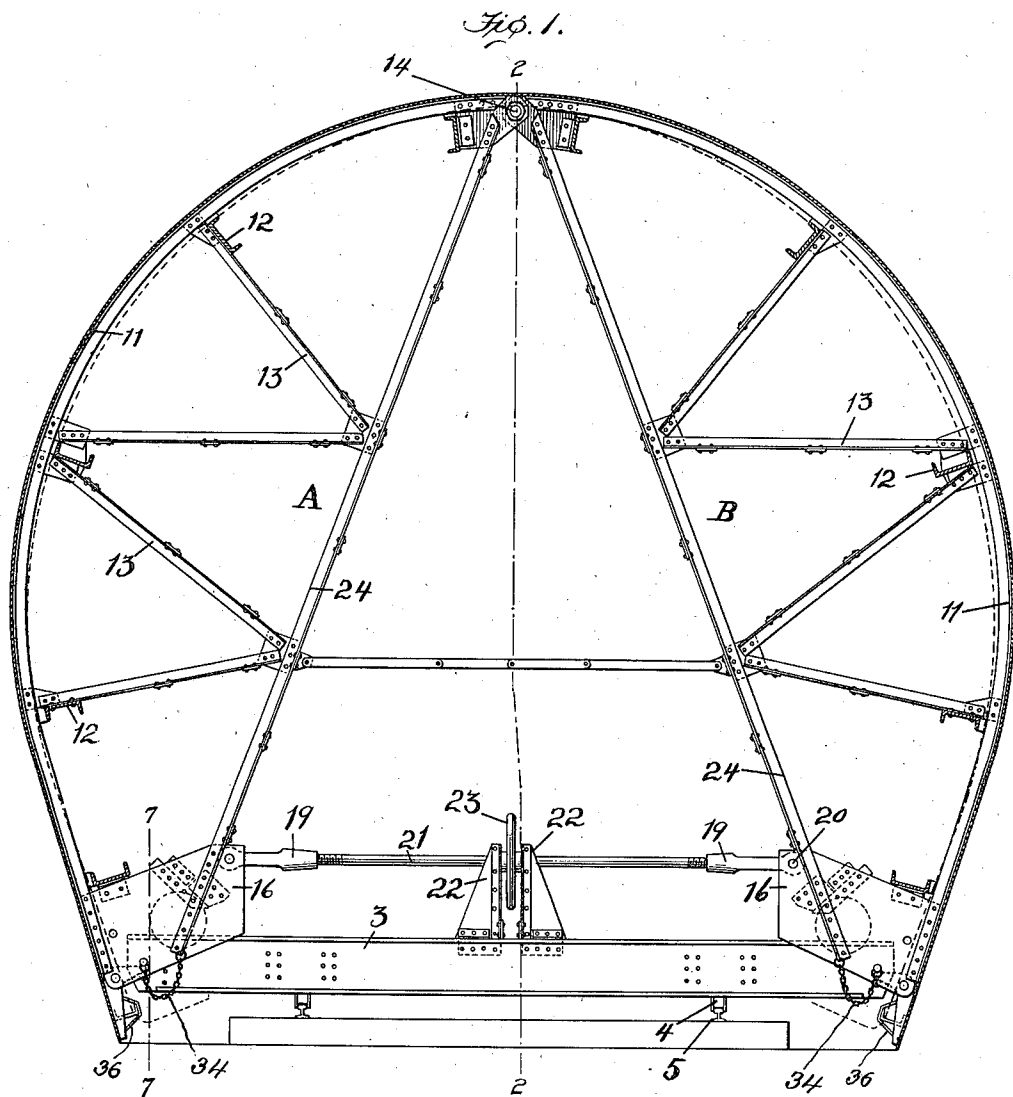


G. F. DILLIG.
 CENTER SUPPORT OR MOLD FOR FORMING TUNNELS OR SEWERS.
 APPLICATION FILED AUG. 31, 1909.

974,778.

Patented Nov. 8, 1910.

4 SHEETS—SHEET 1.



Inventor

Witnesses

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 J. Ferdinand Vogt.

By

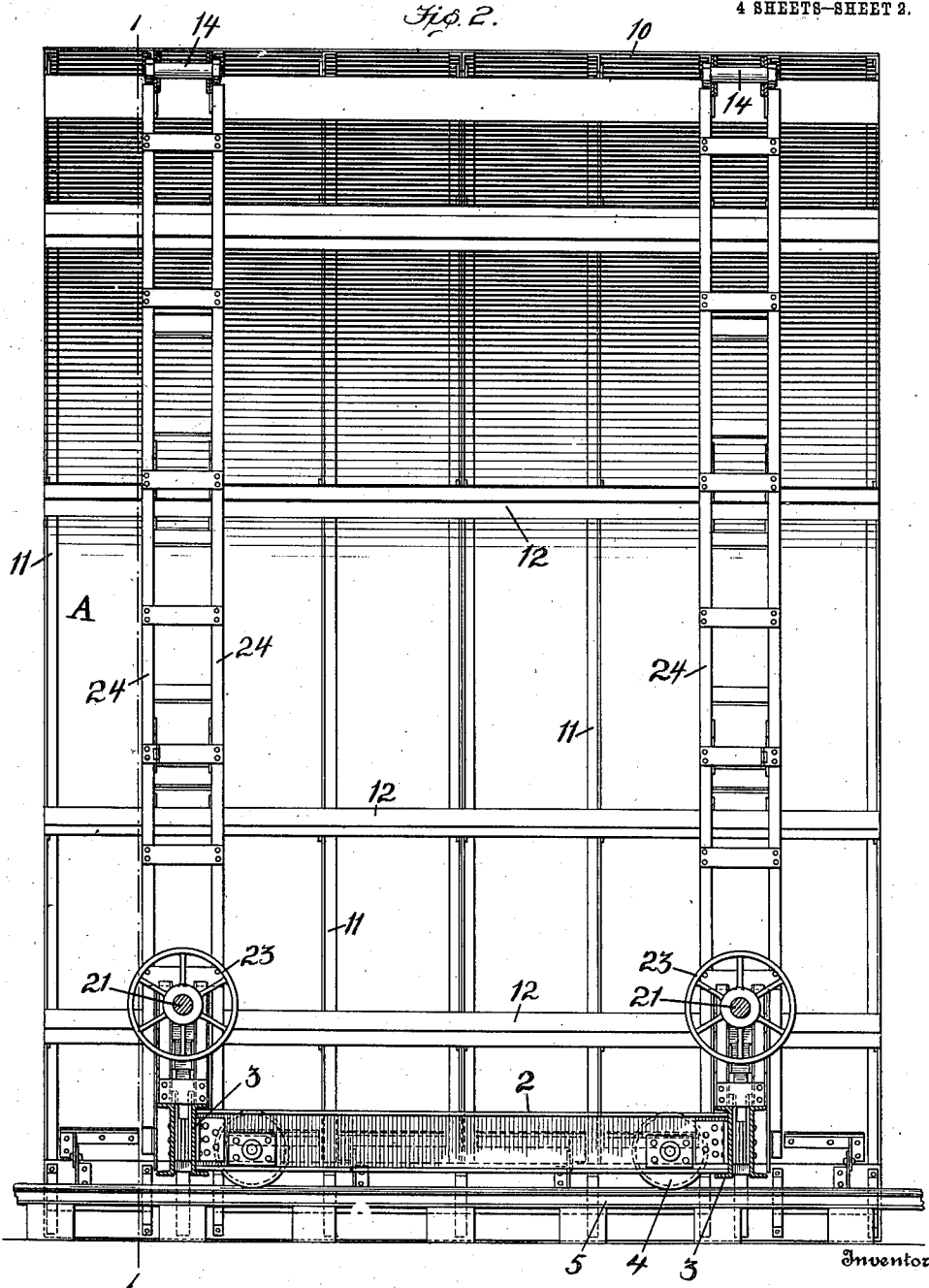
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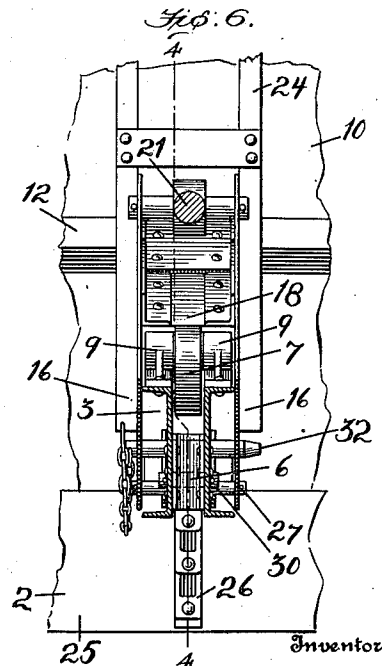
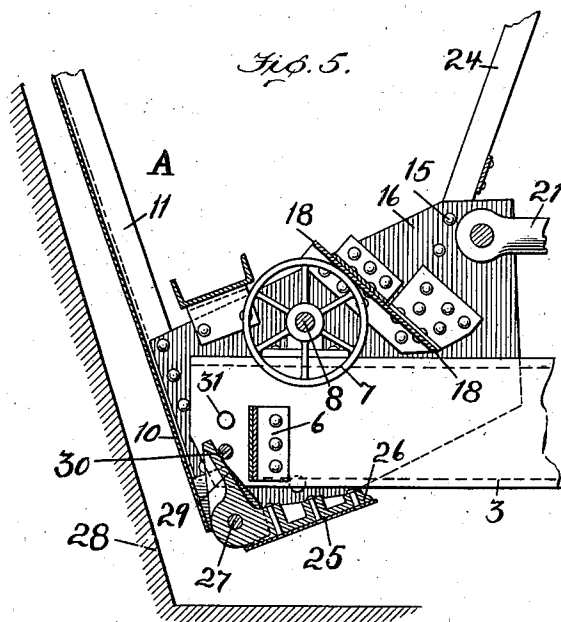
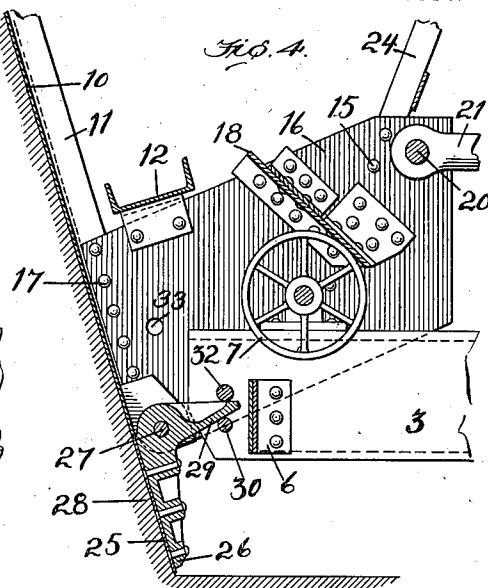
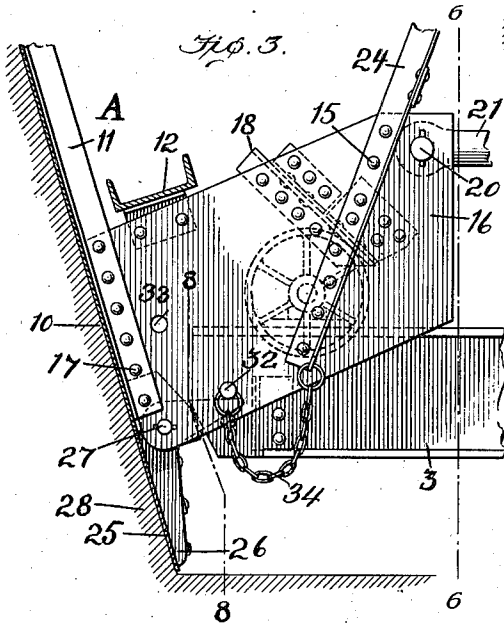
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4 SHEETS—SHEET 3.



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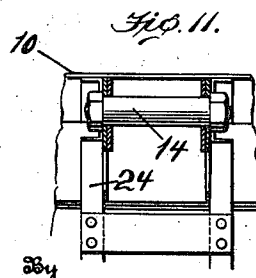
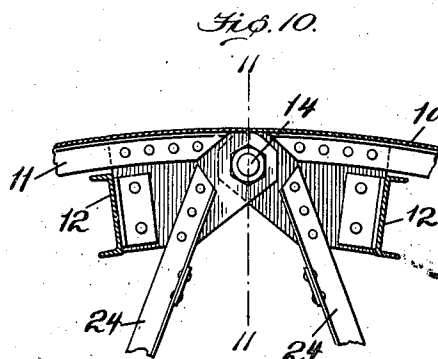
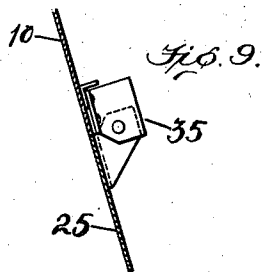
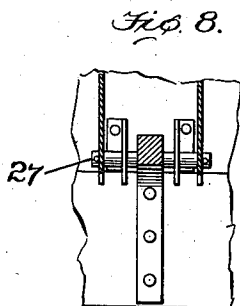
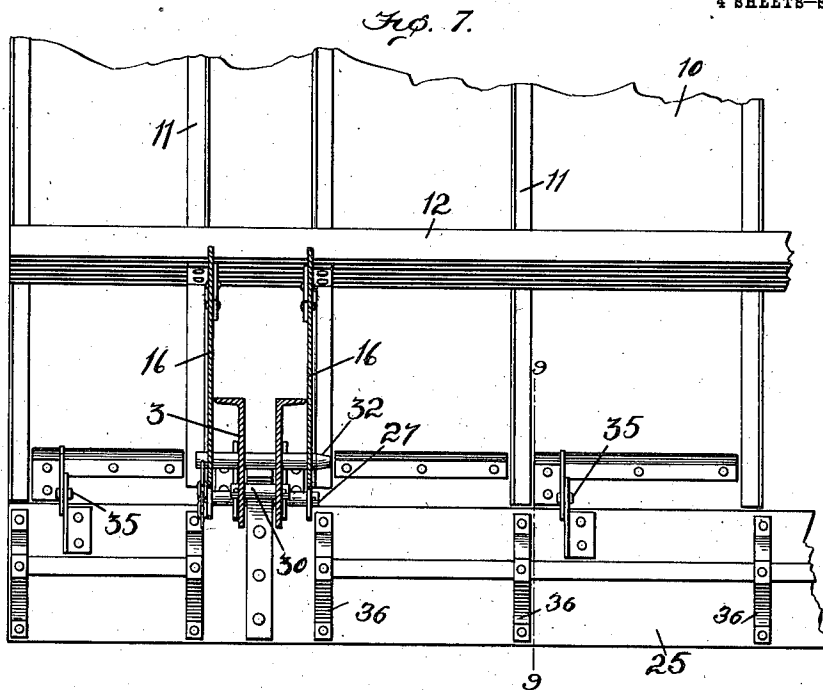
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4 SHEETS—SHEET 4.



Witnesses
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UNITED STATES PATENT OFFICE.

GEORGE F. DILLIG, OF BALTIMORE, MARYLAND.

CENTER SUPPORT OR MOLD FOR FORMING TUNNELS OR SEWERS.

974,778.

Specification of Letters Patent.

Patented Nov. 8, 1910.

Application filed August 31, 1909. Serial No. 515,390.

To all whom it may concern:

Be it known that I, GEORGE F. DILLIG, a citizen of the United States, residing at Baltimore, in the State of Maryland, have
5 invented certain new and useful Improvements in Center Supports or Molds for Forming Tunnels and Sewers, of which the following is a specification.

This invention relates to improvements in
10 what may be termed center supports or molds for sewers, tunnels, or any similar arched structure built in continuous hollow form and formed by using concrete, cement, brick or other material.

15 One object of this invention is to provide a center mold or support made in two side-sections to facilitate the formation of concrete sewers, tunnels or other arched structures of considerable size, and which shall
20 be contractible and expansible simultaneously both in a vertical and horizontal direction by the movements of a single mechanism.

Another object is to provide a collapsible
25 support or mold of the character named, made in two side-sections, which are joined together at the top, and each side-section having at its bottom a movable flap.

Another object is to provide a collapsible
30 support or mold of the character named, made in two side-sections which are joined together at the top, each side-section having at its bottom a movable flap, and operating mechanism whose movement will simultaneously either contract or expand all
35 of said parts.

Still other objects of the invention will appear in the following specification.

In the accompanying drawing which
40 illustrates the invention,—Figure 1, shows an end elevation or cross-section view on the line 1—1 of Fig. 2, showing the collapsible center mold. Fig. 2, is a vertical
45 inner side view on the vertical line 2—2 of Fig. 1, of one side-section of the mold, on a larger scale than that of Fig. 1. Fig. 3, shows on a larger scale the flap that is hinged at the bottom of the side-section, the
50 flap being turned down, and the means for moving the said flap. Fig. 4, is another view of the parts seen in Fig. 3, but certain parts being in section on the line 4—4 of Fig. 6. Fig. 5, is a view of the same parts seen in
55 Fig. 4, but shows the flap turned upward. Fig. 6, is a view as seen from the inner side of the parts on the vertical line 6—6, in the

position shown in Fig. 3. Fig. 7, is an inner-side view of the parts seen on the vertical section line 7—7 of Fig. 1. Fig. 8 is a detail view of parts shown on the line 8—8
60 of Fig. 3. Fig. 9, is a view of one of the hinges of the flap as seen on the vertical line 9—9 of Fig. 7. Fig. 10, is a detail view of the joint that unites the tops of the two side sections. Fig. 11, is a vertical section, on
65 the line 11—11, of Fig. 10, of the joints uniting the two side-sections.

Referring to the drawings, a truck-frame which may be of any preferred construction is employed. In the present instance it com-
70 prises two longitudinal side bars, 2, which are connected by cross-bars, 3. This truck is mounted on wheels 4, that travel on track-rails, 5 supported on suitable cross-ties laid
75 on the ground where the tunnel is to be formed.

Each cross-bar, 3, of the truck comprises two parallel channel beams which are secured together side-by-side, but separated
80 from each other and held by short bars, 6, which are riveted to said cross-bars. The said channel beams support rollers or wheels, 7, whose shafts, 8, turn in bearings, 9, one of which latter rests upon each beam, as
85 seen in Figs. 4, 5 and 6; the lower side of the roller 7, turns freely in the open space between the two bearings and the said two beams. Each of the said cross-bars, 3, sup-
90 ports two of the said rollers, 7, one roller being near each end thereof, these rollers sustain the weight of the two side-sections, A, B, that constitute the frame work of the center mold, and the rollers turn, as will be
95 presently explained, when the said side-sections are either contracted or expanded.

As each side-section, A, and B, are alike in construction, a description of one will be sufficient. Each side-section has an exterior
100 sheet-metal shell 10, that is rounded to give shape to the tunnel and is sustained on the inner surface by curved ribs, 11, of angle-iron, and a number of horizontal channel
105 bars, 12, extend longitudinally, of the side-section adjacent the said exterior shell, 10, and are suitably secured to the said ribs to afford the desired stability. Each side-section
110 also has straight bars, 24, that extend up and down in an inclined direction, the upper ends of these inclined bars, 24, having position in an approximately central vertical plane over the truck. Truss bars, 13, extend between the inclined bars, 24, and

the curved ribs, 11, and connect with said parts.

It will be seen that two curved ribs, 11, two inclined bars, 24, and the truss bars, 13, together form an upright arched frame. Two of these arched frames are in each side-section A, or B, and are carried by the same truck. The said two arched frames of the side-section, A, have their upper ends secured to the two arched frames of the other side-section, B, by pivot-bolts, 14, see Figs. 1, 2, 10 and 11; this pivot permits the bottoms of the two opposite side-sections to have a certain amount of movement toward and away from each other to contract and expand. The lower ends of the said two inclined bars, 24, of each arched frame are secured by rivets, 15, to two stiff vertical plates, 16, which are side by side but spaced apart, and are made fast by rivets, 17, to the curved ribs, 11,—see Figs. 3, 4, 5 and 6.

An inclined bearing, 18, and a roller, 7, cooperate to effect the movement of the side sections, A, B. In the present instance the inclined bearing is between the two vertical plates, 16, and each upright arched frame has two of these inclined bearings, 18; the end of one of the cross-bars, 3, also has position between the said two plates, 16, and each of said inclined bearings, 18, contacts with one of the said rollers, 7.

It will be seen by reference to Fig. 4, that the lower end of the incline, 18, is resting on a roller, 7, showing that the upright arched frame (and of course the side section, A, which is a part of said frame) is in the elevated or expanded position. In Fig. 5, the changed relative position of the incline and roller is shown; here the upper end of the incline, 18, is seen resting on the roller, 7, and in this position the side-section, A, is lowered and the two opposite sides of the mold are contracted.

The mechanism for imparting movement to the two side-sections, A, B, when contracting or expanding will now be described.

A socket, 19, is connected by a pivot-bolt, 20, to the two stiff vertical plates, 16; this socket is internally screw-threaded, as will be understood, to receive one of the screw-threaded ends of a horizontal rod, 21, see Fig. 1. The opposite ends of this rod are screw-threaded right and left, respectively, and each end engages a socket, 19, and at the center the rod has position in the vertical slots of two upright brackets, 22, which are secured to cross bars, 3; a hand-wheel, 23, is on the rod between said two brackets. This arrangement of the wheel, 23, turning between two stationary upright brackets, insures that the section, A, at one side and the section, B, at the opposite side of the mold, will both move in unison, and that one will not move inward any farther than the other. It will now be understood this rod

connects the two opposite side-sections, A, and, B, and that a person by grasping the hand-wheel, 23, may turn the rod either one way or the other and thereby either draw the two side-sections, A, B, toward each other, which is the movement of contraction, or force the two side-sections away from each other, which is the movement of expansion. It will also be understood that the effect of two inclined bearings, 18,—the one that is on the side-section, A, being pitched in a reverse direction from the one that is on the opposite side section, B,—is to lower the said two side-sections at the time they are drawn toward each other, and to raise the two side-sections at the time they are forced away from each other. Thus, when the two side-sections are drawn toward each other, the mold will be contracted in both a vertical and horizontal direction simultaneously; and when the two side sections are forced away from each other, the mold will be expanded in both a vertical and horizontal direction simultaneously.

Each of the side-sections A, B, has at its bottom a flap, 25, which is secured to the side by an arm, 26, jointed or hinged at 27, which permits the said flap to assume either of two positions, which are illustrated in Figs. 4 and 5. In Fig. 4, the flap, 25, is in position to serve as a continuation of the downward part of the wall or exterior sheet-metal shell, 10; this is the down or expanded position, and both the downward part of the shell, 10, and the flap, 25, are in contact with the concrete, 28, on the outside. In Fig. 5, the flap is swung inward and upward; this is the collapsed position, and the flap is here shown turned inward and away from the concrete, 28; also the downward part of the shell, 10, is contracted away from said concrete. It is obvious this hinged flap, 25, may be moved from one position to the other position by any suitable mechanical means. The flaps are stiffened by means of cleats or cross-braces, 36. In addition to the hinge-joints, 27, for the flaps, 25, I also provide simple hinges, 35, shown in Figs. 7 and 9. I have also devised means whereby, when the two side-sections, A, B, are contracted, or collapsed, the flaps will be automatically turned inward simultaneously with the said movement of collapsing; and further when the two side-sections are expanded the said flaps will be automatically turned downward. This means will now be described.

The hinge-device of each flap has an arm, 29, which projects from the joint, 27, substantially at a right-angle with respect to the arm, 26, and said two arms, 29, 26, are rigid and fixed with respect to each other. A fixed pin, 30, extends over the space between the two cross-bars, 3; and the arm, 29, of the hinge device rests on said fixed

pin as shown in Fig. 4. It is obvious that the fixed part, 30, which is shown in the form of a pin, may have any other form that will serve as a rest or shoulder for the arm, 29. As the cross-bars, 3, that hold the pin are immovable, it will be seen that a down or collapsing movement of the side-section, A, will cause the right-angled hinge device to turn on its pivot or joint, 27, and in this way the flaps, 25, will be swung inward and also turned upward, as shown in Fig. 5. When an expanding movement of the two side sections, A, B, takes place, the flaps, 25, will move reversely to that just described; in this movement of the sections the weight of the flap, 25, will cause it to turn downward, to the position shown in Figs. 3, 4 and 6.

The two cross-bars, 3, are provided with holes, 31, and a movable pin, 32, is employed to be inserted in these holes when the hinged flap, 25, is in the down position, as seen in Figs. 3 and 4; the arm, 29, in this position is between the two pins, 30, and, 32, and these pins prevent any movement whatever of the flap. In order to move the flap inward and upward the pin, 32, must first be removed from holes, 31. A hole, 33, is provided in the plates, 16, merely to sustain the pin, 32, when it is not needed. A chain, 34, attached to the pin will keep it from being lost.

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

1. A center support or mold having in combination two opposite upright sections the upper ends of which are jointed together by pivot-bolts, while the bottom ends of the two sections are movable toward and away from each other; a truck on which the weight of the said sections is supported; an inclined bearing a roller in contact therewith, and said bearing and roller supporting the weight of the upright section on said truck; and means acting on the bottom ends of said two upright sections to move them toward and away from each other, whereby the said two opposite sections may be moved to contract and expand simultaneously both in a vertical and horizontal direction.

2. A center support or mold having in

combination two opposite upright sections the bottom ends of which are movable toward and away from each other; a truck on which the said sections are supported; two stationary brackets on the truck and separated by a space; a screw-threaded rod connecting the said two sections, and means positioned on the rod and in said space which separates the brackets, for turning the rod.

3. A center support or mold having in combination two upright side-sections whose upper ends are in contact and whose bottom ends are separated and spaced apart; a horizontal rod connecting the lower parts of said two side-sections and the opposite ends of said rod screw-threaded respectively right and left; two stationary upright brackets separated by a space, and a hand-wheel on said rod positioned in the said space between the two brackets.

4. A center support or mold having in combination a truck provided with a fixed shoulder; two opposite upright sections the upper ends of which meet and the bottom ends of which are movable toward and away from each other; a flap at the bottom of each of said sections; hinges having a pivot-joint and two rigid arms projecting therefrom said arms being at a fixed angle with respect to each other—one of said arms carrying the said flap and the other arm resting on the said fixed shoulder, whereby a lowering movement of the sections will cause the said flaps to automatically swing inward and upward.

5. A center support or mold having in combination two upright side-sections whose upper ends are jointed together leaving the bottom ends free to be moved toward each other and away from each other; an inclined bearing co-acting with each side-section: a flap hinged to the bottom of each side-section, and operating mechanism whose movement will either contract or expand all of said parts.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE F. DILLIG.

Witnesses:

SIMON GREENEBAUM,
EVERETT C. CHANEY.