J. T. CLOSE.

BRIDGE AND CULVERT FORM.

APPLICATION FILED SEPT. 4, 1920.

1,384,514. Patented July 12, 1921.

2 SHEETS—SHEET 1.

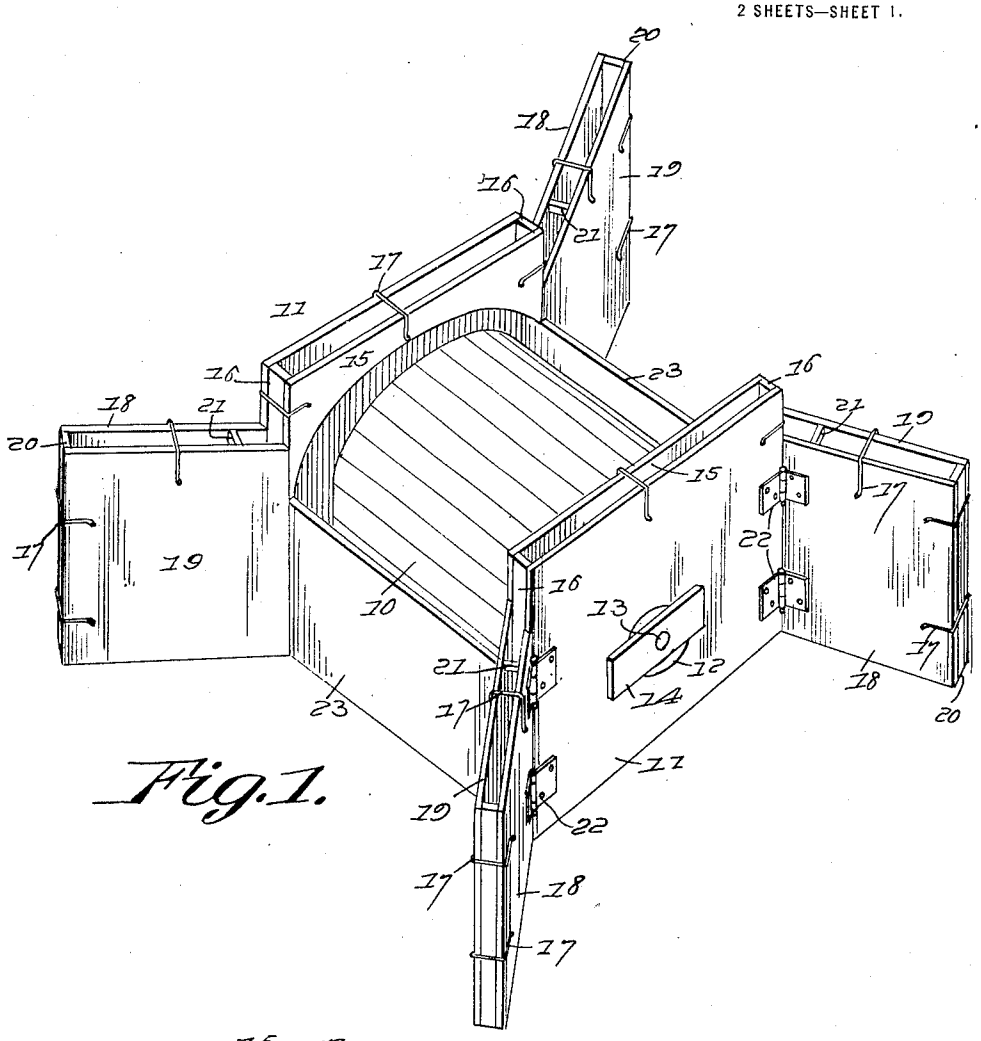


Fig. 1.

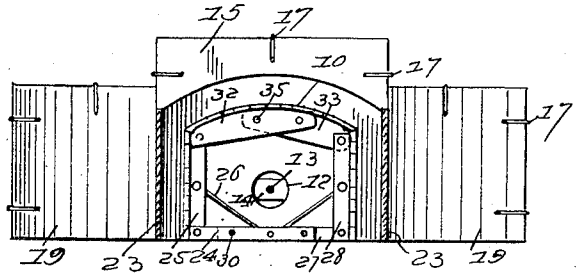


Fig. 2.

Inventor

James T. Close,

By Watson E. Coleman

Attorney

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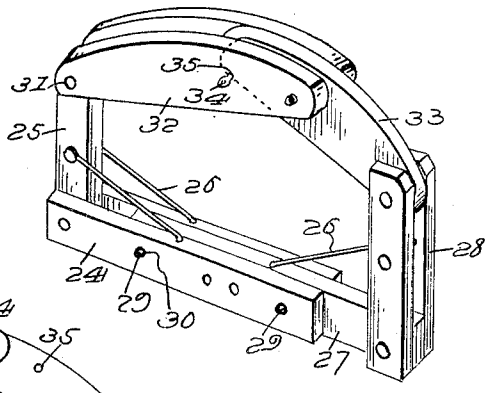
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2 SHEETS—SHEET 2.

Fig. 3.



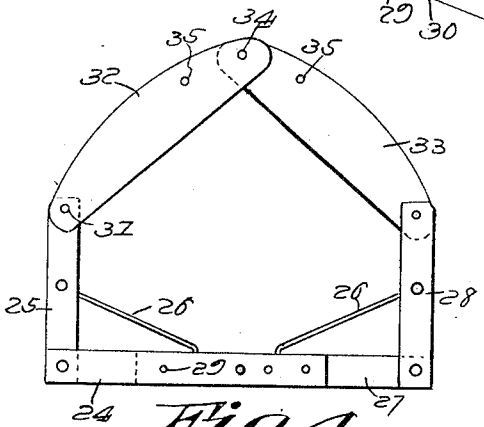


Fig. 4.

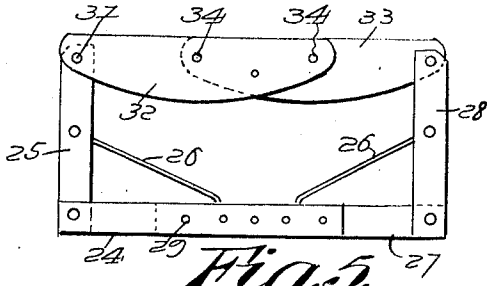


Fig. 5.

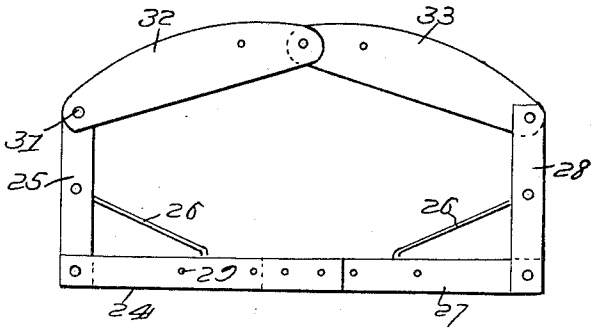


Fig. 6.

Inventor

James T. Close,

By Watson E. Coleman

Attorney

UNITED STATES PATENT OFFICE.

JAMES T. CLOSE, OF NEWKIRK, OKLAHOMA.

BRIDGE AND CULVERT FORM.

1,384,514. Specification of Letters Patent. Patented July 12, 1921.

Application filed September 4, 1920. Serial No. 408,136.

To all whom it may concern:

Be it known that I, JAMES T. CLOSE, a citizen of the United States, residing at Newkirk, in the county of Kay and State of Oklahoma, have invented certain new and useful Improvements in Bridge and Culvert Forms, of which the following is a specification, reference being had to the accompanying drawings.

This invention relates to forms for concrete, and particularly to forms for the purpose of supporting and forming concrete bridges, culverts and the like.

One of the objects of my invention is to provide a collapsible form so constructed that it may be easily collapsed and removed from engagement with the concrete of the bridge or culvert after the concrete has hardened.

And a further object is to provide a center or support for the form which may be readily collapsed to withdraw it from beneath the arch and which may be readily adjusted to arches of greater or less span, and which may be further adjusted so as to increase or decrease the curvature of the arch.

A further object is to provide a centering device of this character which is held in adjusted position by removable pins, these pins being so formed that they may be readily withdrawn, as for instance by wires or rods engaged in the pins and extending out through the arch of the bridge so as to permit the collapse of the centering device and its withdrawal from the arch, and which will particularly permit the ready removal of the centering device when the structure is submerged.

A further object is to provide a form for molding concrete bridges or culverts made up of readily detachable sections, which when associated with each other, form molds within which the concrete may be poured or tamped which includes detachable wing walls or piers also adapted for ready removal from the body of the form.

Other objects will appear in the course of the following description.

My invention is illustrated in the accompanying drawings, wherein:—

Figure 1 is a perspective view of my improved culvert mold;

Fig. 2 is a vertical section thereof;

Fig. 3 is a perspective view of the centering device;

Fig. 4 is a side elevation of the centering device differently adjusted;

Figs. 5 and 6 are side elevations of the centering device showing other adjustments.

Referring to the drawings, and particularly to Fig. 1, it will be seen that my improved mold comprises an arch-shaped body portion 10 which may be made of boards, metal sheathing or any other suitable material, and intended to support the arch of the body or culvert while the arch is setting, and which will, of course, be of various sizes of lengths and spans depending upon the size of the culvert or arch formed. Removably disposed at the ends of this arch-shaped portion 10 are the end walls 11 of the form, these end walls being shown as rectangular, projecting a predetermined distance beyond the ends of the arch form 10, and extending above it any desired distance. These end members 11 have openings 12 through which a connecting rod 13 extends, this connecting rod passing through timbers 14 spanning the openings 12. These connecting rods may be in the form of bolts if the width of the bridge, culvert or the like is small.

Disposed parallel to but inward of the end walls 11 are the inner walls 15 of the form which are arcuately cut away on their lower edges and have their upper edges coincident with the upper edges of the members 11 but which do not extend down to any extent at the ends of the arch form 10. These members 15 are spaced from the walls 11 by means of spacing blocks 16 which may be attached either to the walls 11 or to the walls 15. The walls 15 are held against the spacing blocks in proper relation to the walls 11 by means of the U-shaped clamps 17. It will be seen that the walls 11 are held in place by the bolt or like element 13 and that these walls in turn support the walls 15, and a space is left between these walls 15 and 11 into which concrete may be poured and tamped, concrete being also placed over the arch form 10.

Hingedly connected to each end of each pair of walls 11 and 15 are the forms for the wing walls. Each of these forms consists of an outer wall 18 and an inner wall 19 approximately rectangular in form,

closed at their ends by a spacing block 20 which may be attached to either one of the walls by a transversely extending spacing member 21 carried by one of the walls and abutting against the other wall. These walls 18 and 19 are held together by the U-shaped clamps 17. The outer wall 18 of each wing wall is preferably hinged to the outer wall 11 by means of hinges 22, the leaves of these hinges being formed so as to be readily detachable from each other to permit the removal of the mold walls for the wing wall from the walls 11. It will be noted that the inner wall 19 of each wing wall is longer than the outer wall 18 so that the wing walls are disposed at an angle to the side walls of the bridge or culvert. Transverse walls 23 are also disposed between the inner walls 19 of each pair of wing walls and in spaced relation to the vertical ends of the arch form 10, these walls 22 being beveled at their ends to cause them to fit within the walls 19 of the wing wall forms.

For the purpose of supporting the arch form 10, I provide a centering device, two or more of which are used in the construction of each bridge, culvert or arch. Each centering device comprises a pair of parallel base members 24 spaced from each other by means of a vertical member 25 located at the ends of the members 24 and attached thereto by a bolt or in any other suitable manner. Braces 26 extend from the members 24 and the members 25. Disposed between the members 24 is a member 27, and attached to the outer end of the member 27 are a pair of vertical members 28. A brace 26 is also used in connection with the members 27 and 28 to hold them in right angular relation. The members 24 and the member 27 are each formed with three transverse registering openings 29 through which pass removable pins 30. By this means the members 24 and 27 may be shifted relative to each other and held in any adjusted position so that the span of the centering device may be increased or decreased as desired.

Pivoted, as by a bolt 31, to the upright member 25 are a pair of segmental members 32, the upper faces of which are upwardly curved, the lower faces being preferably straight, and pivoted between the members 28 at the upper ends thereof by a bolt or like means is a segmental member 33 which is also upwardly curved upon its upper face and straight on its lower face. These members 32 and 33 are formed with transversely extending registering perforations 34, there being any number desired, though I have shown two of these perforations in each of the members, and through these perforations pass the pins 35. Where the arch is short, that is of little span, the members 24 and 27 are adjusted as illustrated in Fig. 3, and only two pins 35 pass through the apertures 34 at the ends of the members 32 and 33. Where the arch is relatively wide, however, the members 24 and 27 are shifted outward relative to each other and held by two of the pins 35 instead of by three pins. Only one pin 35 passes through the openings at the extreme ends of the segmental members 32 and 33. This construction permits of a very shallow arch being made, and when it is desired to center a relatively deep arch, the members 32 and 33 are disposed at a relatively great angle to each other, as in Fig. 4, and connected by a removable pin 35. If it be desired to form a flat arch and have the end face of the culvert or bridge horizontal, the members 32 and 33 are removed from engagement with the supports 25 and 28 and then turned over so that the flat edges of these members are uppermost, and the members are then again fastened in position, as illustrated in Fig. 5.

It will be seen that I have provided a form or center for different shaped sizes of arches or for flat or level top arches, which form is adjustable and collapsible. The form will collapse of its own accord when the pins 35 are pulled out, and these pins are sufficiently loose to permit them to be readily removed by the operator using a long hook inserted beneath the arch and engaging the ends of the pins. This hook will also be used for removing the centering after it has collapsed. Obviously, wires may be attached to the eyes at the ends of the pins 35 or 30, and thus these loose pins may be readily removed by pulling on the wires. This permits the centering device to be removed from under the bridge when the latter is entirely submerged in water, these loose wires extending out through the arch of the bridge to the surface of the water. It will be understood, of course, that when the centering device is pulled, the arch form 10, which is made of boards or like material, falls downward and may be removed. It will be understood also that while I have illustrated a center having two sets of holes whereby it may be given two adjustments that many more sets of holes might be used, both in the members 32 and 33 and in the members 24 and 27 to secure a greater range of adjustment so that an arch of any desired curvature and any desired span within reasonable limits may be supported.

This centering device could be made of very small size for culverts which are too small for the operator to enter the arch, but the pins can be removed by means of the wires heretofore referred to. It will be obvious that with this centering device the form of the center may be changed so as to adapt it for use with relatively flat arches or steeply curved arches and for arches having different spans. Of course, in actual

work the number of centering devices used will depend upon the size of the arch, the width of the bridge or culvert, etc.

I claim:—

1. A form for building bridges, culverts and the like including an arch form, end walls adapted to be disposed against the ends of the arch form and clamped thereto, inner walls disposed above the arch form and spaced from the end walls, spacing blocks spacing these inner walls from the end walls at the ends thereof, detachable clamps holding the end walls and inner walls in conjoint relation, molds for the wing walls comprising detachable outer and inner walls held in spaced relation from each other, and clamps holding the walls in conjoint relation, the inner wall of each of the wing forms being detachably hinged to the outer end walls of the culvert form.

2. A centering device for building arches formed of a base portion comprising two sections longitudinally adjustable with relation to each other, removable pins holding said sections in adjusted engagement, members extending upward from the ends of the section, members pivotally connected at their upper ends to the vertical members and overlapping each other at the ends, said last named members having a plurality of registrable openings extending in a line longitudinally of said members, and removable pins disposed through said openings, each of said last named members having one of its edge faces straight and the other edge face convexly curved.

3. A centering device of the character described including a pair of parallel base members spaced from each other, an upwardly extending member disposed between said base members, a third base member disposed between the other two base members and longitudinally adjustable with relation thereto and having a pair of upwardly extending members attached to its ends, said base members being formed with a plurality of registering perforations, removable pins passing through said perforations and having heads, a pair of segmental-shaped members pivotally and detachably connected to the upper ends of the first named upwardly extending member, said segmental members having one edge straight and the opposite edge convexly curved, and a segmental member disposed between the upper ends of the second named upwardly extending members and pivotally and detachably engaged therewith and having one edge curved and the other edge straight, said last named member being insertible between the pair of segmental members and all of said segmental members having a plurality of perforations disposed in longitudinally extending lines registrable with each other, and headed pins insertible through said perforations, said perforations and pins permitting the segmental members to be disposed at a greater or less angle with relation to each other and adjusted longitudinally with relation to each other.

4. A centering device of the character described including a pair of parallel base members spaced from each other, a vertical member disposed between said base members, a third base member disposed between the other two base members and longitudinally adjustable with relation thereto and having a pair of vertical members attached to its ends, braces attached to the base members and extending upward and outward and connected to the vertical members, said base members being formed with a plurality of registrable perforations extending in a longitudinal series, removable pins passing through said perforations and having heads, a pair of segmental-shaped members pivotally and detachably connected to the upper ends of the first named vertical member, said segmental members having one edge straight and the opposite edge convexly curved, and a segmental member disposed between the upper ends of the second named vertical members and pivotally and detachably engaged therewith and having one edge curved and the other edge straight, said last named member being insertible between the pair of segmental members and all of said segmental members having a plurality of perforations extending in a longitudinal series registrable with each other, and headed pins insertible through said perforations, said perforations and pins permitting the segmental members to be disposed at a greater or less angle with relation to each other and adjusted longitudinally with relation to each other.

In testimony whereof I hereunto affix my signature.

JAMES T. CLOSE.