

(No Model.)

A. C. A. HOLZAPFEL.  
MACHINE FOR SHAPING AND FLANGING METAL PLATES.  
No. 474,661. Patented May 10, 1892.

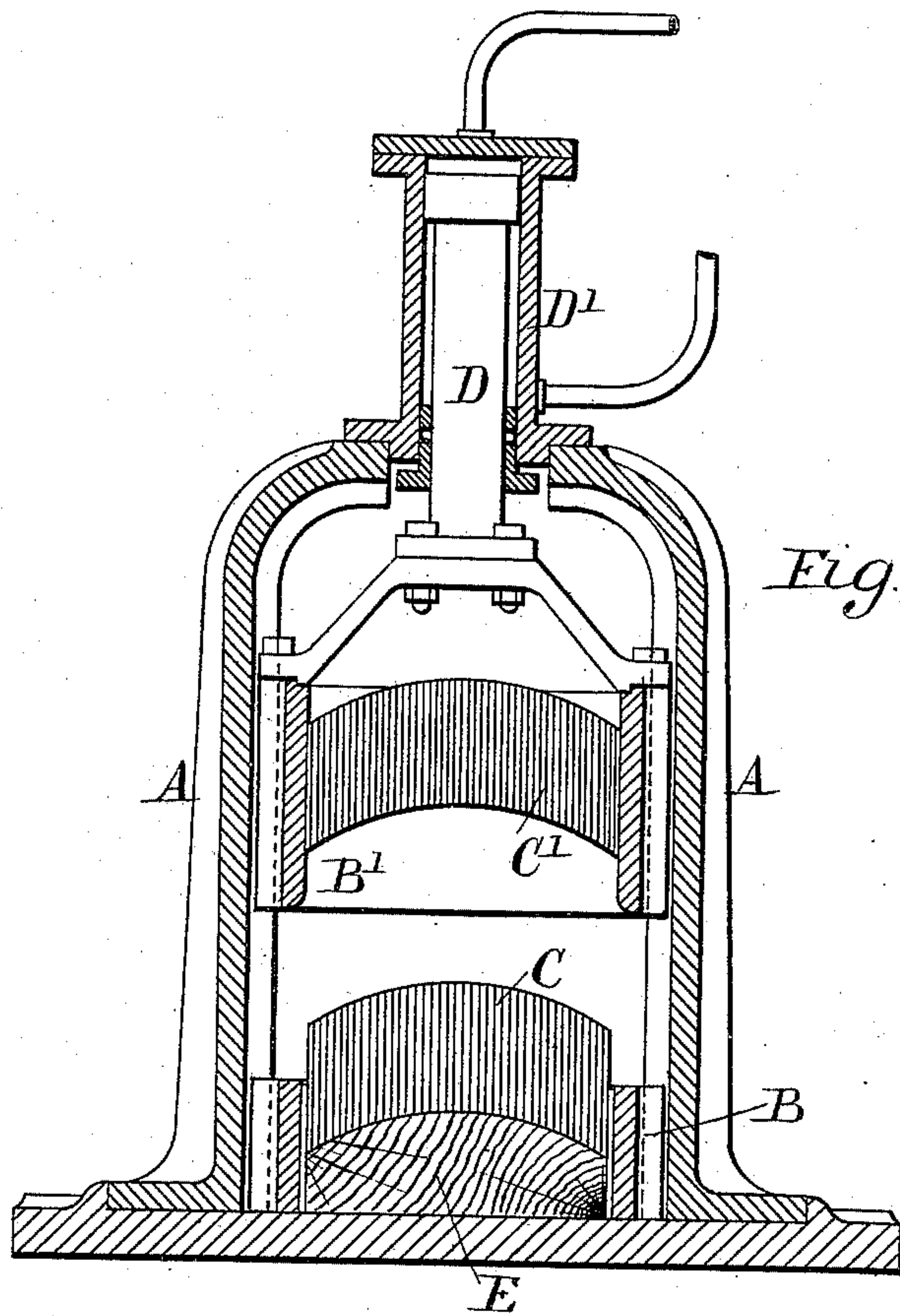


Fig. 1.

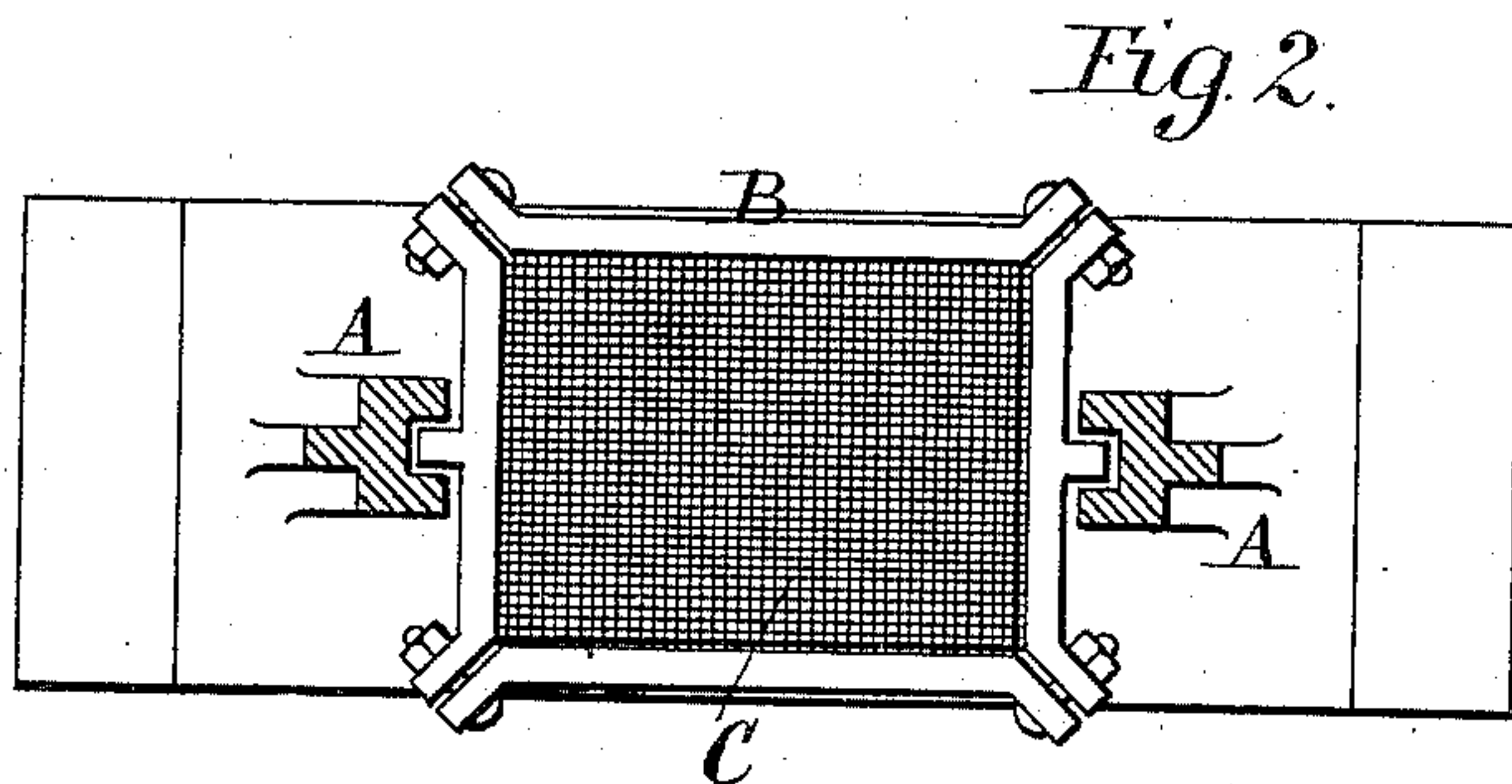


Fig. 2.

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# UNITED STATES PATENT OFFICE.

ALBERT C. A. HOLZAPFEL, OF LONDON, ENGLAND.

## MACHINE FOR SHAPING AND FLANGING METAL PLATES.

SPECIFICATION forming part of Letters Patent No. 474,661, dated May 10, 1892.

Application filed February 23, 1892. Serial No. 422,548. (No model.)

*To all whom it may concern:*

Be it known that I, ALBERT CHARLES AUGUSTUS HOLZAPFEL, a citizen of England, residing at 116 Fenchurch Street, in the city of London, England, have invented a new and useful Improved Machine for Shaping and Flanging Metal Plates for Ship-Building and other Purposes, of which the following is a specification.

My invention relates to a machine for shaping and flanging steel and other plates by subjecting the same to pressure between two molds or dies.

It consists, mainly, in constructing the molds or dies, by means of which a metal plate is brought into the desired curved configuration, of a number of iron, steel, or other metal rods of small transverse section and with more or less roughened sides, which rods are arranged closely side by side within a frame so constructed as first to allow the rods to slide against each other for assuming a definite position and then to bind them tightly together, so as to prevent their shifting when subject to pressure, the ends of the rods being thus made, collectively, to prevent the required curved surface for constituting the mold or die.

By preference I construct the machine with two such molds or dies built of rods, the lower one being arranged so that the pattern of the curved surface to be produced can be placed beneath the lower ends of the rods in order to bring them into correct position, as I will describe with reference to the accompanying drawings, in which—

Figure 1 shows a vertical section of the machine, and Fig. 2 shows a sectional plan of the same.

Within the framing A is mounted a rectangular frame B, formed of four separate parts bolted together at the corners, and within this frame are a number of metal rods C, fitting closely side by side, and when the bolts of the frame B are tightened up the rods are thereby pressed so closely together as collectively to constitute rigid surfaces by means of their upper and lower ends.

Above the frame B is a second frame B', with rods C', constructed to form a mold or

die and operating in precisely the same manner as described with reference to the upper mold or die. This frame is fixed to the plunger D of a hydraulic cylinder D'.

The mode of operating with the machine is as follows: A pattern E of the curved surface to be reproduced having been placed below the lower set of rods C, the frame B is loosened, so as to allow the rods to drop with their lower ends onto the pattern, thus reproducing the surface of E by the upper ends of the rods. The frame B is then tightened and the frame B' is lowered by the plunger D, so as to fit with its lower end to the requisite degree over the projecting sides of the rods C. It is then loosened, so as to allow all the rods C' to adjust themselves with their lower ends resting upon the upper ends of the rods C, after which the frame B' is tightened up again and the whole is lifted up by the plunger. A thin sheet of asbestos paper having been placed on the set of rods C, the heated metal plate to be shaped and flanged is then placed thereon, and after placing a second sheet of asbestos paper on the plate the frame B is forced down by hydraulic pressure, so as, first, to bend down the edges of the plate between the frame B' and the sides of the rods C, and thus form the flanges on the plate, and, secondly, to cause the surface of the plate to assume the same configuration as that of the rods C and C'.

It will be seen from the above that the frames B B', with their rods C C', can be used successively for producing any number of differently-shaped flanged plates, such as may be required in ship-building, the rods C C' being previously adjusted by means of a pattern to the particular shape required.

Having thus described the nature of my invention, and the best means I know for carrying the same into practical effect, I claim—

1. In a machine for shaping metal plates, the combination, with a mold or die adjustable to vary its contour, of a mold or die co-operating therewith and composed of a number of rods fitting closely together and surrounded by a frame, which can be loosened, so as to allow the rods to have their ends brought into such relative positions as to form

a surface having the required curvature, the frame being then tightened, so as to press the rods firmly together and enable them to exert the requisite pressure for shaping the  
5 metal plate, substantially as described.

2. In a machine for shaping metal plates, the combination of a framing A, a frame B, embracing metal rods C, so that these can first be adjusted, collectively, to form a curved sur-  
10 face and then be securely held in such position, and a second frame B', with rods C', actuated by hydraulic or other pressure, so as first to adjust the ends of the rods to the configuration of the ends of the rods C and then  
15 to exert pressure upon a metal plate placed

between the two sets of rods, substantially as described.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 8th day of 20 February, A. D. 1892.

A. C. A. HOLZAPFEL.

Witnesses:

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