No. 689,416. Patented Dec. 24, 1901.

T. F. ROWLAND.

ANVIL MECHANISM.

(Application filed May 14, 1901.)

(No Model.) 2 Sheets—Sheet 1.

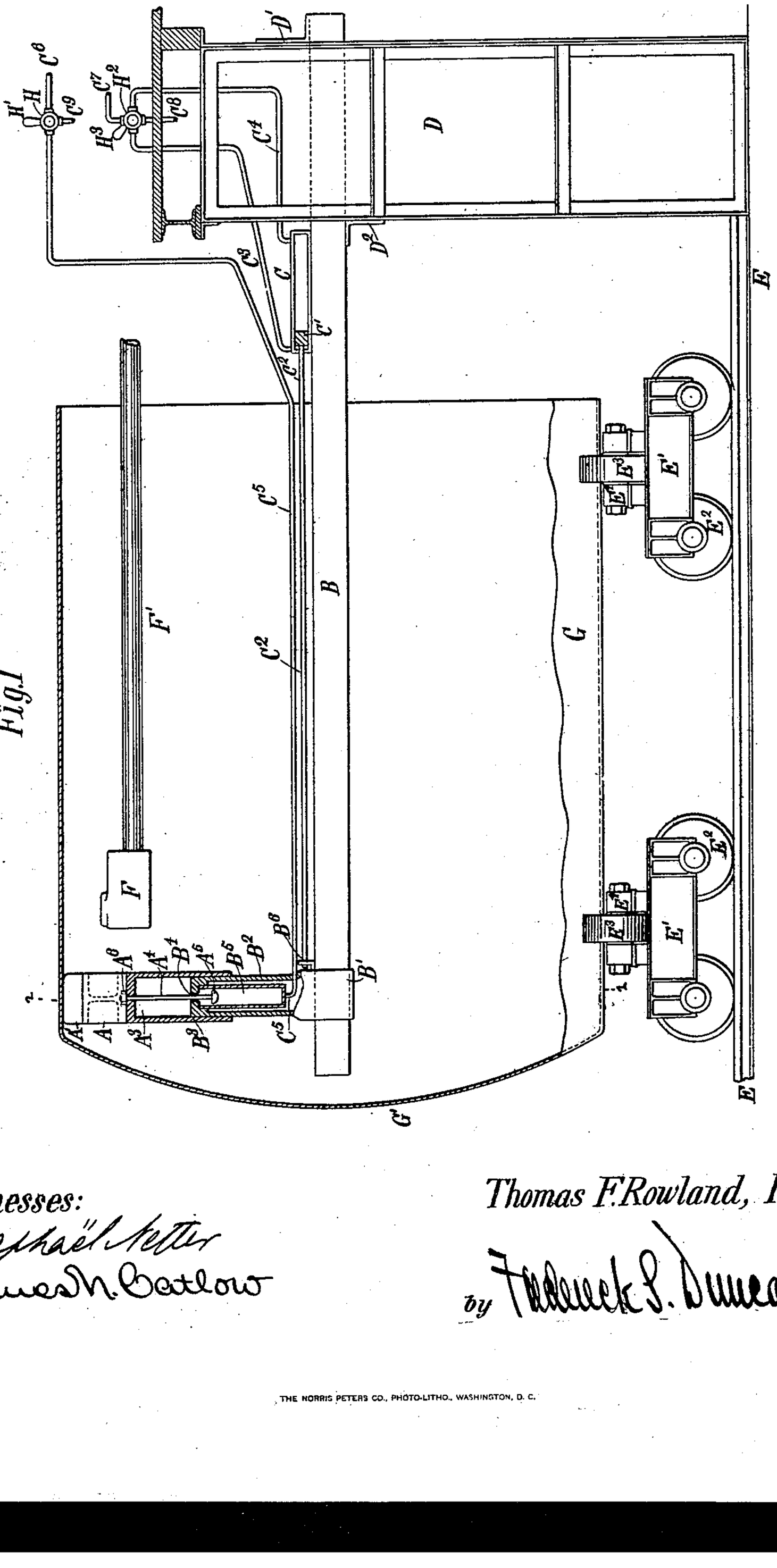

Fig. 1

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Fig. 3

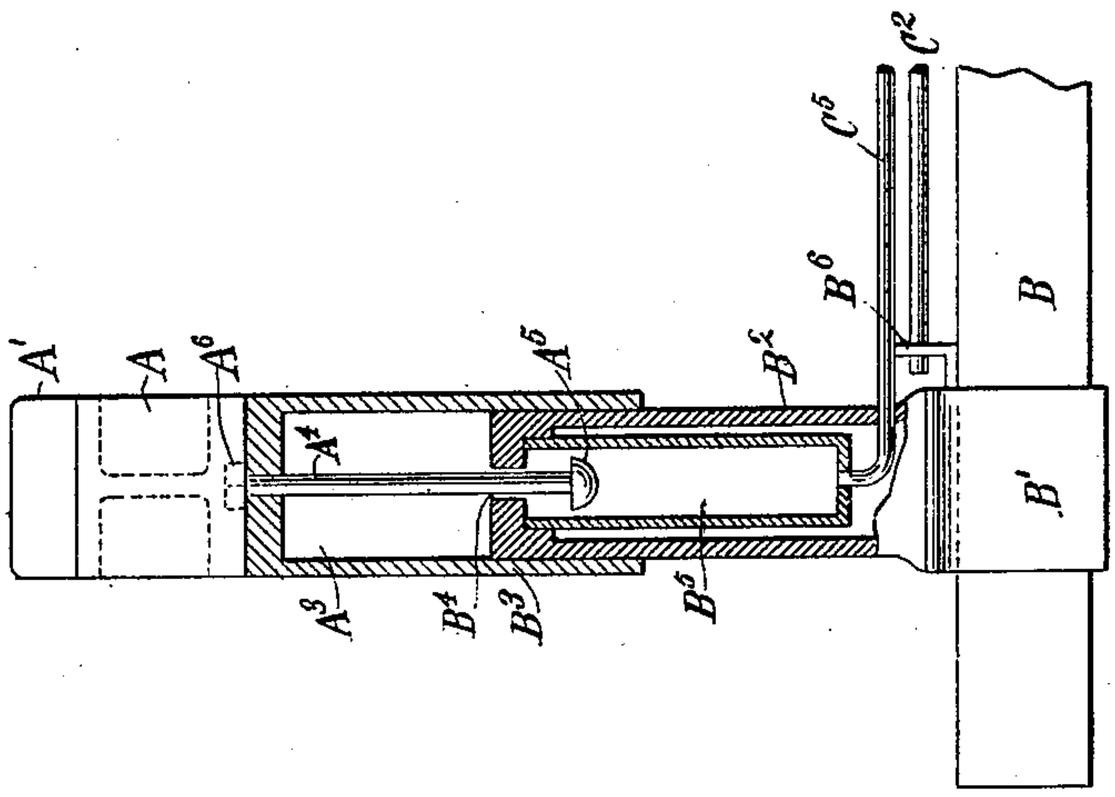
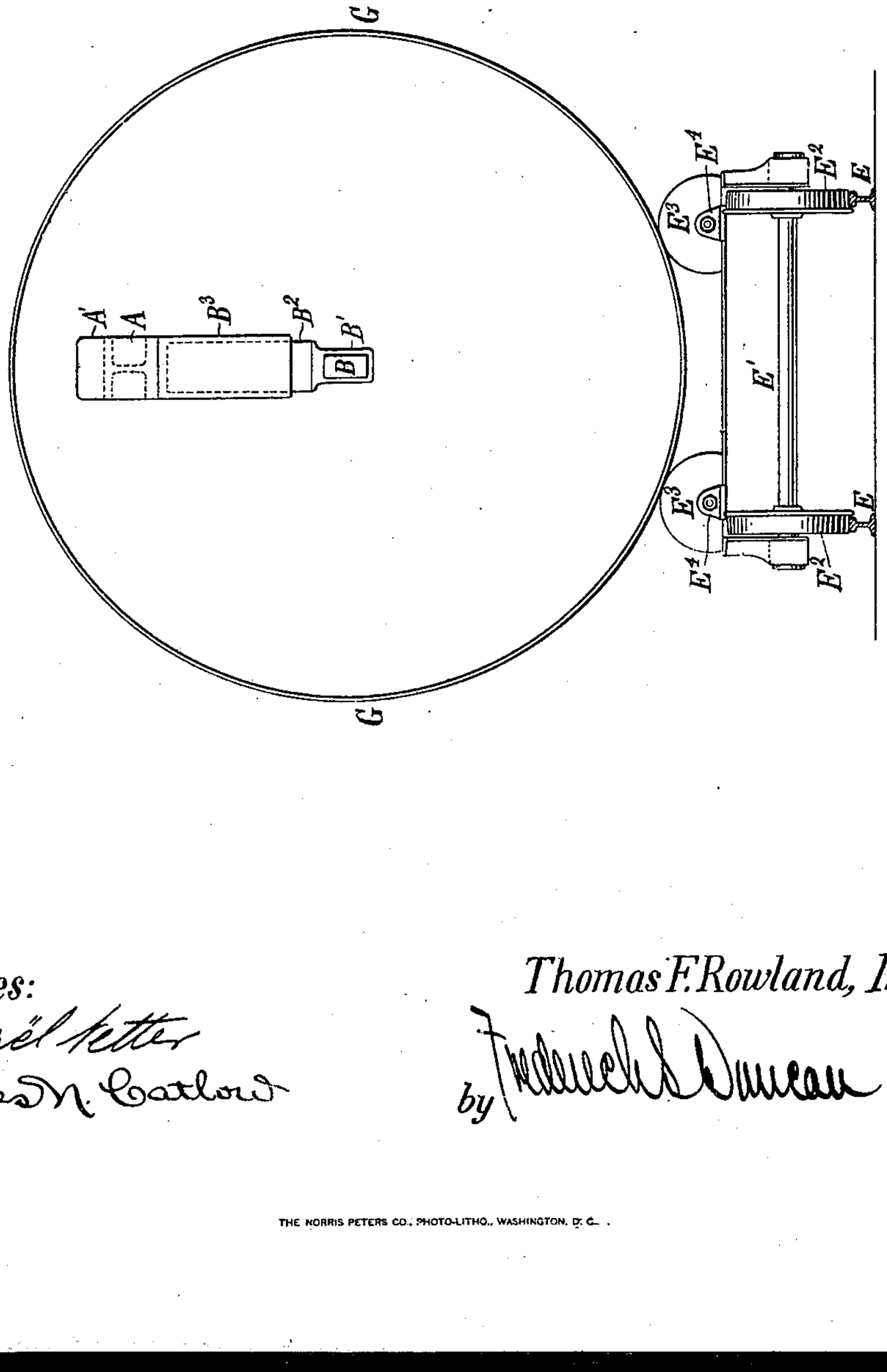


Fig. 2



Witnesses:
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UNITED STATES PATENT OFFICE.

THOMAS F. ROWLAND, OF NEW YORK, N. Y.

ANVIL MECHANISM.

SPECIFICATION forming part of Letters Patent No. 689,416, dated December 24, 1901.

Application filed May 14, 1901. Serial No. 60,191. (No model.)

To all whom it may concern:

Be it known that I, THOMAS F. ROWLAND, a citizen of the United States, residing in the borough of Manhattan, city of New York, county of New York, and State of New York, have invented certain new and useful Improvements in Anvil Mechanism, of which the following is a specification, reference being had to the drawings accompanying and forming a part of the same, in which similar reference characters refer to the same part throughout the several figures.

My invention relates to anvils used in connection with large forgings, and more particularly applicable to welding and shaping large cylinders. The anvil is especially arranged to operate inside of such a cylinder in connection with any external coöperating shaping means.

Figure 1 is a side elevation of my anvil mechanism shown in connection with a suitable carriage supporting a cylinder, parts being shown in section. Fig. 2 is an end elevation of the same, partly in section, taken on the line 2 2 of Fig. 1. Fig. 3 is an enlarged sectional view of the anvil-cylinder and parts adjacent thereto.

D is a heavy supporting-column mounted upon a suitable foundation, and it carries the anvil-bar B, that is bolted to two brackets D′ D^2 on the supporting-column. If desired, the anvil-bar may be mounted so as to be adjusted vertically by securing D′ D^2 to D at the height desired, or it may move in any manner instead of being fixedly supported, and moving means may also be provided. The anvil-bar B is of preferably rectangular cross-section, as is shown in Fig. 2, and near the outer end of the same the anvil-support B′ is mounted so as to slide upon the anvil-bar, the portion B^2, which is cylindrical, projecting at right angles to the bar in a vertical position. The anvil-cylinder B^3 fits about the cylindrical portion B^2 of the support, so as to form a chamber A^3 within the cylinder. The anvil-block A is rigidly attached to the anvil-cylinder and supports at its upper end the head A′, which is connected to the block in any suitable way.

Within the anvil-support is formed a cylinder B^5, the interior of which communicates with a passage B^4 in the upper end of the support.

A^4 is a valve-rod having a cut-off valve A^5 thereon arranged to close the passage B^4 when the anvil-cylinder has moved as far as is desired on the support, since this valve cuts off at that time any further communication between the cylindrical chamber B^5 and the anvil-cylinder.

A^6 is a nut locking the valve-rod A^4 to the anvil-cylinder.

C^5 is a pipe communicating with the chamber B^5 and leading to a three-way-valve casing H, connected to the discharge-pipe C^9 and to the supply-pipe C^6, the lever H′ being connected with the valve within the casing H.

The support-cylinder C is rigidly attached to the anvil-bar, and the piston C′ reciprocates within it. The piston-rod C^2, secured to the piston C′, is connected with the bracket B^6, attached to the anvil-support B′. Suitable pipes C^3 C^4 connect either end of the cylinder C with the valve-casing H^2. C^7 is a supply-pipe for this valve-casing, and C^8 a discharge-pipe.

H^3 is a suitable lever connected with the valve within the casing and arranged to either admit or discharge fluid from either end of the cylinder.

Upon a suitable track E, I have shown two trucks E′, mounted upon wheels E^2, engaging the track. A pair of rolls E^3 upon each truck are mounted in bearings E^4 and support a large cylinder G, having a curved end G′. By this means the cylinder can be moved along the track parallel to the anvil-bar and also can be revolved about its axis by moving the rolls E^3.

I have shown diagrammatically a gas-furnace F, supported upon a boom F′ within the cylinder G. This furnace will be of a construction well known in this art and would operate inside the cylinder G to heat the same in connection with coöperating means outside the cylinder in a manner well known in this art.

The operation of my anvil is as follows: Suppose, for example, that it was desired to weld a circumferential seam between the cylinder G and the head G′ just above the anvil, as the same is shown in Fig. 1. The seam

would first be heated, and to accomplish this the anvil-support and anvil carried thereby are moved away from the end of the anvil-bar B by operating the support-cylinder C through its valve-lever H^3, which would be moved so as to admit fluid under pressure—that is to say, steam, compressed air, or any liquid under pressure—supplied through the pipe C^7 to the pipe C^3, and so to the outer end of the support-cylinder C, at the same time discharging the fluid from the inner end of the cylinder C through the pipe C^4 and the discharge-pipe C^8. In this way the anvil-support and anvil are moved inward along the anvil-bar away from the seam to be welded. The furnace F could then be thrust out to the seam and in connection with some other heating means outside the cylinder G, such as a gas-furnace, would heat the seam to a welding heat. The furnace would then be quickly withdrawn from the seam and the anvil-support and anvil thrust out toward the outer end of the anvil-bar by operating the valve-lever H^3, so as to drive the piston C′ to the outer end of the cylinder C, as is shown in Fig. 1. The anvil, of course, up to this time would be in its lowered position, (shown in Fig. 2,) so as not to be in contact with the cylinder G. When the anvil is brought on its support directly under the seam to be welded, it would then be raised so as to support the seam by admitting fluid from the supply-pipe C^6 to the pipe C^5 by turning the valve-lever H′ in the proper direction, so that fluid under pressure, either steam, air, or some other operating fluid, is admitted to the chamber B^5, passes up through the passage B^4, and enters the anvil-cylinder A^3, thereby raising the anvil to any desired extent to support the seam to be welded. The welding could be done either by sledges in the hands of workmen or by any other means, coöperating with the anvil within the cylinder G. The anvil-head A′ may have any desired contour, and in practice it is desirable to form a number of these heads, so that they can be varied as desired to suit the class of work to be performed. In practice I find in some cases that by simply lowering the anvil and without moving it inward along the bar the furnace can be inserted against the seam. The movability of the anvil on the bar is, however, a very desirable feature for other purposes also. When this section of weld has been completed, the anvil may be lowered away from the seam by moving the valve-operating lever H′ so as to discharge the fluid within the anvil-cylinder through the passage B^4, the chamber B^5, and the pipe C^5, and discharge-pipe C^9. The weight of the anvil and anvil-cylinder will cause the fluid to escape in this manner and the anvil will move downward of its own weight as far as desired. Some positive means of withdrawing the anvil could be provided, if desired. For instance, the anvil-cylinder could be arranged in connection with a double-acting piston, or suitable withdrawing-springs could assist the weight of the anvil and cylinder in moving the anvil toward the anvil-bar. If compressed air is used as the fluid actuating the anvil, the anvil will be supported against the work with a yielding pressure, since the anvil can yield slightly under any increase of pressure upon it. For some classes of work this is a very desirable feature.

I have shown the cylindrical portion B^2 of the anvil-support B′ as projecting at right angles to the anvil-bar B. This exact construction is not necessary, and for some classes of work it would be desirable to have the part B^2 project at some other angle to the anvil-bar, and it may also be desirable to have the anvil mounted so as to move not in a vertical direction, but in some other direction in some cases.

I do not wish to be limited to the exact proportions and construction which I have shown in the drawings in this case. Many variations could be made therefrom by persons skilled in the art. The exact scope of my invention is set forth in the appended claims.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In an anvil mechanism, an anvil-bar, an anvil-support mounted on said bar, an anvil mounted on said support, and fluid means to move said anvil relative to said support.

2. In an anvil mechanism, an anvil-bar, an anvil-support slidably mounted on said bar, an anvil mounted on said support, and fluid means to move said anvil relative to said support.

3. In an anvil mechanism, an anvil-bar, an anvil-support mounted to reciprocate on said bar and extending at right angles therefrom an anvil mounted on said support, means to reciprocate said support on said bar and means to reciprocate said anvil on said support at right angles to said bar.

4. In an anvil mechanism, an anvil-bar, an anvil-support slidably mounted on said bar, means to slide said support on said bar, an anvil mounted on said support and means to move said anvil on said support at an angle to said bar.

5. In an anvil mechanism, a column, a fixed anvil-bar rigidly secured to said column and supported therefrom, an anvil-support slidably mounted on said bar and means to move said anvil-support along said bar.

6. In an anvil mechanism, a column, an anvil-bar rigidly secured to said column and supported therefrom, an anvil-support carrying an anvil embracing said bar and sliding thereon whereby said anvil is supported against its work from said column.

7. In an anvil mechanism, a fixed anvil-bar, a portion of said bar being formed with guides, an anvil-support embracing said bar and engaging said guides, an anvil mounted

upon said support, and a fluid-actuated piston attached to said support and arranged to move the same along said bar.

8. In an anvil mechanism, a fixed anvil-bar, an anvil-support carrying an anvil mounted to reciprocate on said bar, a fluid-actuated piston attached to said support and arranged to reciprocate the same on said bar and fluid means to actuate said piston in either direction.

9. In an anvil mechanism, an anvil-bar, an anvil-support carrying an anvil mounted to reciprocate on said bar, a fluid-cylinder mounted on said bar, a piston therein connected to said support, pipes connected to both ends of said cylinder and means to admit or discharge fluid from both of said pipes so as to reciprocate said anvil on said bar.

10. In an anvil mechanism, an anvil-bar, a fluid-pressure cylinder attached to said bar, a piston moving therein, an anvil-support carrying an anvil slidably mounted on said bar and connected with said piston and valve connections arranged to actuate said piston in either direction within said cylinder to reciprocate said anvil.

11. In an anvil mechanism, an anvil-cylinder, an anvil mounted thereon, an anvil-support fitting within said cylinder, a chamber in said support formed with a passage in the end of said support communicating with said cylinder, means to admit fluid to said chamber and discharge the same therefrom and an automatic cut-off valve governing said passage in the end of the support.

12. In an anvil mechanism, an anvil-cylinder, an anvil mounted thereon, an anvil-support having a chamber therein and having a passage in the end of the same communicating with said chamber, a valve attached to said anvil-cylinder and governing said passage and means to admit fluid to said chamber and discharge the same therefrom.

13. In an anvil mechanism, an anvil-bar, an anvil-cylinder mounted on said bar, an anvil mounted on said cylinder, an anvil-support fitting within said cylinder and means to admit compressed air to said cylinder and discharge the same therefrom so as to move said anvil relative to said support and to hold it in a yielding manner.

14. In an anvil mechanism, an anvil-bar, an anvil-support mounted to reciprocate on said bar, means to reciprocate said support on said bar, an anvil-cylinder carrying an anvil attached thereto fitting about said support and fluid means arranged to move said anvil relative to said support.

15. In an anvil mechanism, an anvil-bar, an anvil-support mounted to reciprocate on said bar and projecting at an angle therefrom, means to reciprocate said support on said bar, an anvil-cylinder fitting about said support, an anvil mounted upon said cylinder and fluid means to move said cylinder along said support.

16. In an anvil mechanism, an anvil-bar, an anvil-support arranged to reciprocate on said bar, a fluid-cylinder mounted on said bar, a piston therein connected to said support, an anvil-cylinder embracing said support and arranged to move thereon at right angles to said bar, an anvil on said cylinder and fluid means to move said cylinder relative to said support.

17. In an anvil mechanism, a fixed anvil-bar formed with guides, an anvil-support embracing said bar and engaging said guides thereon, a support-cylinder mounted upon said bar, a piston therein connected to said support and fluid means to move said piston in said cylinder, an anvil-cylinder fitting about said anvil-support and arranged to move at right angles to said bar, an anvil attached to the said cylinder, a chamber in said support formed with a passage in the end of said support communicating with said anvil-cylinder, an automatic cut-off valve attached to said anvil-cylinder and arranged to govern said passage and means to admit fluid under pressure to said chamber.

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