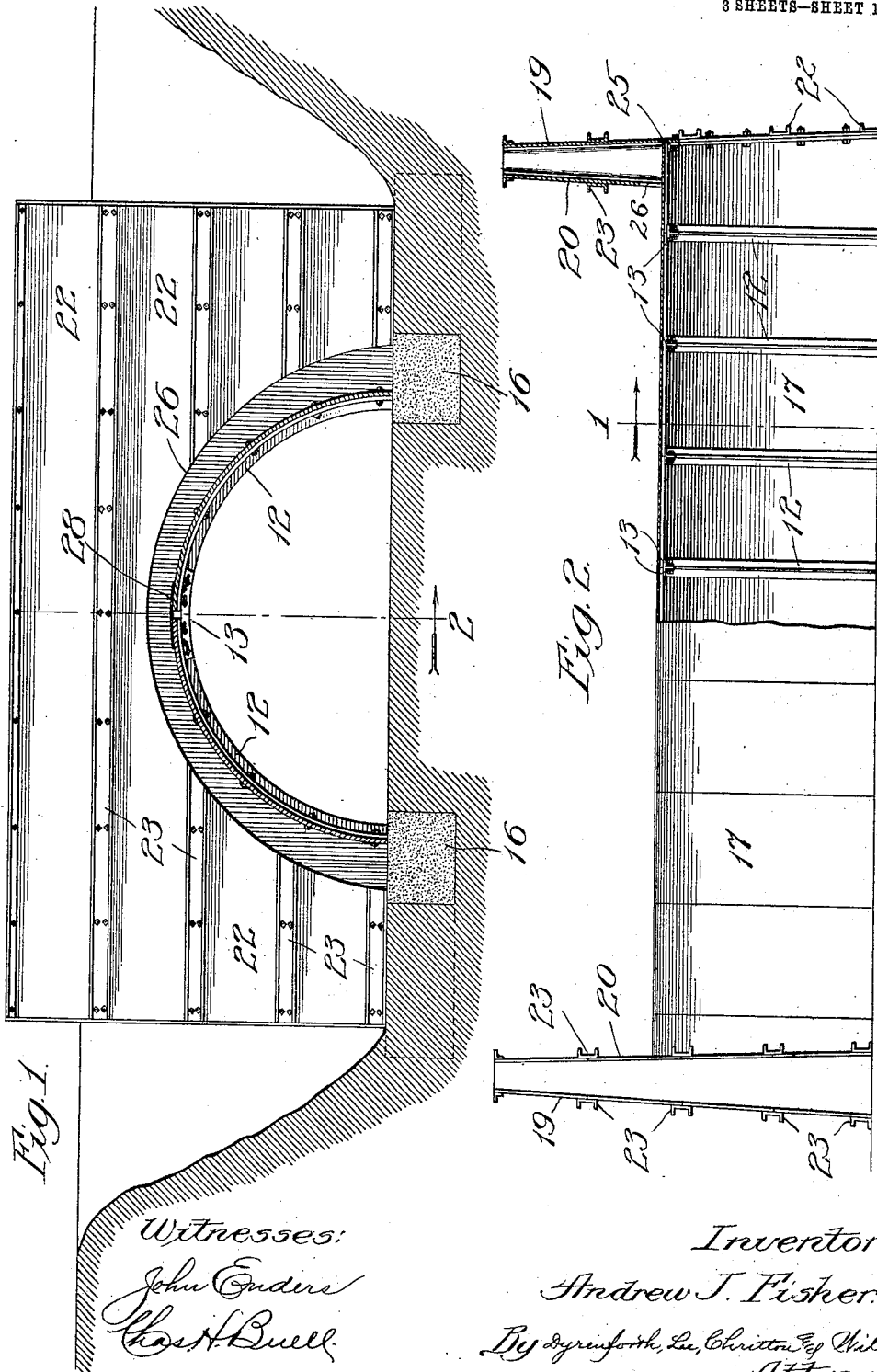


A. J. FISHER.
 PORTABLE MOLD FOR CONCRETE CULVERTS AND BRIDGES.
 APPLICATION FILED AUG. 10, 1908.

920,448.

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Fig. 4.

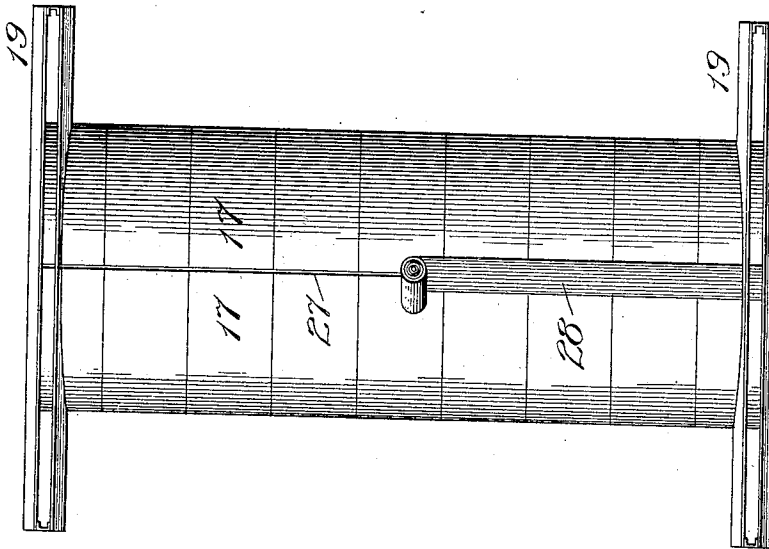
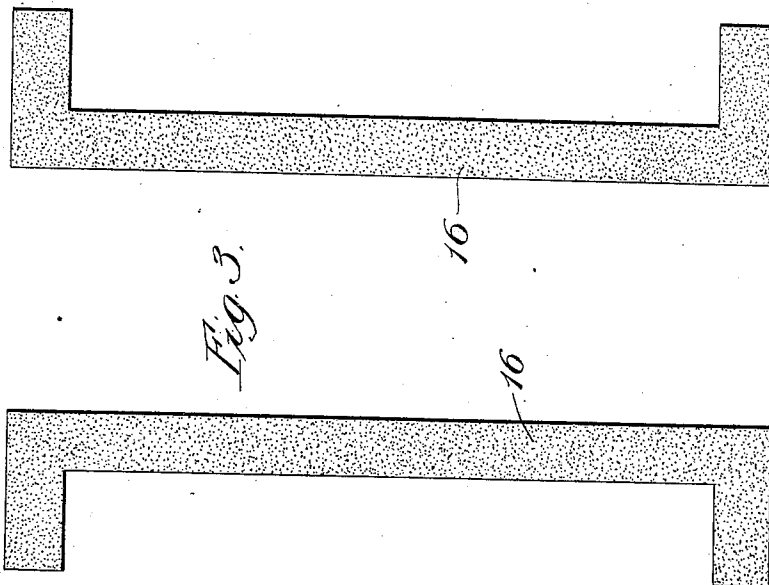


Fig. 3.



Witnesses:

John Enders
Chas. H. Buell

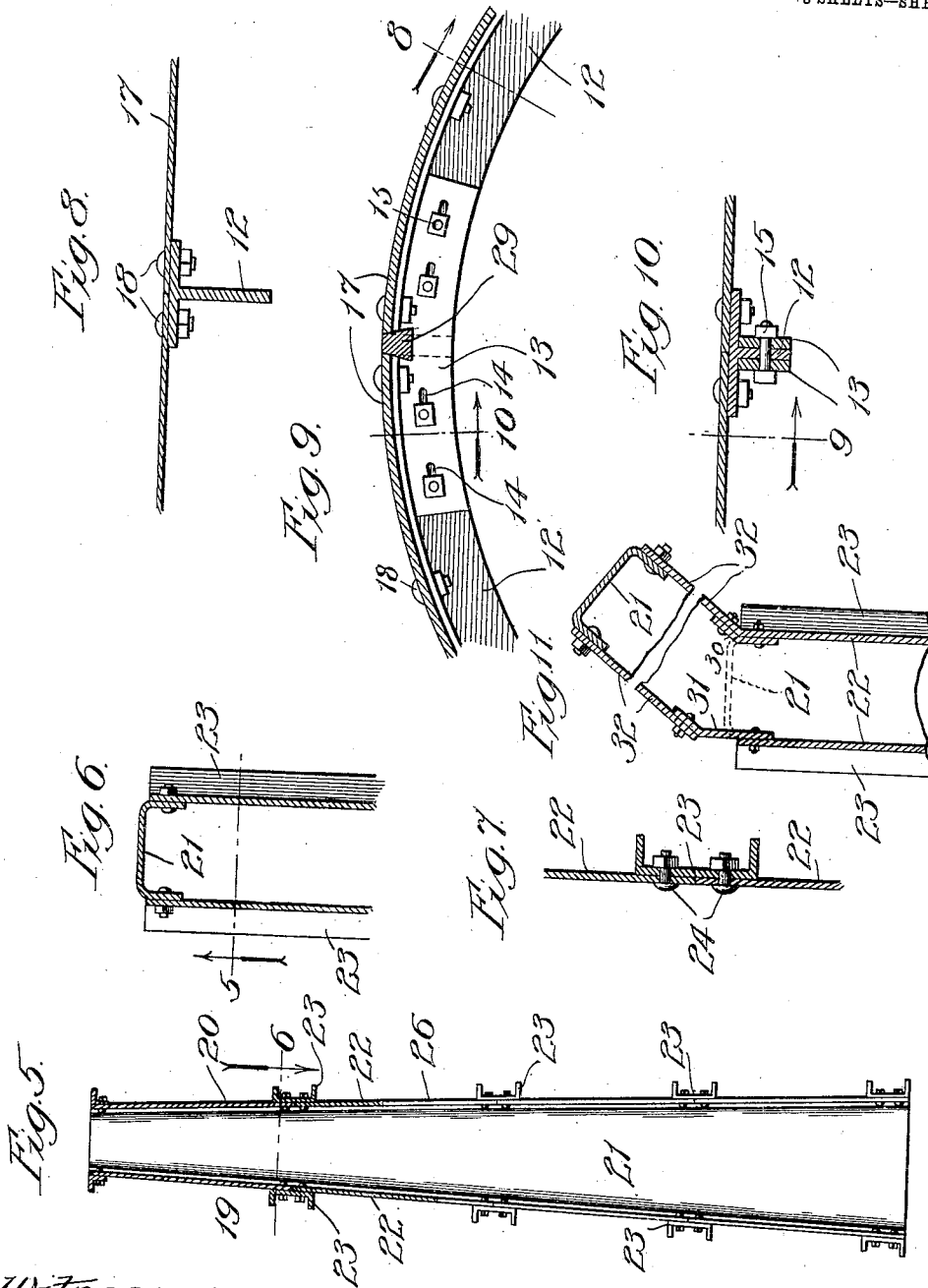
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UNITED STATES PATENT OFFICE.

ANDREW J. FISHER, OF BUDA, ILLINOIS, ASSIGNOR TO LOUIS H. SCOTT, OF PRINCETON, ILLINOIS.

PORTABLE MOLD FOR CONCRETE CULVERTS AND BRIDGES.

No. 920,448.

Specification of Letters Patent.

Patented May 4, 1909.

Application filed August 10, 1908. Serial No. 447,707.

To all whom it may concern:

Be it known that I, ANDREW J. FISHER, a citizen of the United States, residing at Buda, in the county of Bureau and State of Illinois, have invented a new and useful Improvement in Portable Molds for Concrete Culverts and Bridges, of which the following is a specification.

In forming concrete culverts and bridges it has been the usual practice hitherto, in each instance, to construct on the spot a mold consisting of a frame-work of lumber into which the concrete, in a more or less fluid or plastic condition, was poured, or shoveled and tamped, and allowed to set and dry, after which the lumber forming the mold was knocked apart and removed. The labor involved in erecting molds in this way and the waste of lumber it necessarily entailed have added greatly to the cost of erection of such culverts and bridges; and unless great skill and care was employed by the mold constructors the finished culvert or bridge would not present the smooth, regular and attractive appearance desired.

My object is to provide an improved iron or steel knock-down mold for culverts or bridges, formed of members which may be readily attached to and detached from each other, whereby the mold may be erected in desired position very quickly and at little expense for labor; result in producing a smooth and slightly concrete molded structure, and be easily removed without waste of parts, so that the mold may be readily transported and used over and over again.

Referring to the drawings—Figure 1 is a sectional view of my improved culvert or bridge mold erected upon a concrete foundation, the section being taken on line 1 in Fig. 2; Fig. 2, a view partly in section and partly in side elevation, the section being taken on line 2 in Fig. 1; Fig. 3, a plan-view of a concrete foundation; Fig. 4, a top-plan view of the mold and illustrating the manner of applying a strip of tar-paper, or the like, over the open joint at the top of the arch; Fig. 5, an enlarged vertical section of one of the end-molds, the section being taken on line 5 in Fig. 6; Fig. 6, an enlarged fragmentary section taken on line 6 in Fig. 5; Fig. 7, a further enlarged fragmentary section of one of the said end-molds illustrating details of construction; Fig. 8, a fragmentary section of the arch-form taken on line 8 in

Fig. 9; Fig. 9, a fragmentary section of the top of the arch-form showing details of construction, the section being taken on line 9 in Fig. 10; Fig. 10, a fragmentary section taken on line 10 in Fig. 9; and Fig. 11 a view similar to Fig. 6, but showing the manner of applying wing-molds to the end-molds.

The frame-work of the arch-form portion of the mold is formed of arch-bars 12, preferably T-shape in cross-section, each of which may, as shown, be segmental and extend approximately a quarter of a circle. These are provided with bolt-holes equi-distant apart and similarly positioned in each of the bars. The ends of companion bars 12 are fastened together by means of segmental tie-plates 13 having elongated bolt-openings 14 to receive bolts 15 which pass through the said bars.

In constructing a bridge, or culvert, a foundation 16 of concrete is first laid and permitted to set and become more or less dry. The arch-bars 12, fastened together at their ends by means of the tie-plates 13, are then placed upon the foundation as indicated in Fig. 1, and arch-plates 17 approximating in length that of the segmental bars are fastened at their edges to the bars by means of bolts. The bolt-holes provided in the plates are equi-distant apart and spaced to register with bolt-openings in opposite sides of the heads of the T-bars. The plates 17 are caused to abut and fit closely against each other at their side edges and are fastened to the bars 12 by means of bolts which are formed with shallow round heads and held in place by nuts. As many arch-bars and plates are fastened together in position as may be required, and to relieve strain upon the tie-plates 13 and bolts, wedges 29 are driven between adjacent ends of companion arch-bars.

The end-molds are formed with outer walls 19 and inner walls 20 tapering toward each other as indicated, and end-walls 21, all constructed as most clearly shown in Figs. 5, 6 and 7. The inner and outer walls are formed of horizontal plates 22 abutting together at their edges and there fastened together by horizontally extending channel-bars 23. The edge-portions of the plates and the channel-bars are formed with co-incident bolt-openings, and bolts 24 having shallow rounded heads fasten the plates to the channel-bars. The bolts are provided with removable nuts

as indicated. The end-plates 21 are fastened in place by means of round headed bolts as indicated in Fig. 6. They are U-shaped in cross-section and taper longitudinally to give the desired inclinations to the inner and outer walls of the end mold. Each end-mold is open at the top, and its outer wall presents a segmental cut-away portion leaving an arch or opening. The end arch-plates taper to fit against the inner surfaces of said outer walls and carry angle-iron bars 25 which are bolted to the outer walls to fasten the arch and end molds together. The inner wall of each end-mold has a cut-away arch-portion 26 describing the segment of a circle somewhat larger than the built-up arch, leaving between them a space of approximately the dimensions and shape of the intended concrete arch-portion of the culvert, or the like. When the end-molds are erected in proper position as described the mold structure is complete.

The concrete is poured into the top of each of the end-molds, or shoveled in and tamped, and concrete is plastered over the arch-form to a thickness which will cause its outer surface to approximate the arc 26. The mold-ends and arch-form are left in place until the molded concrete has set and become sufficiently dry.

The T-bars 12 and plates 17 do not abut at the top line of the arch, but are held slightly spaced apart by the tie-plates 13 and wedges 29, as most clearly indicated at Fig. 9. The opening 27 thus left may, before the molding operation begins, be covered with a strip 28 of tar paper, or the like, which will prevent the concrete running into the said space. The plate-joining bars 12, 23 and 25 besides strengthening the structure, batten the joints between plates and prevent their leaking.

The construction shown in Fig. 11 shows adjuncts applicable to the end-molds described, to enable the same molds to be employed for forming culverts, or the like, with inclined wing-extensions. In this case inner angle-plates 30 and outer angle-plates 31 are bolted to the ends of the plates 22, and inner and outer suitably shaped wing side-plates 32 are bolted, thereto, as shown. The end-plates 21 instead of being fastened to the plates 22 are bolted to the outer edge-ports of the plates 32. When it is desired to remove the mold, the wedges 29 are knocked out and the bolts at the tie-plates 13 are loosened to cause the arch-portion of the mold to collapse slightly and free itself from the molded concrete arch. The plates and T-bars may then be unfastened from each other and taken out piece by piece, or, if desired, after removing the wedges and tie-plates, the two longitudinal built-up members of the two-part arch form, may be removed bodily. The mold-ends may also be

removed by taking out the bolts which fasten the members thereof together. In erecting molds for culverts for roads of different widths, it is only necessary to increase or diminish the number of the intermediate plates 17 and bars 12 employed. The said intermediate plates 17 and arch-bars 12 being all constructed alike are interchangeable and easily placed in position. Concrete culverts and bridges molded in my improved mold will always be perfect as to shape and proportion and present smooth and slightly surfaces.

I am aware that it has been proposed to provide a mold constructed of a frame-work of lumber with flashings or shoulder molding parts, the inner or inside walls of which are spaced apart from and connected to the end walls of the mold proper by bolts, but I am not aware that prior to my invention a knock-down metal mold has been provided with an end-mold having a cut-away arch-portion describing the segment of a circle somewhat larger than the built-up arch, and leaving between them a space of approximately the dimensions and shape of such arch portion and through which opening the concrete extends when tamped into the hollow end mold and unites with the concrete forming the arch-portion.

While I prefer to construct my improved mold of attachable and detachable members constructed as shown and described, naturally the construction may be variously modified in the matter of details without departing from the spirit of my invention as defined by the claims.

What I claim as new, and desire to secure by Letters Patent, is—

1. A knock-down metal mold for concrete culverts, and the like, comprising in combination, a two-part arch-form each composed of segmental bars, and plates curved to extend longitudinally of and to conform to the contour of said bars and removably fastened at their side edges to the bars, and hollow end-molds fitting against said form and constructed of plates and bars removably fastened together and each provided on its inner face with a cut-away arch portion, substantially as, and for the purpose set forth.

2. A knock-down metal mold for concrete culverts, and the like, comprising in combination, an arch-form composed of a series of companion arch-bars removably secured together at their upper ends, arch-plates extending longitudinally of the said bars and removably fastened thereto at their lateral edges and hollow end-molds fitting against said form and constructed of plates and bars removably fastened together and each provided on its inner face with a cut-away arch portion, substantially as, and for the purpose set forth.

3. A knock-down metal mold for concrete culverts, and the like, comprising in combination, an arch-form composed of a series of companion arch-bars, tie-plates removably securing the companion bars together at their upper ends, arch-plates extending longitudinally of the said bars and removably fastened thereto at their lateral edges, and hollow end-molds fitting against said form and constructed of plates and bars removably fastened together and each provided on its inner face with a cut-away arch portion, substantially as, and for the purpose set forth.

4. A knock-down metal mold for concrete culverts, and the like, comprising in combination, an arch-form composed of a series of companion arch-bars, tie-plates removably securing the companion bars together at their ends in spaced relation, arch-plates extending longitudinally of said bars and removably fastened thereto at their lateral edges and extending slightly short of the top of the arch-form to leave a space, a covering-strip for said space, and hollow end-molds

fitting against said form and constructed of plates and bars removably fastened together and each provided on its inner face with a cut-away arch portion, for the purpose set forth.

5. A knock-down metal mold for concrete culverts, and the like, comprising in combination, an arch-form composed of a series of companion arch-bars, tie-plates removably securing the companion bars together at their ends in spaced relation, removable wedges interposed between the ends of said companion bars, arch-plates extending longitudinally of said bars and removably fastened thereto at their lateral edges, and hollow end-molds fitting against said form and constructed of plates and bars removably fastened together and each provided on its inner face with a cut-away arch portion, for the purpose set forth.

ANDREW J. FISHER.

In presence of—

C. F. SCOTT,

M. E. NELSON.