P. C. MERILLAT.

ADJUSTABLE VARIABLE SHAPE CULVERT MOLD.

APPLICATION FILED FEB. 10, 1916.

1,198,469.

Patented Sept. 19, 1916.

3 SHEETS—SHEET 1.

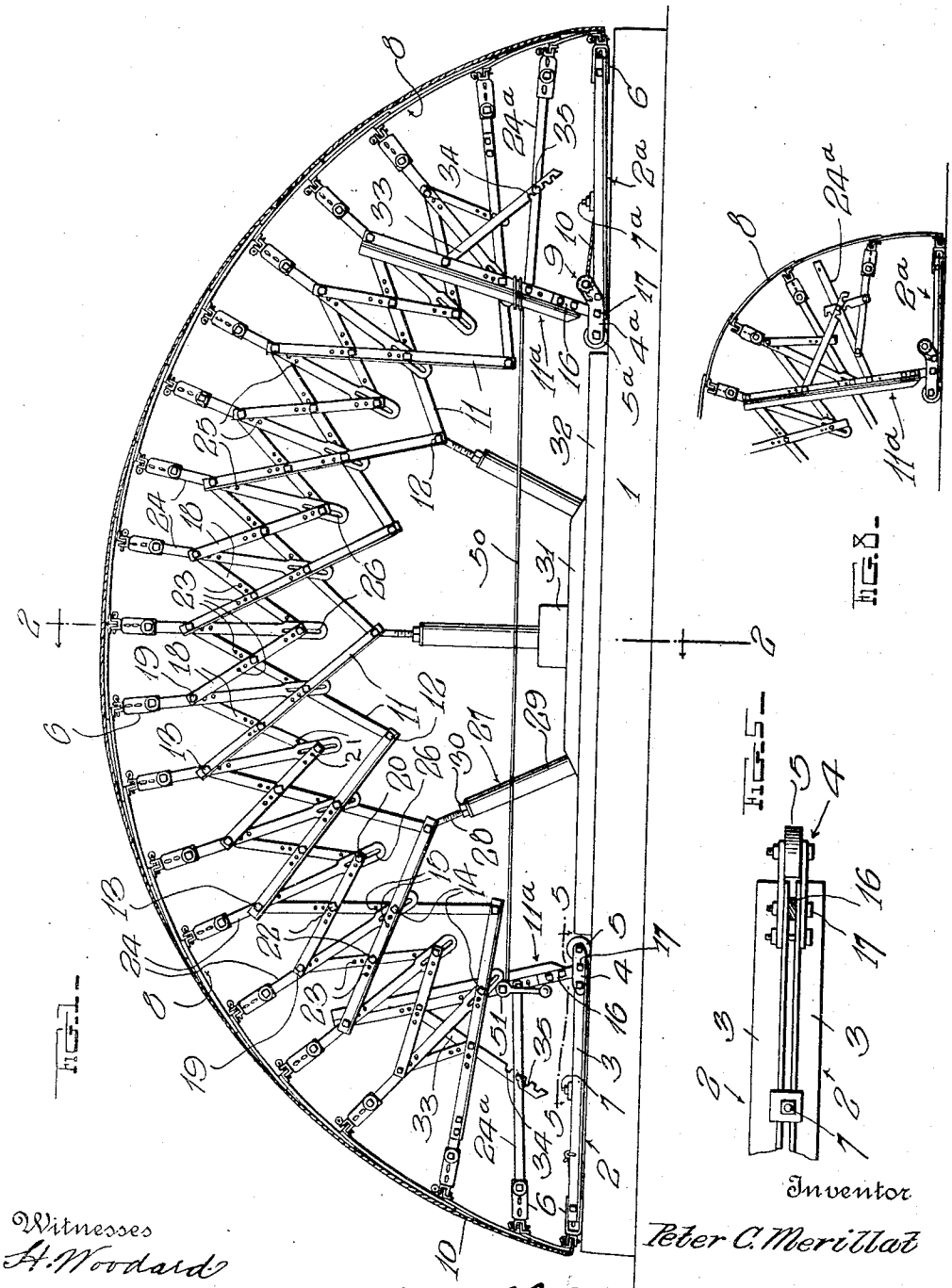


FIG. 1.

FIG. 3.

FIG. 5.

Witnesses

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FIG. 1.

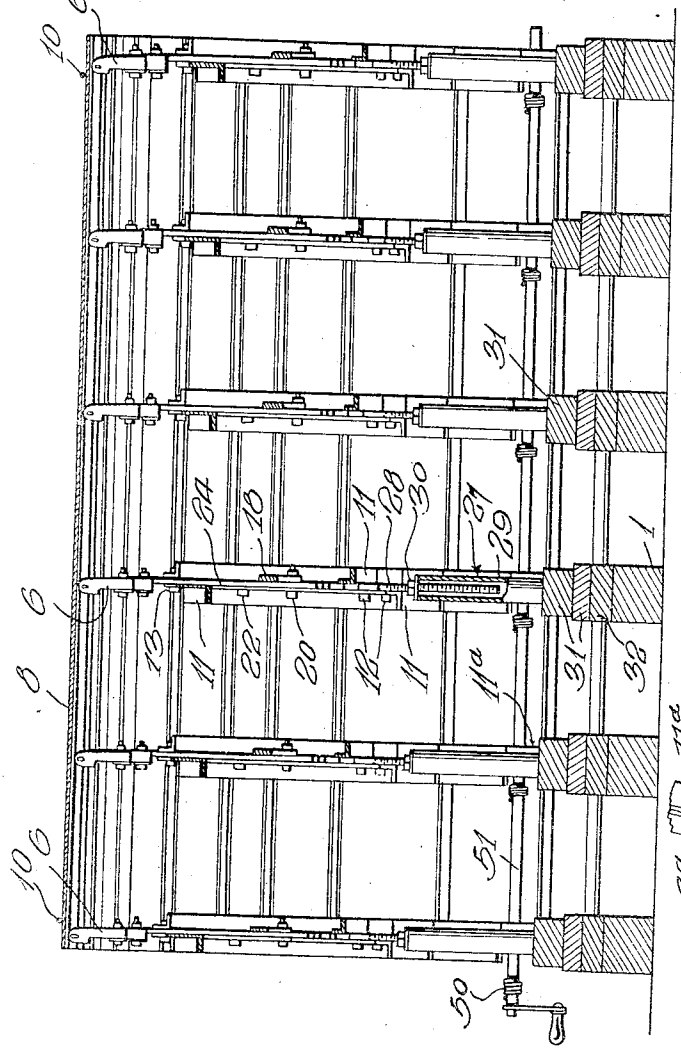


FIG. 3.

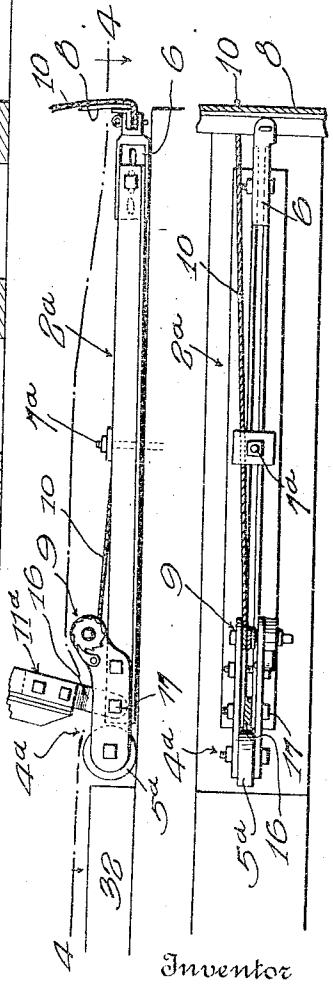


FIG. 4.

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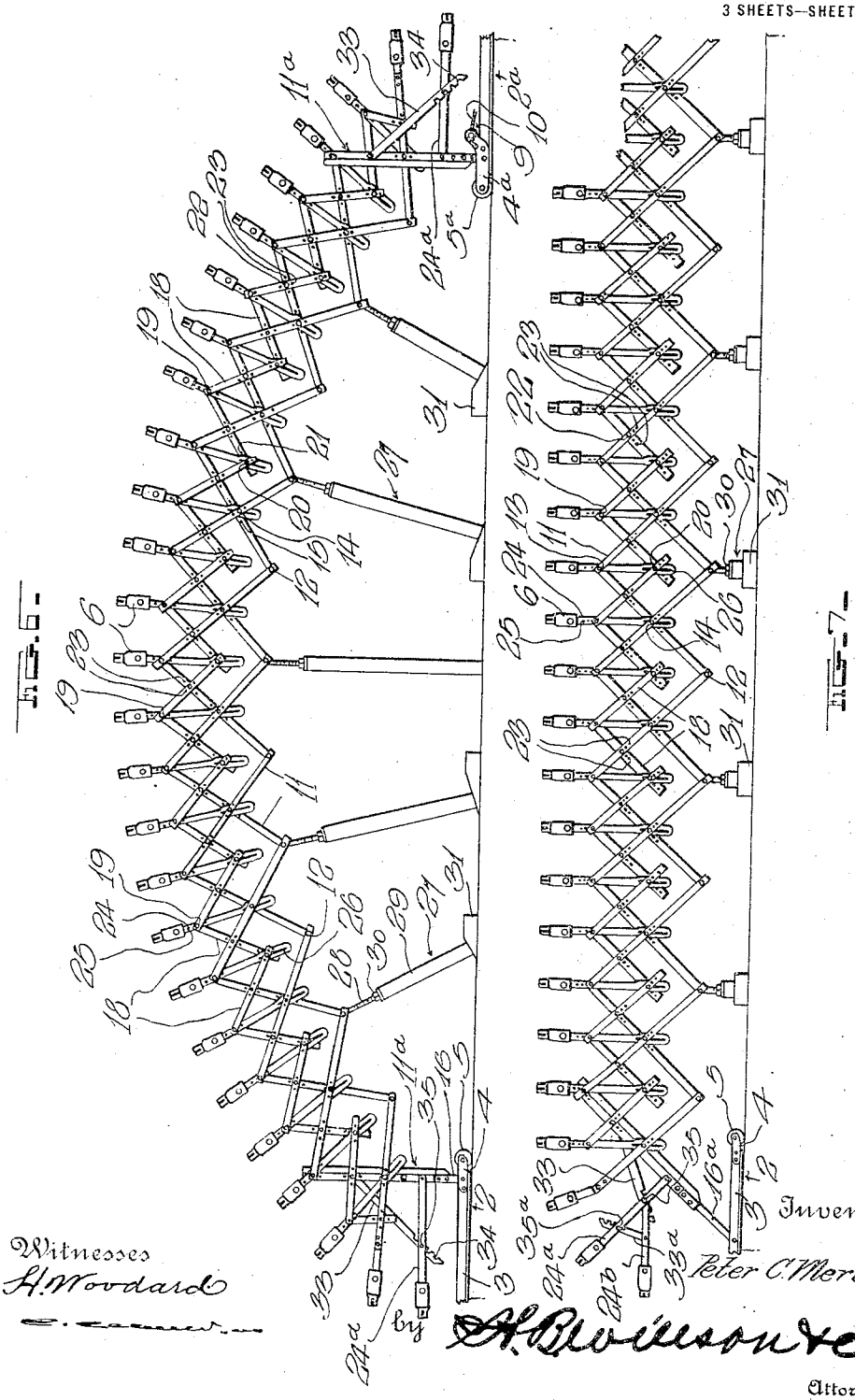
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UNITED STATES PATENT OFFICE.

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ADJUSTABLE VARIABLE-SHAPE CULVERT-MOLD.

1,198,469. Specification of Letters Patent. Patented Sept. 19, 1916.

Application filed February 10, 1916. Serial No. 77,471.

To all whom it may concern:

Be it known that I, PETER C. MERILLAT, a citizen of the United States, residing at Winfield, in the county of Henry and State of Iowa, have invented certain new and useful Improvements in Adjustable Variable-Shape Culvert-Molds; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in adjustable molds for constructing concrete culverts and bridges, the main object of the invention being to improve upon my United States Patent 1,022,960 to such an extent as to allow the shape of the arches to be varied to produce any one of a number of formations.

A secondary object of the invention is to improve upon numerous structural details to the extent hereinafter fully described.

With these general objects in view, the improvements reside in certain novel features of construction and in unique combinations of parts which will be specifically described hereinafter and which are shown in the accompanying drawings.

In these drawings which constitute a part of this application, Figure 1 is a side elevation of the improved mold showing its application to use; Fig. 2 is a vertical transverse section taken on the plane indicated by the line 2—2 of Fig. 1; Fig. 3 is a detail side elevation of the lower right hand corner of Fig. 1; Fig. 4 is a horizontal section taken on the plane of the line 4—4 of Fig. 3; Fig. 5 is a detail horizontal sectional view taken on the plane designated by the line 5—5 of Fig. 1; Figs. 6 and 7 are elevations of one arch showing it adjusted to two different shapes; and Fig. 8 is an elevation of a detail of construction to be described in connection with Fig. 7 but showing a different position of parts.

In specifically describing the construction shown in the drawings above briefly described, similar characters will be placed on corresponding parts throughout the several views and reference will be herein made to the numerous elements by their respective indices. To this end, the numerals 1 designate a plurality of parallel sills adapted to either span the gulley to be bridged or to rest upon the bottom thereof, according to the location of the culvert to be constructed. Resting on one end of the sills, and positioned one on each sill, is a plurality of supporting members 2 each preferably formed of two angle metal bars 3 disposed side by side as shown in Fig. 5. Carriages 4 formed of plates bolted to the opposite sides of the bars 3 are disposed at the inner ends of the members 2, said carriages having anti-friction rollers 5 resting on the sills 1. The outer ends of the members 2 are provided with brackets 6 for the purpose to be described, and for the purpose of preventing longitudinal shifting of said members, bolts or the like 7 are provided. Supporting members 2^a rest on the other ends of the sills 1, said members having carriages 4^a at their inner ends provided with anti-friction rollers 5^a and being also equipped with brackets 6 at their outer ends. As is the case with the members 2, bolts or equivalent fastening devices 7^a are provided for holding said last named members against longitudinal movement after first being properly adjusted.

Secured at its ends to the brackets 6 is a crown 8 which is preferably constructed in the same manner as the crown shown in the patent above referred to, other brackets 6 being provided for adjustably attaching the numerous sections of said crown to the super-structure for supporting the same.

Mounted on the ends of the carriages 4^a remote from the rollers 5^a are windlasses 9 equipped with appropriate pawls and ratchets for holding them against retrograde movement, one end of cables 10 being secured to said windlasses. These cables pass over the crown 8 to hold the sections thereof in tight overlapping engagement and have their opposite ends suitably secured to the base members 2. Obviously, the cables in question may be tightened to the necessary amount by the application of a crank or the like to the windlasses 9.

The super-structure for supporting the crown 8 consists of a plurality of arches each including a set of main lazy tong levers 11 pivoted together at their inner ends by bolts or rivets 12, at their outer ends by bolts 13, and at their crossing points by bolts 14. The last named bolts pass removably through openings 15 with which the intermediate portions of the levers 11 are formed, thus allowing said bolts to be adjusted longitudinally of the levers to change the shape of the arch to that shown

in Fig. 6, to the form depicted in Fig. 7, or to any one of a number of contours. One of the levers 11^a at each end of the arch is preferably constructed more rigidly than the rest, bars 16 being secured to the lower ends of these levers and being in turn pivoted upon bolts or the like 17 to the inner ends of the members 2 and 2^a and the carriages thereon. The other levers 11^b at the ends of the lazy tong structure, are secured to certain of the brackets 6 above described. A set of supplemental lazy tong levers 18 is also included in the super-structure of the mold, said levers being pivoted together at their outer ends by bolts 19 and at their inner ends by bolts 20 which are adapted for engagement with longitudinally spaced openings 21 formed in said ends.

The intermediate portions of the levers 18 cross and are pivoted at their crossing points to the upper arms of the levers 11, the last named pivots being in the form of bolts 22 passing through certain of spaced bolt holes 23 in said arms and in the aforesaid levers 18.

A plurality of radial bars 24 are pivoted between their ends upon the bolts 13 and 19, said bars being provided with longitudinally spaced bolt holes 25 through any one of which said bolts may be passed. The outer ends of the bars 24 are secured to certain brackets 6 while the inner ends thereof are slotted longitudinally at 26, these slots slidably receiving the bolts 14 and 20. The slots in question are necessary in allowing the complete device to fold as depicted in Fig. 4 of Patent 1,022,960 discussed above. They also are of advantage in allowing the bars 24 to be adjusted longitudinally.

For the purpose of supporting the superstructure above described, and relieving the same of unnecessary strain, jacks 27 are used, said jacks being composed of inner and outer telescopic sections 28 and 29 respectively, and nuts 30. These nuts are threaded on the inner sections 28 and bear on the upper ends of the outer tubular sections 29, said inner sections being connected to the arches by certain of the bolts 12. The lower ends of the jacks may rest directly on the sills 1, but chock blocks 31 are preferably provided for this purpose, said blocks being suitably shaped for performing their functions. Certain of the blocks 31 are shown in Figs. 1 and 2 as resting on bars 32 which overlie the sills 1 and abut the rollers 5 and 5^a to prevent inward movement of the base members 2 and 2^a. In Figs. 6 and 7 the chock blocks 31 are shown of different constructions and arranged to meet demands.

When the device is to be used for constructing an arch or culvert of approximately the curvature shown in Fig. 1, bars 24^a supplement the bars 24 in holding the crown 8 in proper position, said bars 24^a being connected at their outer ends to the brackets 6 of certain of the lower sections of the aforesaid crown, while the inner ends of said bars are pivoted to the lower ends of the levers 11^a. To uphold the bars 24^a at the proper height, hanger bars 33 are pivoted to an appropriate part of the structure, preferably to the upper end portions of the aforesaid levers 11^a, the lower ends of said hanger bars being formed with spaced notches 34 which take over studs or bolts 35 projecting laterally from the intermediate portions of the aforesaid bars 24^a.

The construction so far described is adaptable for constructing culverts or bridges having under sides of different curvatures, this being allowed by proper adjustment of the numerous pivots above described. For instance, by positioning these pivots as shown in Fig. 6, a long low curve is obtained, whereas if said pivots be located as depicted in Fig. 7, the entire superstructure will assume a horizontal position. Furthermore, by removing certain of the lazy tong levers, the entire structure may be shortened, or by applying other levers, it may be increased in length as occasion may demand.

When the structure is straightened out as shown in Fig. 7, the bars 24^a and hanger bars 33 are used as is also the case when the device is employed as shown in Figs. 1 and 6. In addition to these bars, however, others 24^b are preferably pivoted on the bolts 35, said bars 24^b being secured to certain brackets 6 and being equipped with hanger bars 33^a pivoted thereto and having notches taking over bolts 35^a which project laterally from the bars 24^a. Also, when the apparatus is arranged as shown in the figure under discussion, bars 16^a will replace the bars 16.

In Fig. 8 an arrangement is shown similar to that depicted at the left hand end of Fig. 7, but when the apparatus is used in this manner, the outer ends of the bars 24^a will be free of connection with any of the brackets 6. This arrangement is usually employed when constructing a comparatively short high arch.

In the drawings, I have illustrated a number of shapes which may be assumed by the improved mold, but it will be obvious that it could well be adjusted to numerous other formations. Furthermore, the numerous accessories described need not be employed as specifically set forth, but may be used as occasion may require.

When removing the form from a completed culvert or bridge, it is necessary to draw the two ends thereof inwardly, and for this purpose I preferably use cables 50 secured at one end to the levers 11^a at one end of the mold, while the other ends of said cables are wound on windlasses 51 car-

ried by the levers 11ª at the other end thereof. By the use of these cables, the necessary result can be attained after first removing the bolts 7, loosening the jacks 27, and removing the beams 32.

From the foregoing, taken in connection with the accompanying illustration, the construction, manner of operation, and numerous advantages of the improved device will be readily understood without requiring a more extended explanation. In conclusion, however, I will state that although certain specific details of construction have been shown for accomplishing probably the best results, numerous changes may be made within the scope of the invention as claimed without sacrificing any of the main advantages thereof.

I claim:—

1. An adjustable variable shape culvert mold comprising arches of lazy tong levers pivoted together at their ends and at their crossing points, certain of said pivots being adjustable longitudinally of certain of the levers to vary the shape of the arches, and a crown supported by said arches.

2. An adjustable variable shape culvert mold comprising arches of lazy tong levers pivoted together at their ends and at their crossing points, one set of said pivots being adjustable longitudinally of the levers to vary the shape of the arches, and a crown supported by said arches.

3. An adjustable variable shape culvert mold comprising arches of lazy tong levers pivoted together at their ends and at their crossing points, the latter pivots being adjustable longitudinally of the levers to vary the shape of the arches, and a crown supported by said arches.

4. An adjustable variable shape culvert mold comprising arches composed of a set of main lazy tong levers pivoted together at their ends and at their crossing points, the latter pivots being adjustable longitudinally of said levers, a set of supplemental lazy tong levers pivoted together at their ends and pivoted between their ends to the upper arms of the main levers, the latter pivots being adjustable longitudinally of both sets of levers, a plurality of radial bars connected between their ends to the pivots at the upper ends of both sets of levers, said bars having sliding connections at their inner ends with the intermediate pivots of the main levers and with the inner pivots of the supplemental levers, and a crown carried by the outer ends of said bars.

5. An adjustable variable shape culvert mold comprising arches composed of a set of main lazy tong levers pivoted together at their ends and at their crossing points, the latter pivots being adjustable longitudinally of said levers, a set of supplemental lazy tong levers pivoted together at their ends and pivoted between their ends to the upper arms of the main levers, the latter pivots being adjustable longitudinally of both sets of levers, and pivotal connections between one end of the supplemental levers being adjustable longitudinally of these levers, a plurality of radial bars connected between their ends to the pivots at the upper ends of both sets of levers, said bars having sliding connections at their inner ends with the intermediate pivots of the main levers and with the inner pivots of the supplemental levers, and a crown carried by the outer ends of said bars.

6. An adjustable variable shape culvert mold comprising arches composed of a set of main lazy tong levers pivoted together at their ends and at their crossing points, the latter pivots being adjustable longitudinally of said levers, a set of supplemental lazy tong levers pivoted together at their ends and pivoted between their ends to the upper arms of the main levers, the latter pivots being adjustable longitudinally of both sets of levers, and the pivotal connections between the inner ends of the supplemental levers being adjustable longitudinally of these levers, a plurality of radial bars having their intermediate portions connected for longitudinal adjustment to the outer pivots of the main and supplemental levers, said bars having slidable connections at their inner ends with the intermediate pivots of the main levers and with the inner pivots of the supplemental levers, and a crown carried by the outer ends of said bars.

7. In a culvert mold, the combination of parallel sills, bars resting on the end portions thereof and having carriages on their inner ends, means for holding said bars against movement on said sills, brackets on the outer ends of said bars, an arched sectional crown having its ends secured to said brackets, lazy tong arches connected at their ends to said bars and having additional brackets connected to the sections of the crown, windlasses carried by the carriages adjacent one end of the sills, and cables passed around the crown and secured at one end to said windlasses, the other ends of said cables being secured to the bars at the other end of the sills.

8. In a culvert mold, the combination of parallel sills, an arched crown thereover, arches of lazy tong levers supported on the sills and in turn supporting said crown, and a plurality of supporting jacks rising from the sills and engaging the inner ends of certain of said levers.

9. In a culvert mold, the combination of parallel sills, an arched crown thereover, arches of lazy tong levers supported on the sills and in turn supporting said crown, radial tubes rising from the sills and having open upper ends, radial rods received slid-

ably in said tubes and extending above the latter, said rods being connected at their upper ends to the inner ends of certain of the lazy tong levers, and nuts threaded on said rods in contact with the upper ends of the aforesaid tubes, said tubes, rods and nuts operating to form supporting jacks for the arches.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

PETER C. MERILLAT.

Witnesses:
J. W. ROBERTSON,
LEE VAN WINKLE.

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