

R. W. HARDIE.

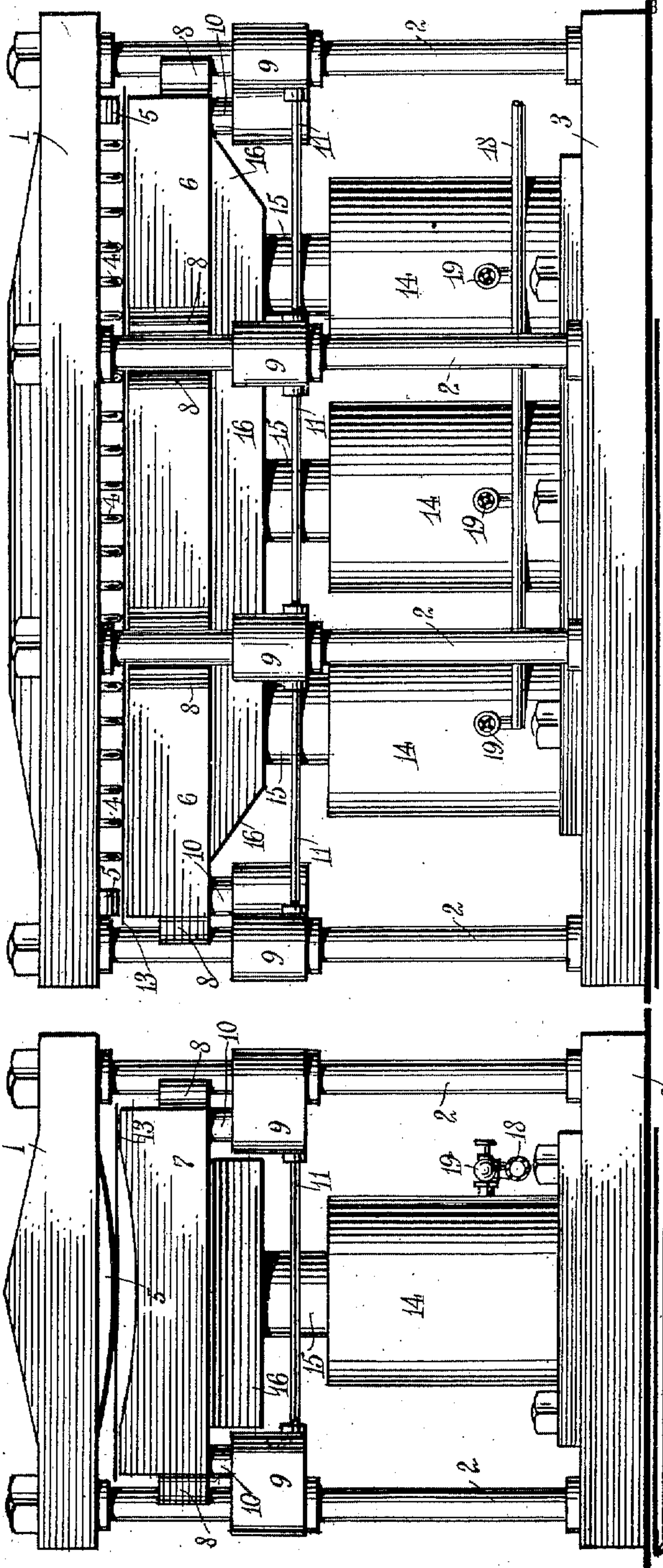
PRESS.

APPLICATION FILED SEPT. 23, 1910.

985,756.

Patented Feb. 28, 1911.

3 SHEETS—SHEET 1.



WITNESSES:
Johna Bergstrom
C. J. Hackenberg

INVENTOR
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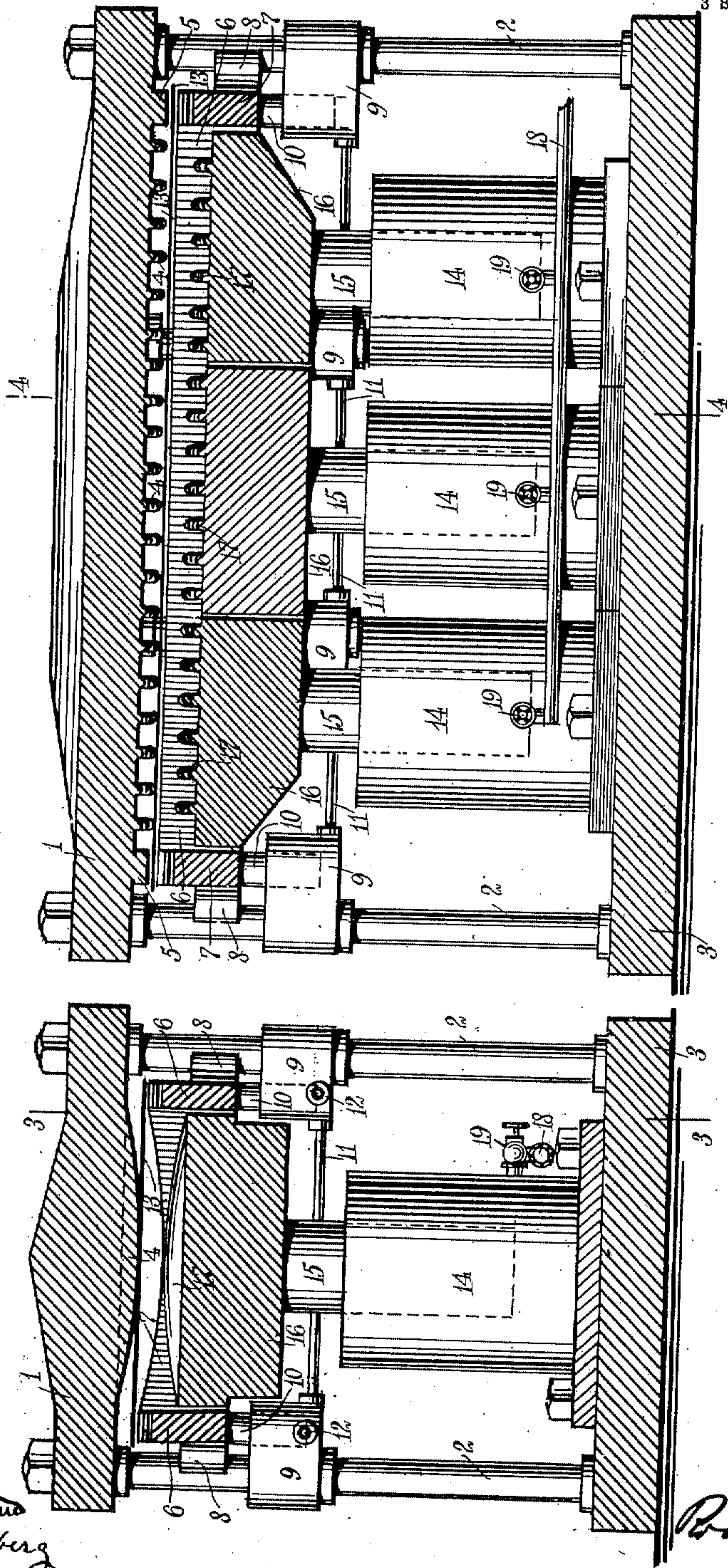
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3 SHEETS—SHEET 3.

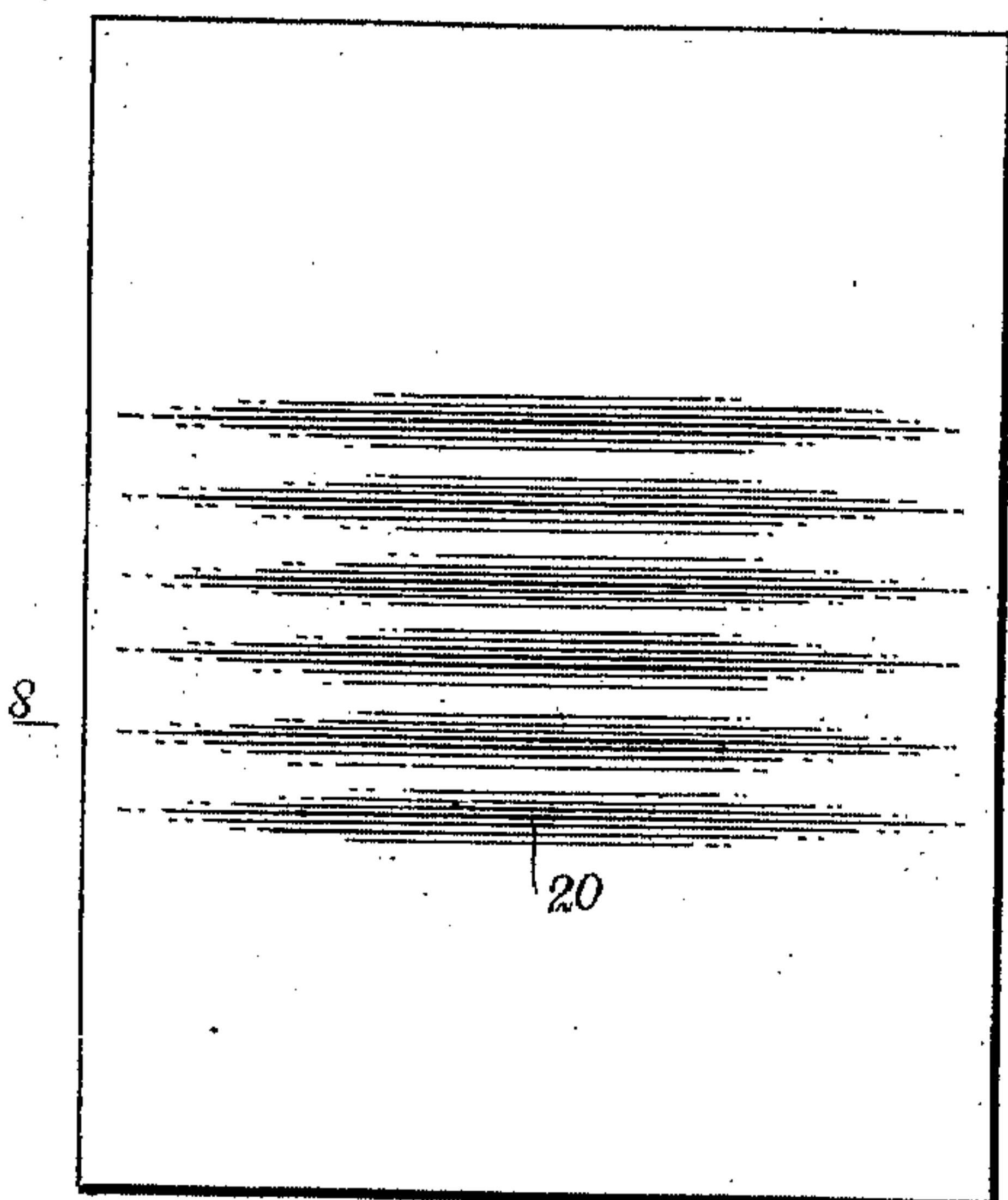


Fig. 5

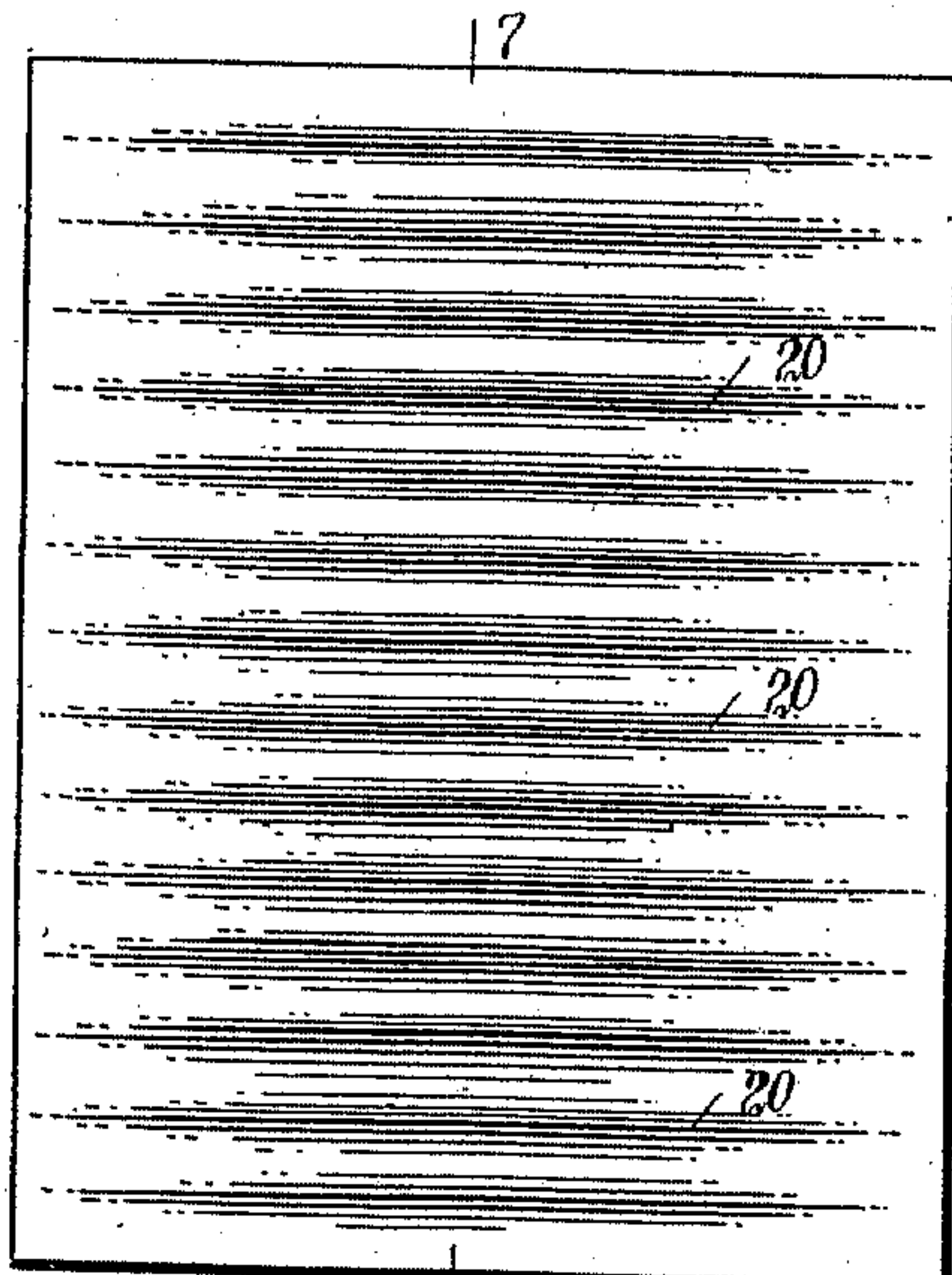
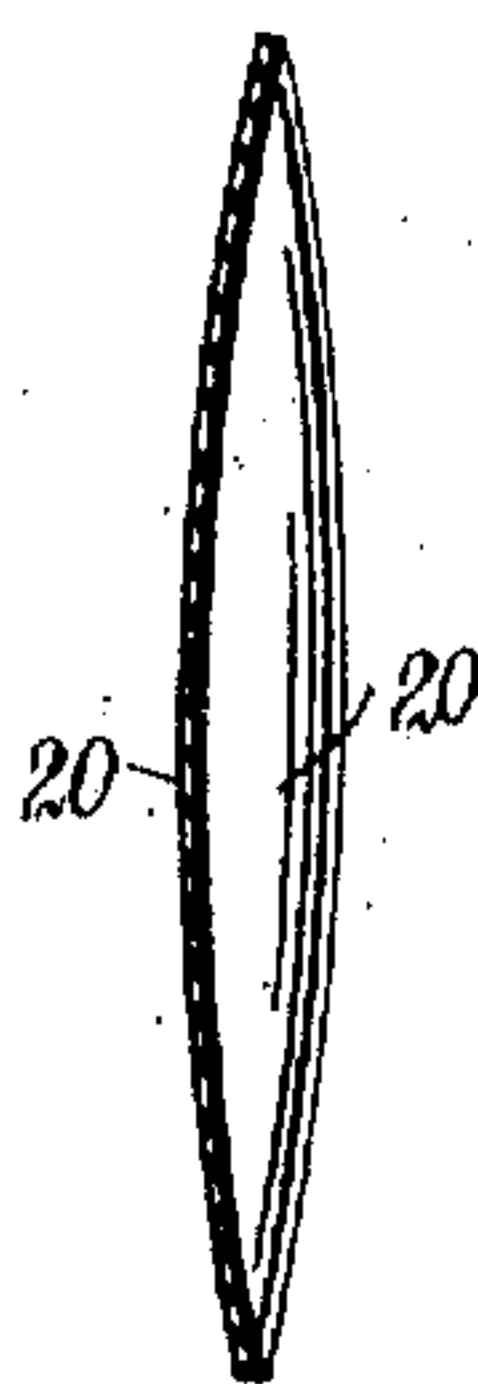
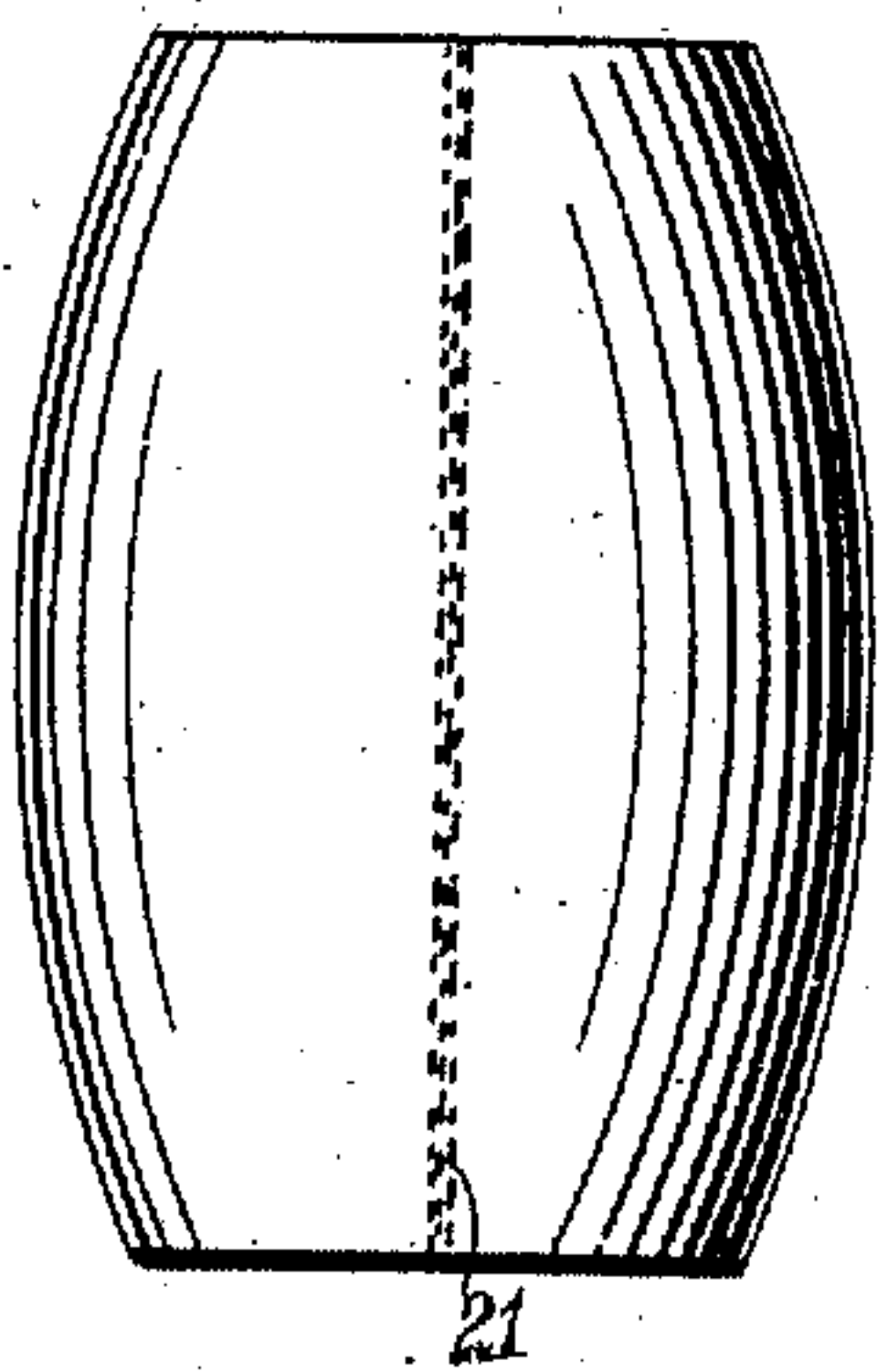


Fig. 6



Fig. 7



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Fig. 8

Fig. 9

INVENTOR

R. W. Hardie

UNITED STATES PATENT OFFICE.

ROBERT W. HARDIE, OF NEW YORK, N. Y.

PRESS.

985,756.

Specification of Letters Patent.

Patented Feb. 28, 1911.

Application filed September 23, 1910. Serial No. 583,407.

To all whom it may concern:

Be it known that I, ROBERT W. HARDIE, a citizen of the United States, and a resident of the city of New York, borough of Manhattan, in the county and State of New York, have invented certain new and useful Improvements in Presses, of which the following is a full, clear, and exact description.

10 This invention relates to presses for corrugating and stretching metal blanks, designed to be used in the manufacture of bilge shaped bodies for barrels, cans and for other purposes.

15 In stretching and corrugating a sheet of metal to make the body of a bilge shaped receptacle, it is essential that the blank be held firmly in position so as not to be drawn inward at the ends and lateral margins of the blanks, while the dies are stretching and corrugating the blank, and so held that the dies may operate on the blank without injuring the blank. In stretching the entire surface of a blank of the character described, at one operation, a great amount of power is required, the dies are subjected to great strains, and it is important that the pressure of the dies on the blank be uniformly applied at the different points along the longitudinal lines of the blank. But, because of the length and surface area of the blank, the amount of power necessarily applied, and the limitations of the means for holding a blank in position, it is important
35 to provide means for operating a press of the character described with a minimum amount of power, and to provide means for so holding the blank that the desired amount of pressure may be applied to the different parts of the blank, and the blank stretched uniformly without injuring the blank, and my invention has for its objects to accomplish the foregoing results. These objects I accomplish by the means illustrated in the accompanying drawings, in which is embodied my invention in its preferred form, and in which similar characters of reference indicate like parts throughout the views, and in which—

50 Figure 1 is a side elevation of a press embodying my invention; Fig. 2 is an end view thereof; Fig. 3 is a vertical longitudinal section taken on the line 3—3 of Fig. 4; Fig.

4 is a vertical cross section taken on the line 4—4 of Fig. 3; Fig. 5 is a blank having its middle portion corrugated; Fig. 6 is a blank entirely corrugated; Fig. 7 is a vertical longitudinal section taken on the line 7—7 of Fig. 6; Fig. 8 is a vertical cross section taken on the line 8—8 of Fig. 5; and Fig. 9 is a side elevation of a bilge shaped body formed by pressing out the corrugations of the blank shown in Figs. 6 and 7, bending the blank into circular form, and welding the meeting edges of the blank together.

As illustrated in the drawings, 1 represents a top plate or anvil mounted upon standards 2, the standards being preferably supported upon a bed plate 3. As shown in the drawings, the anvil 1 is provided with a series of parallel ribs 4 and intermediate depressions extending transversely of said anvil, which together with the top plate 1 form an anvil die. The die ribs 4 are not necessarily formed integral with the anvil 1, but may be made on plates formed independently of the anvil and attached thereto in any suitable manner. The die ribs are fixed to the anvil 1 so as to be stationary when the press is in operation. The die ribs 4 are preferably deepest at their central portion and diminish in depth toward their opposite ends, where they merge into the unbroken outer margins of the anvil 1, as shown in Fig. 4. The opposite ends of the anvil are provided with bearing bars 5 extending transversely of said anvil and curved so as to correspond substantially with the contour of the sides of the die ribs 4. A die for bending a blank against the outer edges of the die ribs 4 and holding the blank in that position, is formed of longitudinal or side bars 6 connected by end bars 7, the end bars being preferably concave on their upper surface to conform to the convex surface of the bearing bars 5 of the anvil die. The side bars 6 of the bending die are preferably provided with guides 8 having concave bearing surfaces corresponding with the transverse section of the standards 2 so as to bear against said standards and guide the bending die in its vertical movement. Hydraulic cylinders 9 are secured to the press in any desired manner, preferably to the standards 2, as shown in the drawings, and these cylinders are pro-

vided with rams 10 that bear against the side bars 6, and if desired against the end bars 7 of the bending die. The cylinders 9 may be connected with each other by means of supply pipes 11, and provided with controlling valves 12, and the supply pipes may be connected with a source of pressure supply.

When the press is in use, a sheet of metal 13 is placed upon the side bars 6 of the bending die, and when hydraulic pressure is supplied through the supply pipes 11 to the cylinders 9, the rams 10 of the cylinders are forced upward carrying with them the bending die, and in so doing the bars 6 of the bending die bend the sheet into a transverse curvature corresponding to that of the die ribs 4, and the bearing bars 5, and clamp the sheet of metal against the outer margins of the anvil, the bearing bars 5, and the die ribs 4. The series of cylinders 9 on each side of the press apply pressure at different points to the clamping die, and thereby insure an even and firm grip on the sheet blank during the further operation of the press. Such construction has the further advantage of dispensing with any adjusting means for the clamping dies when sheet blanks of various thicknesses are operated upon. This is due to the fact that the hydraulic rams 10 carry the sheet blank upwardly until the lateral edges of the blank are clamped firmly between the side bars 6 of the clamping die, and the outer margins of the anvil die, and between the end bars 7 of the bending die and the bearing bars 5 of the anvil. The rams 10 of the cylinders 9 bear in a direct line against the side bars 6 of the bending die, without the aid of arms or levers, and with a short ram, thereby applying to said side bars the full force of the rams under the most advantageous conditions.

Hydraulic cylinders 14, larger than the cylinders 9, are mounted upon the base plate 3 and are provided with rams 15. These rams each support a drawing die section comprising a base 16 and transverse ribs 17 corresponding in construction generally with the die ribs 4 of the anvil die, and registering alternately therewith. These ribs 17 like the ribs 4 of the anvil die preferably diminish in depth from the middle toward the opposite ends of the ribs, as shown in Fig. 4. The die sections 16 are arranged in a row within the bending die and the inner surface of the bending die may serve as a guide to the upward movement of the die sections 16, if desired. A supply pipe 18 is connected with the cylinders 14 and may lead to a source of pressure supply, and regulating valves 19 are connected with said supply pipe so as to control the pressure on each of the cylinders 14.

When the press is in operation and the blank is bent and gripped against the anvil die by the bending die, in the manner already described, hydraulic pressure may be applied to the middle cylinder 14, so as to force the ram 15 of said cylinder upward with the middle die section 16, thereby pressing the ribs 17 of said section against the blank 13, drawing the blank between the ribs 4 of the anvil die, stretching said blank and forming corrugations 20 therein, as indicated in the blank shown in Fig. 5. After the corrugations are so formed in the blank, the central die section 16 may be left in contact with the middle portion of the blank under pressure, and the middle die section then becomes in effect a holding die when pressure is applied to the end portions of the blank by the end die sections 16. After the middle portion of the blank has been corrugated and while the blank is held by the side bars 6 and the end bars 7 of the bending die, and while the ribs 17 of the middle die section 16 of the drawing die bear against the corrugated middle portion of the blank, hydraulic pressure may be applied to the end cylinders 14 and the end portions of the blank may be stretched and corrugated in the same manner as the middle portion of the blank. The end sections of the drawing die may be operated successively or simultaneously. After the blank has been stretched and corrugated in the manner described, the corrugations may be pressed out and the blank bent into cylindrical form, as illustrated and described in Letters Patent No. 901,963, issued to me October 27, 1908, and the meeting edges of the blank may be welded together, as indicated at 21 in Fig. 9, or secured together in any other manner desired.

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

1. In a press, the combination of a ribbed anvil die, a clamping die having oppositely disposed clamping bars extending parallel with and substantially adjacent to the respective end ribs of the anvil die, a drawing die comprising a plurality of similarly ribbed sections separately and successively operative toward said anvil die, whereby one of said sections after operating as a drawing die, serves to assist in holding the blank during the drawing operations effected by the remaining drawing die sections.

2. In a press, in combination, an anvil die, a clamping die adapted to coact with said anvil die and to hold opposite margins of a blank with respect to said anvil die, a row of drawing dies adapted to coact with said anvil die and to engage a blank intermediate said margins thereof, and having an intermediate die of said row operable

separately from its contiguous dies, where-
by said intermediate die after effecting its
drawing action serves to assist in clamping
the blank during the drawing operations
5 effected by the dies contiguous to said inter-
mediate die.

In witness whereof I have signed my

name to this specification in the presence of
two subscribing witnesses.

ROBERT W. HARDIE.

Witnesses:

W. W. HOLT,

PHILIP D. ROLLHAUS.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents,
Washington, D. C."
