig. 9, on which two plates are clamped, one on each side, and a former J^2 is secured to the beam E. This former may be made in two parts, the former proper, *s*, and the extension *s'*, so that one extension may answer for a number of formers *s* in shaping articles such as the bracket shown in Fig. 10. I prefer to use a steadying-post I^2, secured to the base of the machine, for guiding the former J^2.

In Fig. 11 I have shown a device for flanging the edges of plates. I^3 is a die or block, and J^3 is a former having an edge *t*, shaped to turned down a flange on the plate mounted on the die or block I^3. A roller *t'* or other device is made to hold the plate on the die near the edge. Thus it will be seen that different-shaped dies and formers can be used in this machine.

I claim as my invention—

1. The combination in a machine for dishing plates, of the circular die, a narrow former adapted to shape the plate to the form of the die by a series of pressing movements, the former acting on a section of the plate at each stroke, a carrier for the former and means for reciprocating the carrier, said former being free to turn on the carrier, substantially as and for the purpose set forth.

2. The combination in a machine for shaping metal objects, of a die, a former, a carrier for the former, a combined gimbal-and-swivel connection between the carrier and former, so that the former may be turned on the carrier and will have freedom to accommodate itself to the die, with means for moving the carrier toward and from the die, substantially as described.

3. The combination in a machine for shaping metal objects, of a base, two standards, screws mounted in bearings on said standards, means for reciprocating the screws, a beam having nuts adapted to the screws so that the beam will reciprocate with the screws, a former carried by the beam, with means for turning the screws in unison so as to raise or lower the beam independently of the reciprocating motion, substantially as described.

4. The combination of a base, two standards, a die mounted between the two standards, screws adapted to bearings in the standards, levers connected to the screws, means for operating said lever, a beam having nuts adapted to the screws so that it will reciprocate with the screws, a former carried by the beam and mounted above the die, a shaft geared to the two screws, mechanism for turning said shaft so that the beam and its former will be raised or lowered independently of the reciprocating motion, substantially as described.

5. The combination of a base, two standards, a die mounted between the two standards, screws mounted in bearings on the standards, a lever connected to each screw, power-driven mechanism for operating the levers and reciprocating the screws, a cross-beam having nuts adapted to the screws, a former carried by the beam, a cross-shaft geared to the two screws, belt-wheels on the cross-shaft, a hand-wheel also on the shaft and a clutch for throwing into and out of gear the hand-wheel and belt-shifting mechanism, substantially as described.

6. The combination of the standards, a die mounted between the standards, screws adapted to bearings on the standards, a cross-beam having nuts adapted to the screws, mechanism for reciprocating the screws, and mechanism for turning the screws, so that the beam and its former will be raised independently of the reciprocating motion and a loose connection between the beam and its former so that the former will accommodate itself to the die, substantially as described.

7. The combination of the standards, the die mounted between the standards, screws adapted to bearings on the standards, a cross-beam having nuts adapted to the screws, mechanism for reciprocating the screws and mechanism for turning the screws so that the beam and its former will be raised independently of the reciprocating motion and a loose connection between the beam and its former so that the beam will accommodate itself to the die, a plate, and springs mounted between the plate and the beam so as to limit the motion of the former, substantially as described.

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

JACOB C. SOTTER.

Witnesses:
ISAAC SPATZ,
J. H. MAXWELL.