No. 871,385. PATENTED NOV. 19, 1907.

J. B. BLAW.

MOLD.

APPLICATION FILED FEB. 16, 1907.

3 SHEETS—SHEET 1.

Fig. 2.

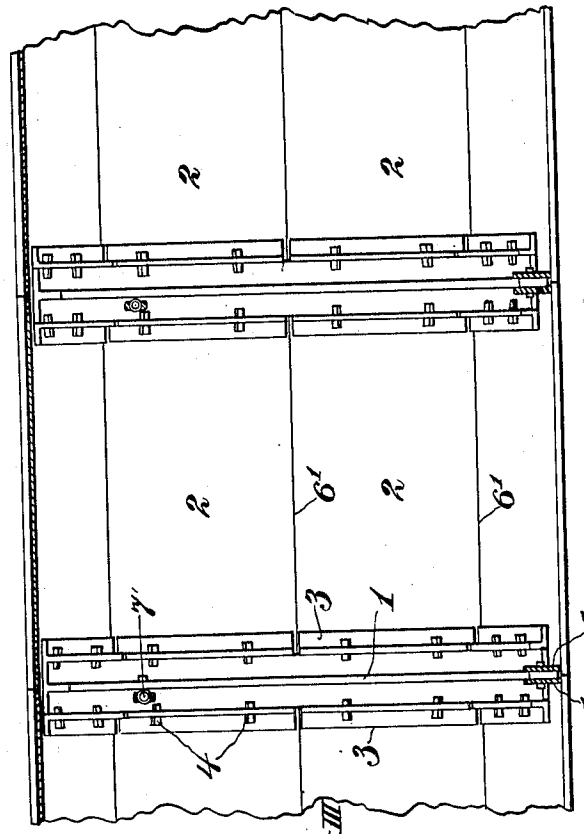
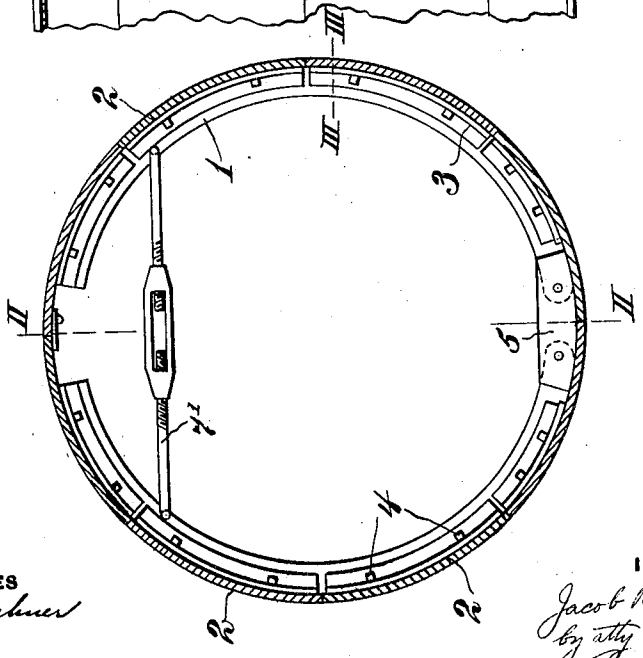



Fig. 1




WITNESSES

Harry L. Lechner

J. L. Bradley

INVENTOR

Jacob B. Blaw

by atty

Paul Synnestvedt

No. 871,385. PATENTED NOV. 19, 1907.

J. B. BLAW.

MOLD.

APPLICATION FILED FEB. 16, 1907.

3 SHEETS—SHEET 2.

Fig. 3

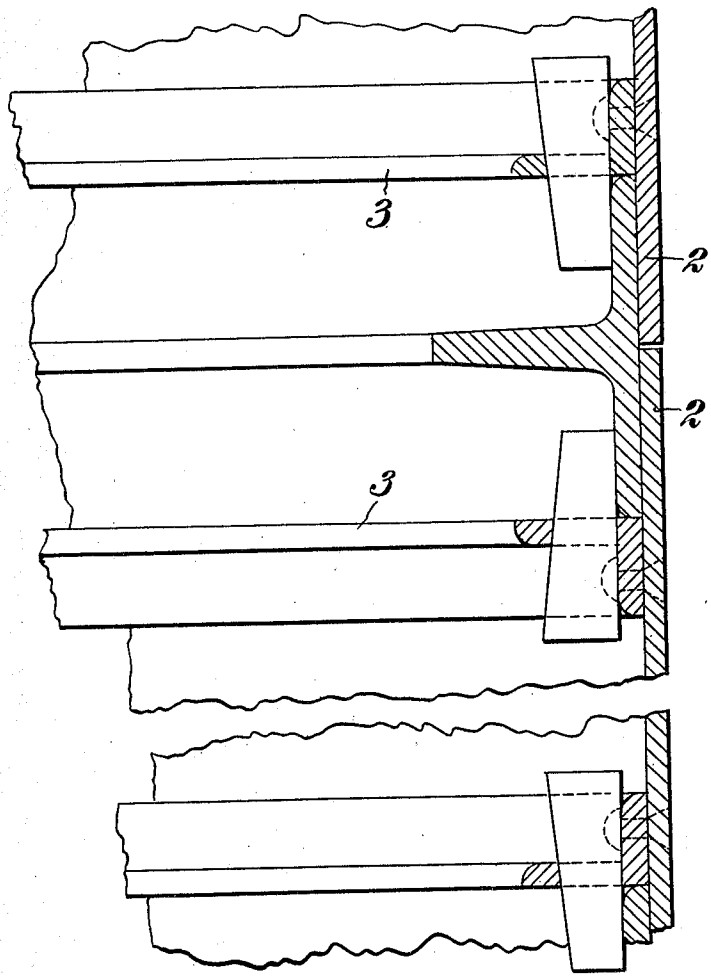
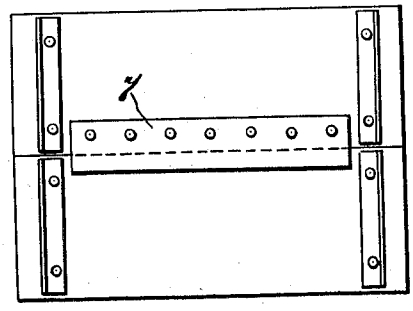



Fig. 4.




WITNESSES

Harvey L. Lechner

J. C. Bradley

INVENTOR

Jacob B. Blaw

by atty Paul Synnestvedt

No. 871,385. PATENTED NOV. 19, 1907.

J. B. BLAW.

MOLD.

APPLICATION FILED FEB. 16, 1907.

3 SHEETS—SHEET 3.

Fig. 6.

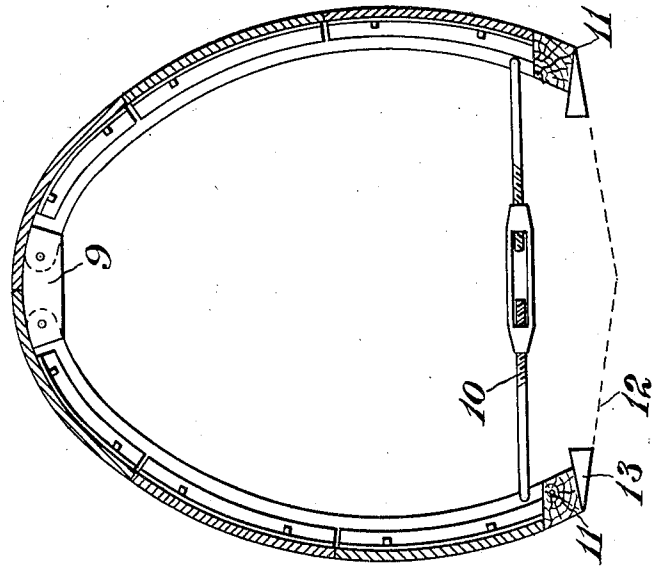
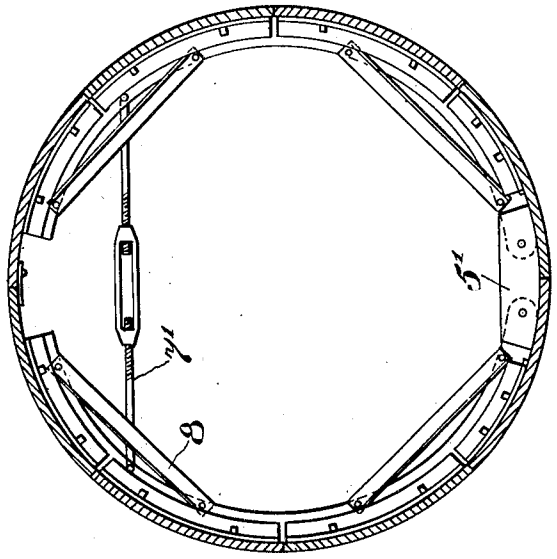



Fig. 5.




WITNESSES

Harvey L. Lechner

J. L. Bradley

INVENTOR

Jacob B. Blaw

by atty

Paul Symmestvedt

# UNITED STATES PATENT OFFICE.

JACOB B. BLAW, OF PITTSBURG, PENNSYLVANIA, ASSIGNOR TO BLAW COLLAPSIBLE STEEL CENTERING COMPANY, OF PITTSBURG, PENNSYLVANIA, A CORPORATION OF NEW JERSEY.

## MOLD.

No. 871,385. Specification of Letters Patent. Patented Nov. 19, 1907.

Application filed February 16, 1907. Serial No. 357,628.

*To all whom it may concern:*

Be it known that I, JACOB B. BLAW, a citizen of the United States, residing at Pittsburg, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Molds, of which the following is a specification.

My invention relates to molds and particularly to knock-down molds or sectional molds upon which to form the concrete walls of tunnels, sewers and conduits. The invention has for its objects to provide a mold of superior rigidity with a minimum amount of metal; to provide a mold which can be built up in sections as the concrete is filled in; to provide a mold in which the supporting frame work can be readily detached from the shell of the mold and such shell removed from the concrete in comparatively small sections; and to provide an improved means for securing the plates which form the shell of the mold to the frame work. The invention is illustrated in the accompanying drawings in which

Figure 1 is a transverse section through one form of sewer molds,

Figure 2 is a longitudinal section on the line II—II of Figure 1;

Figure 3 is an enlarged sectional detail on the line III—III of Figure 1 showing the means of attaching the vertical edges of the plates detachably to the circumferential T ribs constituting the frame of the device.

Figure 4 is a detail plan view of two of the plates detached from the supporting T rib and showing the vertical securing angles adjacent the vertical edges of the plate and the overlapping plate at the horizontal edges for securing a tight joint at such edges,

Figure 5 is a transverse sectional view of a modified form of mold, and

Figure 6 is a transverse sectional view of still another form of mold.

The mold comprises a series of circumferential T ribs spaced apart longitudinally the length of the plates constituting the shell, and a shell composed of a series of plates resting at their ends upon the T ribs, which plates are detachably secured to the ribs so that after the concrete has set about the mold the ribs may be detached from the plates and removed, after which the plates constituting the shell can be detached from the concrete. The ribs constitute a frame work about which the shell can be gradually built up commencing at the bottom and filling in behind the plates as they are placed in position.

Referring to Figures 1 and 2, 1 are the circumferential T ribs constituting the frame work of the mold and spaced apart longitudinally a distance equal to the length of the sectional plates composing the shell of the mold, 2 are the plates constituting the shell, which plates as shown are eight in number and are bent to the desired radius necessary to fit the curve of the T rib, 3 are angles secured adjacent each edge of the plate at such a distance from the edges as indicated in Figure 2, so that the upstanding legs of the angles will abut the flanges of the T rib; 4 are wedges which pass through the upstanding legs of the angles and press upon the tops of the lateral flanges of the T rib for locking the plate to the T rib, and 5 are the hinge plates, one on either side of the upstanding leg of the T rib whereby the two halves of the T ribs are movably joined together. The means, just referred to, for detachably securing the vertical abutting edges of the plates to the T rib detachably is shown in detail in Figure 3 which figure is a horizontal section on the line III—III of Fig. 1. As here shown it will be seen that the abutting edges of the plates 2 2 are located opposite the upstanding flange of the T rib 1 and that each of the plates 2 2 is provided with the angles 3, which are riveted rigidly to the plate at a distance from the edges thereof substantially equal to the length of the lateral flange of the T rib 1. The upstanding portions of these angles 3 are as shown, provided with perforations to receive the wedges 4 so that when such wedges 4 are driven through the perforations in the legs of the angles they will press tightly upon the laterally extending flanges of the T rib 1, thus securedly fastening the edges of the plate to such T ribs. In order that the horizontal edges 6 of the plates may be flush and smooth upon the outside, the overlapping members plate 7 shown in Figures 2 and 4 are provided, which overlapping members are riveted to one sheet and adapted to extend down over the edge of the other plate. As heretofore indicated, the two halves of the ribs 1 are hinged together by means of the plates 5, and in order that the upper ends may move in, a space is provided between

the upper ends of the halves as shown in Figure 1 and such ends are held in position by the turn-buckle 7′ which also serves to collapse the rib when desired.

The operation is as follows. A layer of cement having been laid for the bottom of the sewer, several of the T ribs with the bottom plates attached thereto, are placed in position, and the concrete filled in till it reaches the upper edges of such plates. Another pair of plates are now secured to the rib above the first pair by means of the wedges 4, and still more concrete is added and the sewer walls built up to the upper edges of the plates. The remaining plates are then added successively in the same manner until all have been placed in position as shown in Figure 1 and the entire mold is surrounded with concrete. It will be understood that this operation may be carried on simultaneously with as many lengths of plates as can be conveniently handled, which number will depend upon the size of the plates and upon the size of the sewer or tunnel being constructed. After the cement has set about the plates, the wedges 4 are removed freeing the ribs 1 from the plates 2 and such ribs are then contracted by means of the turn-buckles 7′ and removed from the sewer, after which the plates 2 can be easily detached from the cement and removed to be used in a new location. It will be apparent from the foregoing that the structure provides a very rigid mold with a minimum amount of metal, and that the mold is convenient of operation as the plates are easily secured to the ribs and removed therefrom, and furthermore, the concrete or cement is easily applied because of the fact that such concrete is positioned separately for each section and there are no interfering sections above to prevent a proper placing and packing of the concrete. It will also be apparent that because of the small weight and size of the parts of the mold, it can be easily handled and removed to different locations.

In Figure 5 a slightly different form of mold is shown. In this form of mold, supporting corner struts 8 are used for stiffening the T rib, which construction is desirable when the mold is of large diameter, and furthermore secures a saving of metal as the increase stiffness due to the struts, permits of the use of a light T section. Otherwise this form of mold is the same as shown in Figures 1 to 4.

In Figure 6 the construction is shown as applied to the horse shoe shaped tunnel or sewer. The top of the mold is provided with the hinge 9 corresponding to the hinge 5 at the bottom of the mold of Figure 1, and the turn-buckle 10 takes the place of the turn-buckle 7′ as used in the form of device of Figure 1. In constructing a tunnel with this type of mold, the bottom is first laid to the dotted lines 12 shown in Figure 6, after which the timbers 11 and wedges 13 for supporting the mold, are positioned, and the T ribs secured together by means of the bottom plates and the walls built up in the manner described for the form of device as shown in Figures 1 to 4. As this form of device is largely used with very large passages, it may be found convenient to carry the material to the desired position by means of cars running upon a track upon the bottom 12 of the sewer, which feature of construction, however, in nowise effects the invention involved and is referred to merely to indicate the rapidity with which a conduit may be constructed when this form of mold is used, it being apparent that such cars could not be conveniently used in the old form of mold provided with the cross braces or ties. It will be apparent that various modifications of the exact structure shown might be made without departing from the spirit of the invention. The T ribs shown are ordinary integral commercial sections, but it will be understood that built up T's of regular or irregular shape might be used, and in fact any style of supporting ribs might be substituted for those shown, it only being necessary that side flanges be provided for the engagement with the wedges. These and other modifications which will be apparent to those skilled in the art are comprehended by my invention and intended to be covered by the claims.

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

1. A mold comprising spaced supporting ribs having lateral flanges and a shell comprising a plurality of plates abutting behind the ribs, together with wedging means for releasably securing the plates to the lateral flanges.

2. A mold comprising spaced supporting ribs having lateral flanges and a shell comprising a plurality of plates abutting behind the ribs and provided with inturned flanges adjacent the edges of the lateral flanges, together with wedging means for securing the inturned flanges to the lateral flanges.

3. A mold comprising spaced supporting ribs having lateral flanges and a shell comprising a plurality of plates abutting behind the ribs and provided with perforated inturned flanges adjacent the edge of the lateral flanges, together with wedges adapted to pass through the perforations and engage the lateral flanges.

4. A mold comprising spaced supporting ribs having inwardly projecting flanges and a shell comprising a plurality of plates abutting behind the ribs, together with clamping means adapted to move the edges of the plates in a direction radial of the mold and hold them against the ribs.

5. A mold comprising spaced circumferen-

tial supporting ribs having lateral flanges, a shell consisting of plates abutting along their vertical edges at the backs of the ribs, and having members with projecting perforated legs adjacent the vertical edges of the plates and removable holding members adapted to pass through the said perforations and engage the said lateral flanges, whereby the plates are locked detachably to the ribs.

6. A mold comprising spaced supporting ribs each having side flanges and an inwardly extending flange, and a shell consisting of a plurality of plates abutting at the back of the ribs, and means engaging the inside edges of the side flanges and the plates and operable from the interior of the mold for detachably clamping the plates to the ribs.

In testimony whereof, I hereunto sign my name in the presence of the two subscribed witnesses.

JACOB B. BLAW.

Witnesses:
J. C. BRADLEY,
F. E. GAITHER.