H. B. LOXTERMAN.

TUNNEL FORM.

APPLICATION FILED FEB. 5, 1916.

1,227,281.

Patented May 22, 1917.

2 SHEETS—SHEET 1.

Fig. 2

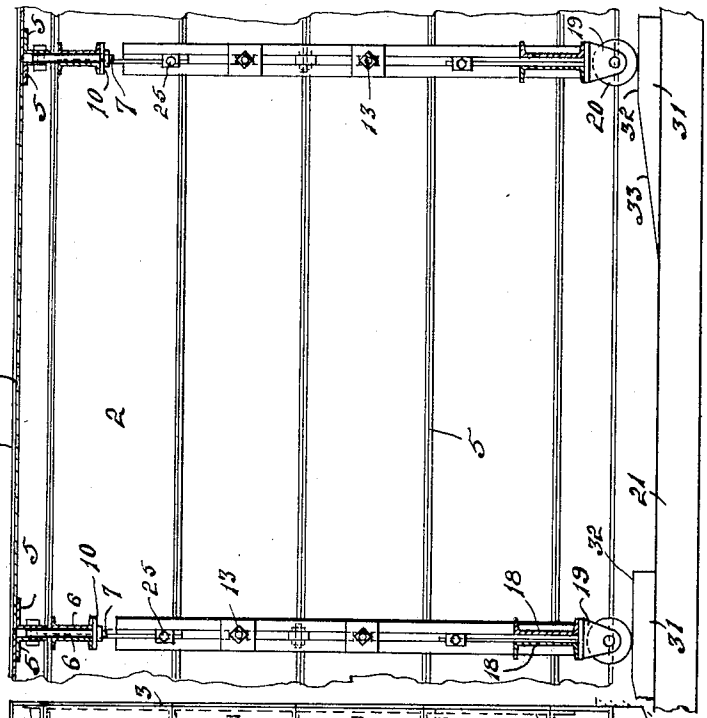
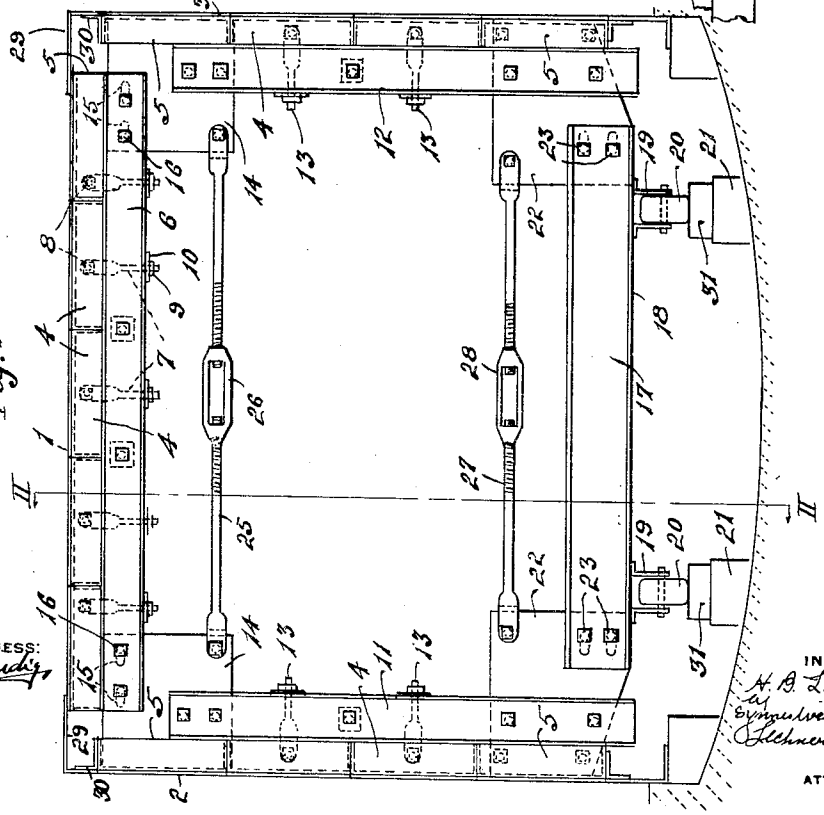


Fig. 1



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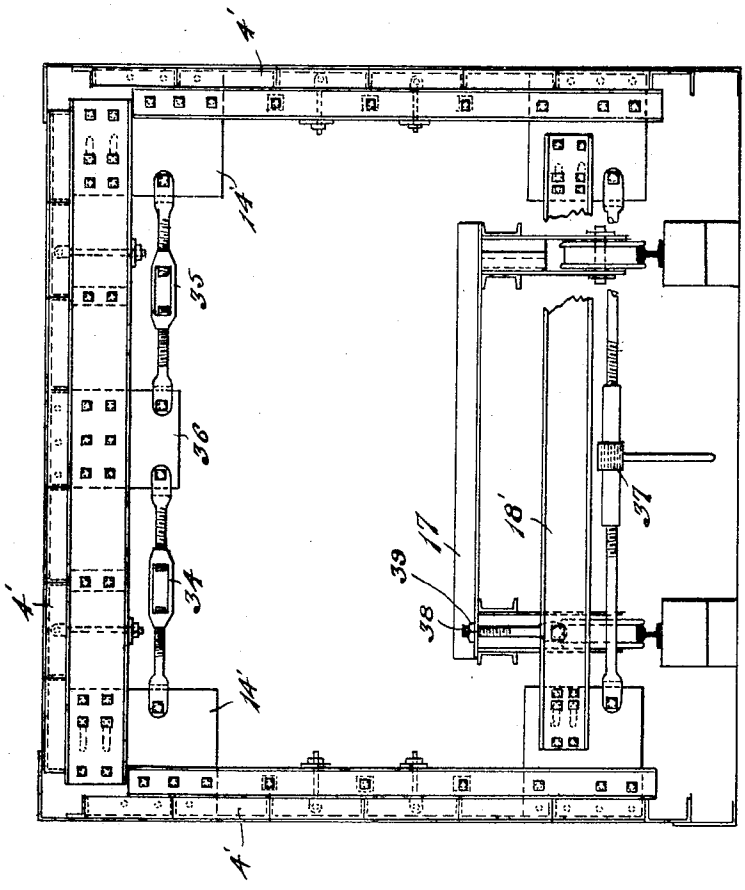
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2 SHEETS—SHEET 2.

Fig. 3



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UNITED STATES PATENT OFFICE.

HOWARD B. LOXTERMAN, OF PITTSBURGH, PENNSYLVANIA, ASSIGNOR TO BLAW STEEL CONSTRUCTION COMPANY, OF HOBOKEN, PENNSYLVANIA, A CORPORATION OF NEW JERSEY.

TUNNEL-FORM.

1,227,281. Specification of Letters Patent. Patented May 22, 1917.

Application filed February 5, 1916. Serial No. 76,346.

To all whom it may concern:

Be it known that I, HOWARD B. LOXTERMAN, a citizen of the United States, residing at Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented certain new and useful Improvements in Tunnel-Forms, of which the following is a specification.

This invention relates to tunnel forms and more particularly to that class of forms used in the construction of concrete lined tunnels and has for its principal objects the provision of a tunnel form which may readily be built up in the field to serve for forming tunnels of various dimensions, the provision of a mold form that may be moved into operative position with a minimum of elevating apparatus, the provision of a mold form that may be built up of a plurality of panels having standard dimensions to accommodate tunnels of various dimensions and such other objects as may hereinafter appear. Certain embodiments of the invention are illustrated in the accompanying drawings wherein—

Figure 1 is an end elevation of the form set up ready to receive the concrete; Fig. 2 is a longitudinal section on the line II—II of Fig. 1; and Fig. 3 is an end view of a modified form of the invention.

Referring to Figs. 1 and 2, the apparatus comprises a ceiling mold form 1 and side mold forms 2 and 3 which are built up of a plurality of form panels 4. Each panel consists of a rectangular form plate stiffened on all sides by angle irons 5 secured permanently to the plate adjacent the edges thereof.

The panels 4 of the ceiling mold are tied with their edges abutting to a pair of supporting channels 6 by means of the short tie rods 7 which extend between the ends of the panels 4 and are bolted between the angles 5 by bolts 8. The free ends of the tie rods are threaded to receive the nuts 9 which take bearing upon the cross plates 10 which connect the supporting channels 6. Thus the panels 4 may be secured to the supporting channels 6 in any adjusted position.

The panels 4, which form the side mold forms 2 and 3, are tied to vertical supporting channels 11 and 12 respectively, by tie rods 13, in a manner similar to the method employed in securing the panels 4 to the supporting channels 6.

Between each pair of vertical channels 11 and 12 and adjacent their upper ends, is securely bolted a connecting plate 14, which is adapted to fit between the supporting channels 6 adjacent the extreme ends thereof. The plates 14 are provided with horizontal slots 15 through which the bolts 16 pass, the said bolts being adapted to extend through the webs of the channels 6 where they are rigidly secured by means of nuts. It will be seen, therefore, that the side forms may be adjusted laterally with respect to the ceiling form for a purpose to be hereinafter described.

For the purpose of moving the mold form from one position to another a truck 17 is provided which consists of a pair of channels 18 secured in spaced relation by means of the wheel bearing clips 19 which are secured to the underside of the channels 18. Wheels 20 are pivoted between the clips 19 and are adapted to roll upon the rails 21 when the form is being moved to another position.

Connecting plates 22 are adjustably supported upon the truck between the channels 17 and are held in position by the bolts 23 which extend through the webs of the channels and the slots 24 cut in the plates 22. The outer ends of the plates 22 are securely bolted between the lower ends of the vertical channels 11 and 12 and between the angles 5 of the lowermost panels 4. The connecting plates 14 are connected by means of a tie-rod 25 provided with a turn buckle 26, and the connecting plates 22 are connected by means of a tie-rod 27 provided with a turn buckle 28. Adjustment of the turnbuckles 26 and 28 will result in movement of the side mold forms 2 and 3 with respect to the ceiling mold form 1.

The space between the side forms and the ceiling forms at the upper corners is covered by means of angle corner plates 29 which are provided with stiffening angles 30 adapted to be secured to the top edge of the panels 4 forming the side walls. The horizontal portion of the plate is adapted to overlap the ceiling mold when the side mold forms are in their extended position as shown in Fig. 1, and to be supported by the ceiling mold. It will be seen that the various parts of this form may be used for tunnels of various dimensions by simply changing the dimensions of the corner plates

29 to take care of alterations in the size of the tunnel.

Heretofore it has been the custom to elevate the form to the desired position by means of jack screws, but in the present case a much simpler and cheaper means is employed which consists in providing a wedge block for each truck wheel for supporting the truck in elevated operative position while the concrete is formed upon the mold. The operation of the device is as follows. First the form is assembled to its approximate size and mounted upon the rails 21. At this time the side forms are drawn toward each other and occupy their extreme collapsed position. The ceiling form is also lower than the predetermined elevation of the tunnel ceiling, a distance equivalent to the thickness of the wedges. The wedge blocks are placed so that when the truck wheels 20 engage the flat surface 32 the form will be in its proper position. The form is then advanced along the rails until the wheels engage the inclined surface 33 of the wedge blocks. Further movement of the form will cause the wheels 20 to roll up the inclined portion of the wedges thereby elevating the form to operative position. After the form has been moved up upon the wedges so that the ceiling mold 1 is in operative elevation, the side forms 2 and 3 are then pushed outward the desired distance by rotation of the turn buckles 26 and 28.

After the concrete has been poured to form the tunnel and has become set, the wedges 31 are knocked out from under the forms by means of a heavy maul and when the side forms are collapsed the form will settle down so that the wheels again engage the rails. The form is then ready to be advanced into a new position.

Referring to Fig. 2 it will be seen that the forms may be connected in such manner that a number of sections may be joined to form a mold of considerable length.

Fig. 3 shows a modified form of mold form built up of panels 4′ supported in a manner similar to that previously described, the difference in construction residing in the use of two separate tie rods 34 and 35 each secured at one end to a rigid central plate 36 and at the outer end to the connecting plates 14′. This construction makes it possible to adjust the top of each side mold independently of the other side wheel.

The lower ends of the side mold forms are moved in and out by means of a ratchet screw 37 which is more readily adjusted than a turn buckle.

For the purpose of elevating the mold form to operative position, the cross channels 18′ are suspended from the truck 17′ by means of the eye bolts 38, (only one of which is shown) which are pivoted between the channels 18′ at one end and secured to the truck 17′ by means of the adjusting nut 39. The form is therefore raised and lowered by means of the nut 39.

It is obvious that many changes in detail may be made without departing from the spirit of the invention and the invention is not limited to the specific means herein illustrated.

What I claim is:

1. A mold form comprising, a ceiling form, a pair of side forms, a frame member for supporting the ceiling form, a pair of vertical frame members for supporting the side forms adjustably attached to the ceiling form support, a truck adjustably attached to the lower ends of the side mold supports and adapted to support them, means attached to the upper and lower ends of the side form supports for moving the side forms toward each other, and a plate carried by the side forms adapted to slidably engage the ceiling form and to constitute a part of the ceiling form.

2. A mold form comprising, a ceiling form built up of a plurality of abutting panel forms, a pair of side forms built up of a plurality of panel forms, a frame member for supporting the ceiling panel forms, a pair of vertical frame members for supporting the panels of the side forms, means for securing the panels to the frame members, means for adjustably securing the frame support for the ceiling forms to the vertical frame members, and a corner plate carried by the side form adapted to slidably engage the ceiling form and to constitute a part of the ceiling form.

HOWARD B. LOXTERMAN.

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