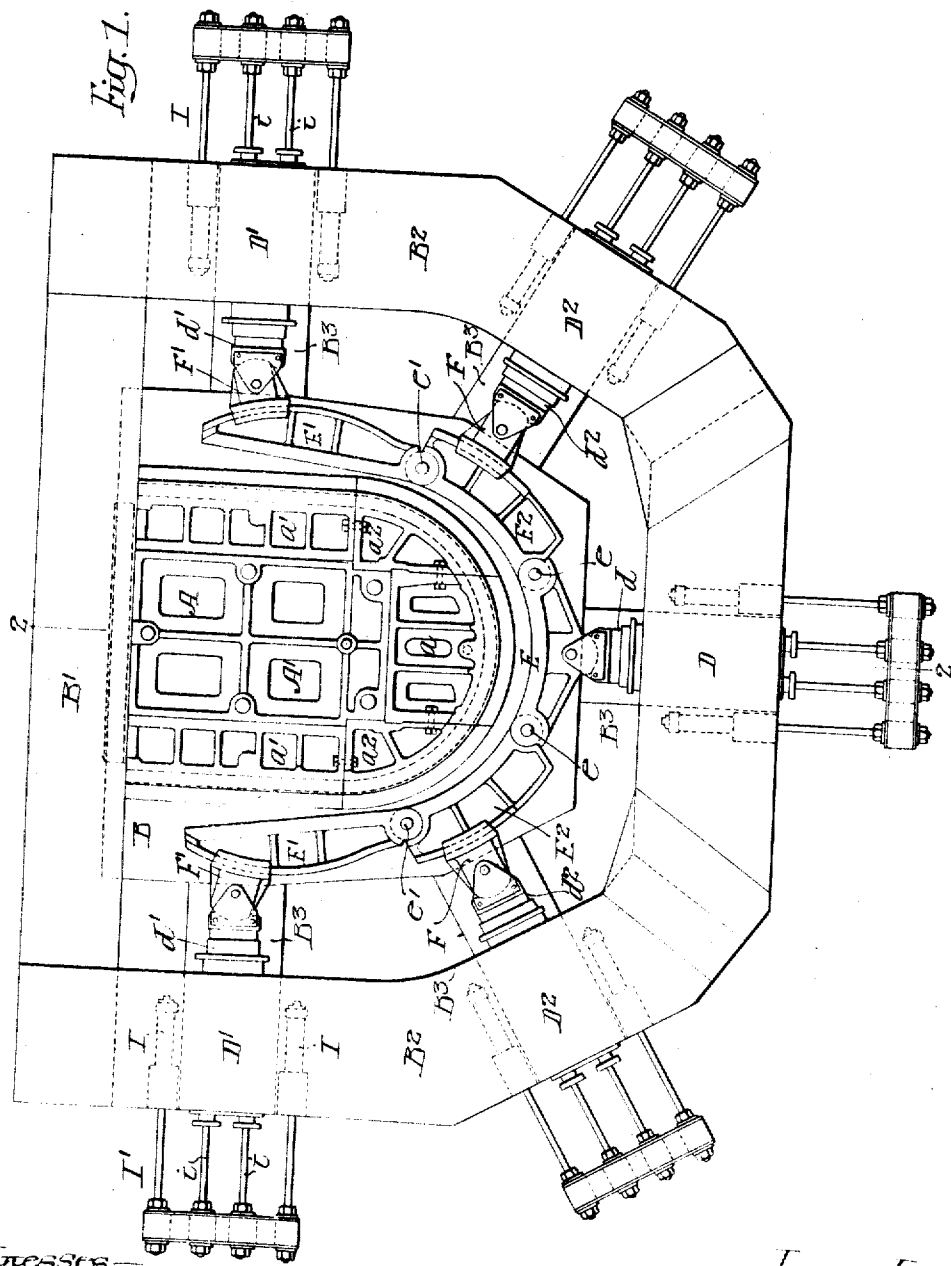


C. L. HUSTON.
 PRESS FOR BENDING METAL SHAPES.
 APPLICATION FILED AUG. 26, 1910.

1,021,526.

Patented Mar. 26, 1912.
 3 SHEETS-SHEET 1.



Witnesses.
 Walter Chism
 Will H. Burrows

Inventor.
 Charles L. Huston,
 by his ATTORNEYS.
 Howard Johnson

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3 SHEETS—SHEET 2.

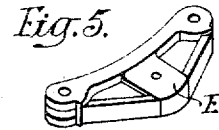
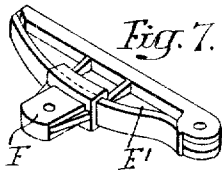
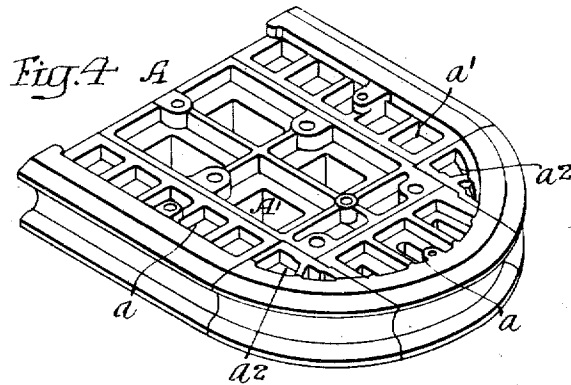


Fig. 6.

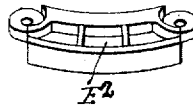


Fig. 2.

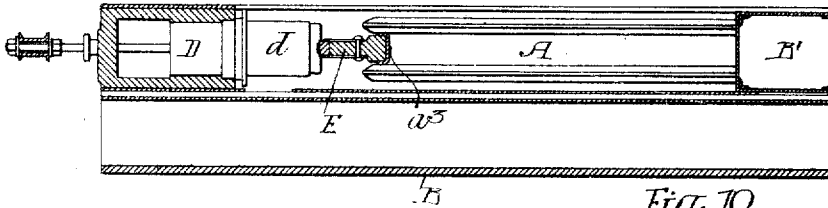


Fig. 10.

Fig. 8.

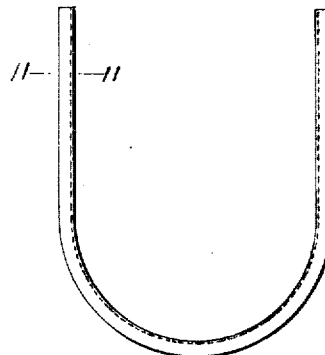
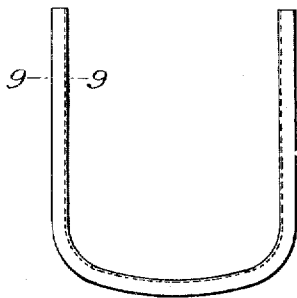
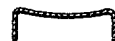


Fig. 9.



Fig. 11.



Witnesses—
Walter Blum
Wills A. Burrows

Inventor—
Charles L. Huston
by his Attorneys—
Horn & Horn

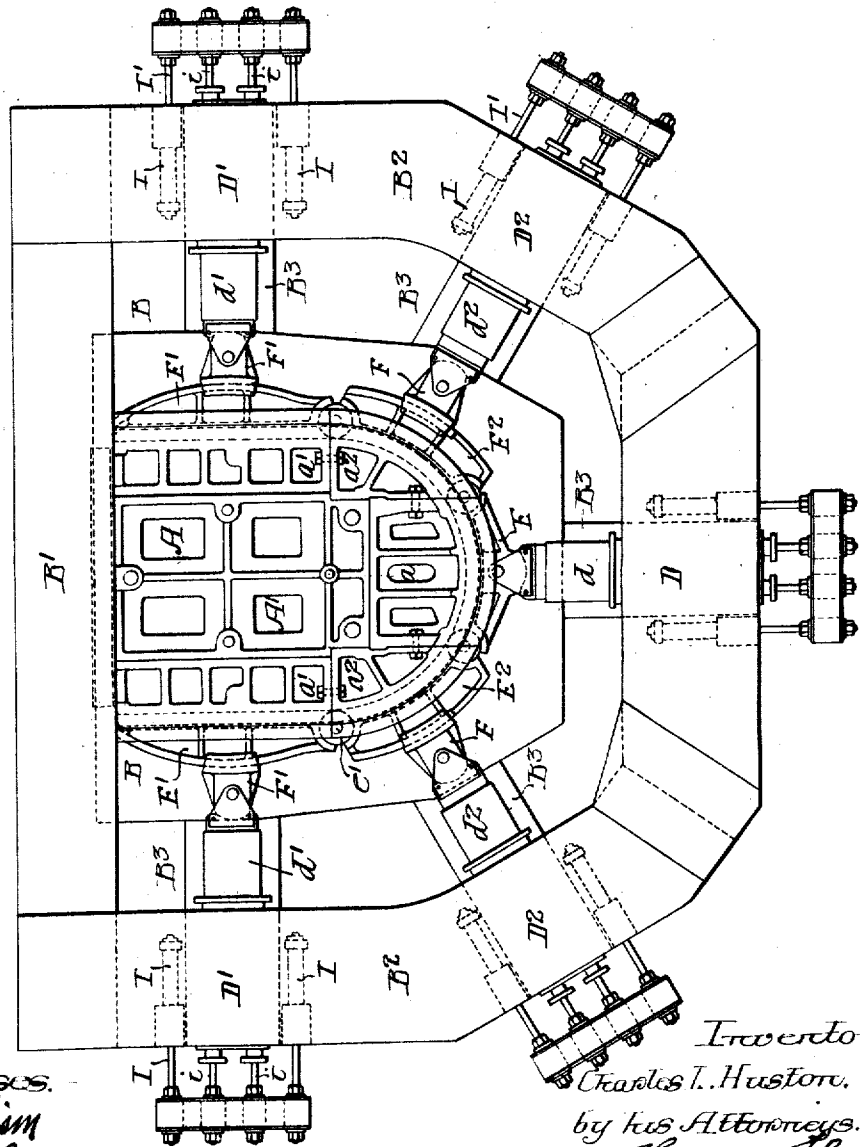
C. L. HUSTON.
PRESS FOR BENDING METAL SHAPE
APPLICATION FILED AUG. 28, 1910.

1,021,526.

Patented Mar. 26, 1912.

3 SHEETS-SHEET 3.

Fig. 3.



Witnesses.
Walter Chism
Atty. of Huston

Inventor.
Charles L. Huston,
by his Attorneys.
Huston & Huston

UNITED STATES PATENT OFFICE.

CHARLES L. HUSTON, OF COATESVILLE, PENNSYLVANIA.

PRESS FOR BENDING METAL SHAPES.

1,021,526.

Specification of Letters Patent.

Patented Mar. 26, 1912.

Application filed August 26, 1910. Serial No. 579,058.

To all whom it may concern:

Be it known that I, CHARLES L. HUSTON, a citizen of the United States, residing in Coatesville, county of Chester, State of Pennsylvania, have invented certain Improvements in Presses for Bending Metal Shapes, of which the following is a specification.

My invention relates to certain improvements in presses for shaping metal plates.

The invention is particularly adapted for bending flat plates to U-shaped form; the forms being channeled in cross section. Forms of this type are used in the manufacture of locomotive boilers for the sections of the fire box and the boiler adjacent to the fire box and the forms must be accurately shaped so that when assembled they can be firmly secured together and tightly calked.

The object of my invention is to so construct a press that a flat plate can be accurately bent into proper shape preferably with one heating.

My invention relates further to details of construction which will be fully described hereinafter.

In the accompanying drawings:—Figure 1; is a plan view of my improved press, the dies being open; Fig. 2; is a sectional view on the line 2—2, Fig. 1; Fig. 3; is a plan view showing the dies closed; Fig. 4, is a perspective view showing the former; Figs. 5, 6 and 7 are perspective views showing the movable dies; Fig. 8, is a plan view of one of the forms made in the dies; Fig. 9; is a sectional view on the line 9—9, Fig. 8; Fig. 10; is a plan view of another form, and Fig. 11, is a sectional view on the line 11—11, Fig. 10.

Referring in the first instance to Figs. 8 to 11, inclusive, which illustrate the forms made by my improved press, would state that the form illustrated in Figs. 8 and 9, is the form of the interior of a fire box of a locomotive having flanges which extend into the body portion as shown in cross section, Fig. 9, so as to allow for expansion and contraction.

Figs. 10 and 11, illustrate the form used in making up the outer walls of the boiler at the fire box and also consists of a section U-shaped in cross section, as in Fig. 11, having outwardly extending flanges, and the body portion is slightly curved, as shown. These two sections are preferably of the same width and are coupled together by per-

forated plates which take the place of stay bolts in tying the two sections of the boiler together, although stay bolts may be used in some instances. These two sections must be accurately made so that when they are assembled they will aline one with the other, so as to facilitate the making of repairs by taking out the enlarged section and substituting therefor a new section.

Sections made by my improved press are accurate in every detail and can be readily assembled, or one section can be substituted for another.

Referring to Figs. 1 and 2, A is a former around which the plate is shaped. This former, in the present instance, has a central portion A', an end portion *a* and side portions *a'* connected to the end portion by corner sections *a*². The side sections and the end section are loosely connected to the corner sections by single bolts so as to allow them to have a certain amount of flexibility when not held in place. They are secured to the central section A' by any suitable clips or fastenings, as desired. The former consisting of the end section, the two sides and the two corner sections can be raised bodily by a suitable crane when it is necessary to remove the shaped plate from the former. When in place the former rests upon a bed B having an abutment B' made of plates shaped in any suitable manner to give the desired strength. Connected to the abutment B' at each end, are two U-shaped frames B² above and below as shown in Fig. 1, and to these frames and to the radial bed structures B³ the hydraulic cylinders D, D'. D² are rigidly secured. E is the central movable die. E', E' are the two side dies and E², E² are the two intermediate dies. The intermediate dies E² are connected to the central die E by hinge joints *e* and to the side dies by hinge joints *e'*. The plunger *d* of the central cylinder D is pivotally connected to the die E, while the plungers *d*² of the intermediate cylinders D² are pivotally connected to the shoes F, which slide upon the die E. The shoe, in the present instance, has flanges which extend over the ribs on the backs of the dies so as to control the movement of the die toward and from the former and yet slide upon the die as it is moved from one position to another. Hinged to each of the plungers *d'* of the side cylinders D' is a shoe F', which is adapted to slide on the side dies E'; the

connection being similar to the connection between the shoe F and the die E² so that while the plungers can move the dies toward and from the former, the dies can slide 5 in the shoes to accommodate themselves to the shape of the former. In the present instance fluid is admitted to the main cylinders D, D', D² for the purpose of forcing the dies forward, the dies being retracted 10 by return cylinders I and having their piston rods connected to cross heads I', which in turn are connected by rods i attached to the main plunger. The hydraulic mechanism is arranged so that the initial supply 15 of fluid under comparatively low pressure is supplied to the cylinders after which the pressure is increased so as to insure the accurate shaping of every detail of the form. The pressure can be regulated according to 20 the thickness of the metal to be shaped and the intricacy of the shape.

The operation of the press is as follows: The metal to be shaped is cut to the proper length and the proper thickness, and is introduced into a furnace and heated. When 25 it is turned out of the furnace it is bent into U-shape form and placed between the former A and the dies E, E', E². When it is adjusted to the position desired, power is applied and the plate is first pinched by the 30 central die E and slightly by the other dies so as to give it practically the initial shape of the groove a³ in the periphery of the former A. This pressure is continued on 35 the side dies E' by allowing fluid under pressure to be admitted to the cylinders D' and the metal at the ends of the form is practically driven into final position, pinching the metal at this point, after which the other 40 dies are driven toward the former A to the full extent, bringing all the parts of the plate to conform accurately with the shape of the former. Then to insure absolute accuracy additional pressure is exerted on all 45 the dies and the shape of the plate completed. By this method either of the forms illustrated in Figs. 8 to 10, can be readily and accurately made on a press of this type. In order to remove the formed plate the dies 50 are backed off and the former, with the plate attached, is lifted by a crane and hooks

are applied to the ends of the shaped plate and the formed plate is drawn bodily from the form, after which the former is placed 55 in position between the dies and the operation is repeated.

I claim:

1. The combination in a press for shaping metal plates, of a fixed former, a central die, side dies and intermediate dies, said intermediate dies being coupled to the central die 60 and to the side dies, with a plunger connected to the central die, plungers back of the side and intermediate dies, and shoes mounted between the plungers and the said 65 side and intermediate dies and arranged so that the dies slide in the shoes as they are forced toward the former.

2. The combination of a fixed former, a central die, intermediate dies hinged to the 70 central die, and a side die hinged to each intermediate die, curved slides on each intermediate and on each side die, a central plunger pivoted to the central die, intermediate 75 plungers, shoes pivotally mounted on the plungers and having guides in which the slides of the dies have a certain amount of movement, a plunger back of each side die, shoes pivotally mounted on the plungers 80 and having ways in which the slides of the side dies travel as the dies are forced toward the former.

3. The combination in a press for shaping metal plates, of a fixed former consisting of a center section; an end section and a section at each side; with connecting rounded 85 corner sections loosely attached to the end and center sections, the end, side and corner sections being grooved to receive the plate to be shaped; and a series of dies opposite 90 each of the side sections and corner sections and the center section, said dies being coupled together; with a plunger back of each die, the plungers having a sliding connection with the side and corner dies. 95

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

CHARLES L. HUSTON.

Witnesses:

MURRAY C. BOYER,
WM. A. BARR.