

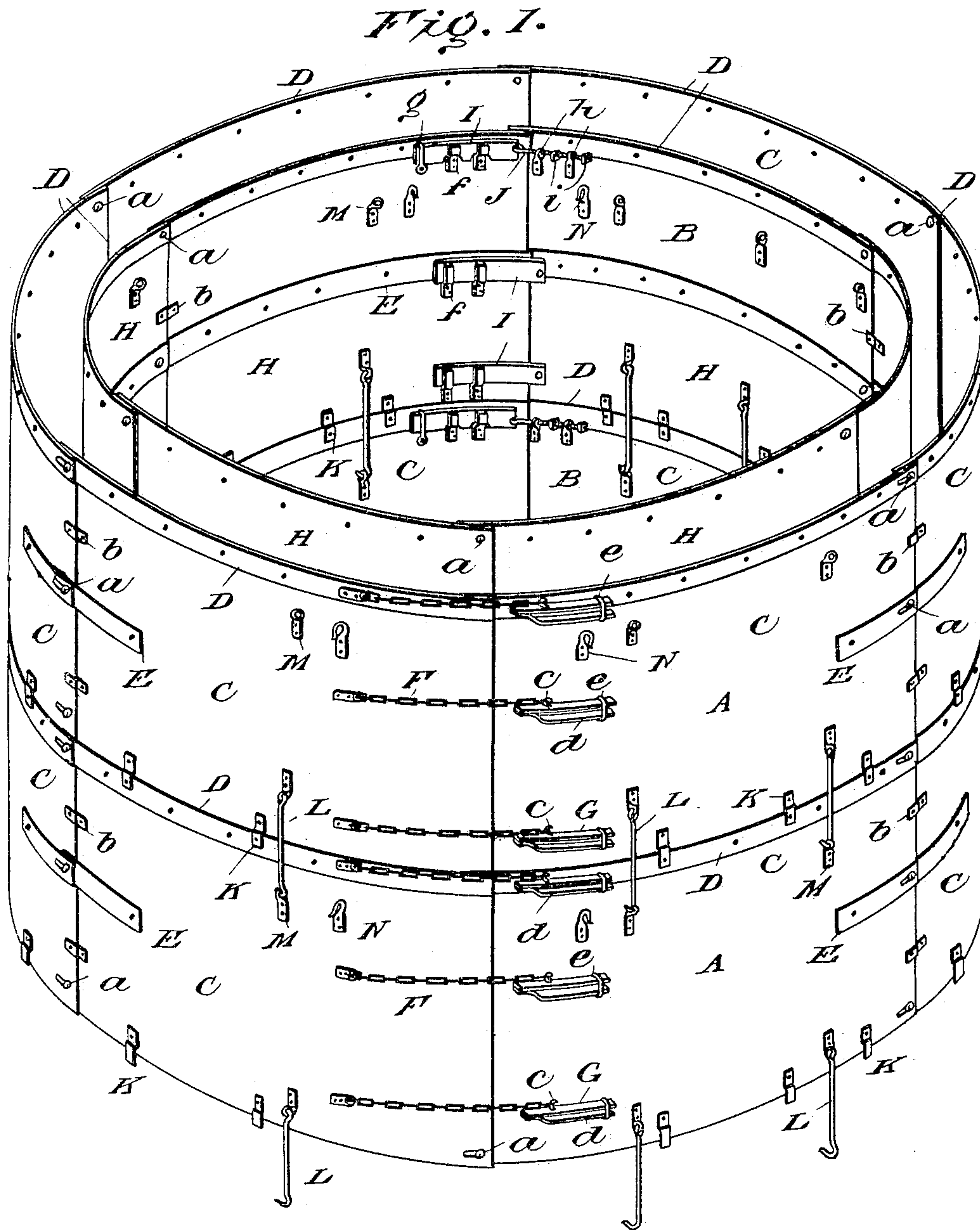
No. 793,194.

PATENTED JUNE 27, 1905.

A. E. HODGERT.  
APPARATUS FOR CONSTRUCTING CIRCULAR CONCRETE SILOS OR OTHER  
BUILDINGS.

APPLICATION FILED MAY 13, 1904

2 SHEETS—SHEET 1.



Witnesses

*James  
Stewart Rice.*

Archibald E. Hodgert <sup>Inventor</sup>

By *Ridout & Mayhew* <sup>Attorneys</sup>

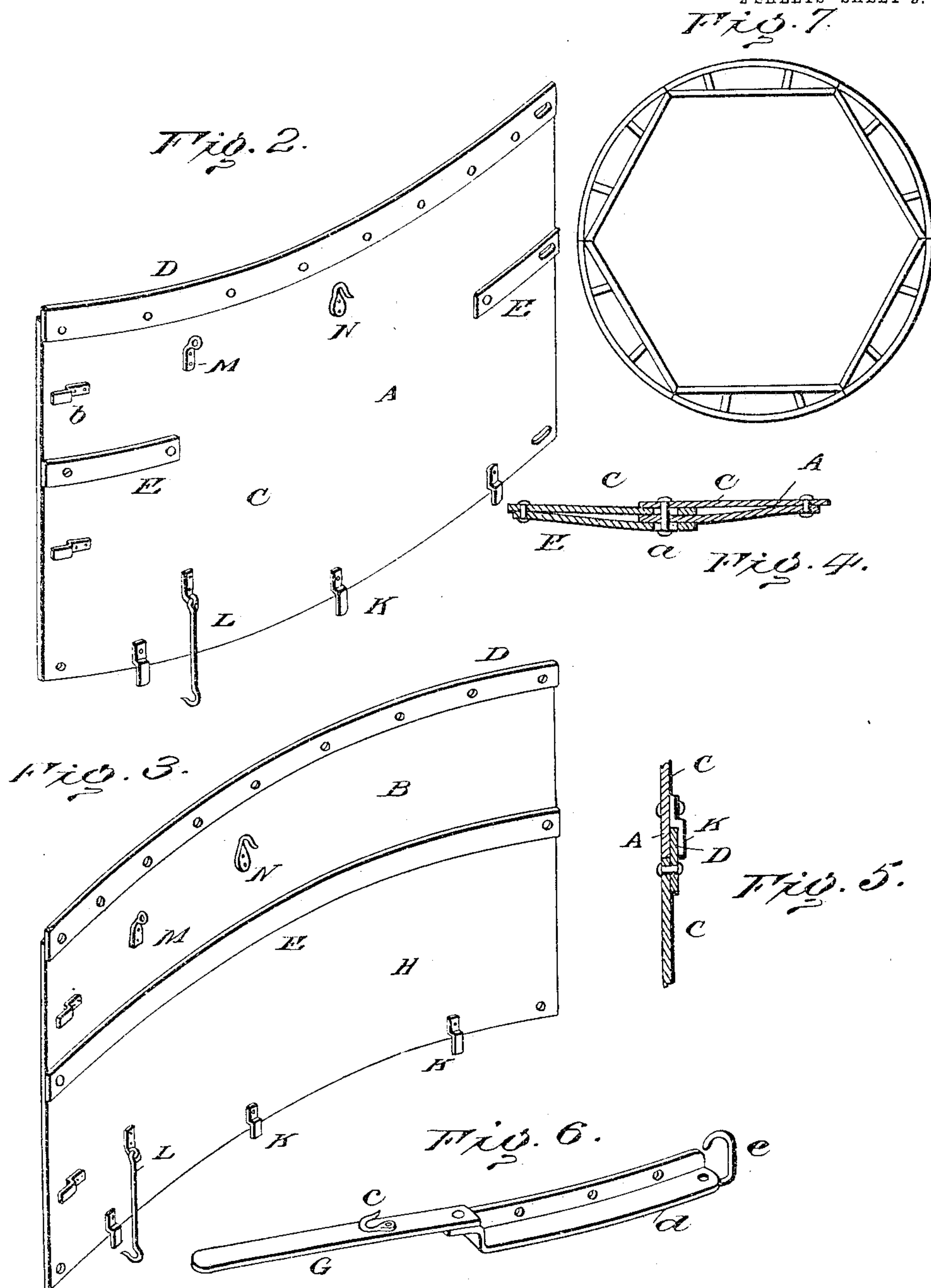
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2 SHEETS—SHEET 2.



Witnesses

*For Invention*  
*Stewart Rice.*

Inventor

*Archibald E. Hodgert.*

By

*Ridout & Mayhew.* Attorneys



# UNITED STATES PATENT OFFICE.

ARCHIBALD E. HODGERT, OF EXETER, CANADA.

APPARATUS FOR CONSTRUCTING CIRCULAR CONCRETE SILOS OR OTHER BUILDINGS.

SPECIFICATION forming part of Letters Patent No. 793,194, dated June 27, 1905.

Application filed May 13, 1904. Serial No. 207,855.

*To all whom it may concern:*

Be it known that I, ARCHIBALD E. HODGERT, of the village of Exeter, county of Huron, Province of Ontario, Canada, have invented certain new and useful Improvements in Apparatus for Constructing Circular Concrete Silos or other Buildings, of which the following is a specification.

The object of my invention is to devise means for molding circular concrete walls *in situ*; and it consists, essentially, of two bottomless annular molds, each mold being formed of two independent bands of thin metal, each band having its ends detachably connected to form a ring and the bands being so constructed that either mold may be set on top of and engaged with the other, substantially as hereinafter more specifically described and then definitely claimed.

Figure 1 is a perspective view of my improved apparatus in position for use. Fig. 2 is a perspective view of one of the sections of one of the outer bands. Fig. 3 is a similar view of one of the sections of one of the inner bands. Fig. 4 is an enlarged sectional view showing the connection between two of the sections of a band. Fig. 5 is a similar view showing how an upper and lower band are fitted together. Fig. 6 is a perspective detail of one of the levers used in connecting the ends of the outer bands. Fig. 7 is a plan view, on a small scale, of a wooden centering for the upper inner band of the mold.

In the drawings like letters of reference indicate corresponding parts in the different figures.

Referring particularly to Fig. 1, A A are circular bands having their ends connected together, as hereinafter described, to form closed rings. B B are similar bands of less circumference with their ends similarly connected to form rings. A band A, with one of the bands B, may thus be used to form an annular mold for use, as hereinafter described. Each band A comprises a series of sections C, detachably connected together, each section being connected to two adjacent sections with the exception of those at the ends of the band, which are connected as hereinafter described. It will be understood, of course, that the bands

A are identical in construction and that each section of each band is, with the exceptions pointed out or to be pointed out, precisely similar to the others. Each section C is provided at its upper edge with a steel strip D, riveted to its upper edge and projecting a short distance above the upper edge of the section. It is also provided near the center of each end with short steel strips E, riveted at their inner ends to the section, but free adjacent to the edges of the section.

When the sections are connected together, the edges, the strips D, and the strips E are interlocked, as shown in Fig. 4, and securely fastened together by bolts *a*. A similar bolt connects the lower corners of the sections together, as shown in Fig. 1. As indicated in Fig. 4, slots are provided for the bolts in one section and simply holes in the adjacent end of the next section. Thus the overlap of two adjacent sections at the top of a band A may be increased or decreased relative to the overlap at the bottom of the band, so that the circumference of the upper edge of a band may be made less than the circumference of the lower edge of the band, so that when the band is set up, as shown in Fig. 1, it forms a portion of the surface of a cone.

As the bands are preferably formed of about 16 gage sheet-steel, I find it desirable to provide clips *b*, fast to one end of each section and overlapping the end of the adjoining section, as shown in Fig. 1.

The ends of each band A are connected when required by means of one or more chains F, which are connected with eyes riveted to one end of the band. On the opposite end of the band I provide a similar number of levers G, each of which is pivoted on a bracket *d*, riveted to the end of the band. On each bracket is also pivoted a latch *e*, which may be swung to engage the lever, as shown in Fig. 1, or disengaged therefrom, as shown in Fig. 6.

When connecting the ends of a band, a link of each chain is hooked onto the hook *c* of its corresponding lever. The lever is then swung to the position shown in Fig. 1 and the latch engaged with it. Thus the chains are drawn upon to draw the ends of the bands together as desired.



Each inner band B is made up of sections H, connected together similarly to the sections C, with the exception that it is not necessary to provide the slots at the ends of the sections, as the inside of the wall of the silo is usually made vertical. As the pressure on the inner bands is from the outside inward, I prefer to extend the steel strips E from end to end of each section for stiffening purposes. I also employ a different method of connecting the ends of the band. As will be seen, one or more latches I are pivoted on one end of the band and are adapted to be swung into engagement with clips *f* on the other end of the band. The upper latch I is, however, notched, as shown, to engage one of the clips *f* and may be held in engagement with the clip by means of the pivoted latch *g*. The other end of the latch I is pivoted on the threaded spindle J, carried by two lugs *h*, suitably riveted to the band. Nuts *i* are secured on this spindle, one on each side of one of the lugs *h*. By means of these nuts the latch I may be drawn upon to expand or contract the band B to give it exactly the circumference required.

The mode of procedure in building a silo is as follows: The sections of one of the bands B are connected together and the ends of the band connected by the means just described. This band is preferably set up around a wooden centering of the exact cross-section of the silo. The sections of one of the bands A are then connected together and the ends of the band connected by the chains, as already described. This band is accurately spaced from the band B by any suitable means and adjusted to give the desired taper to the walls, as already described. The bands A and B thus form an annular mold, and the space between them is filled with cement, concrete, or any artificial stone material. As soon as this is done the second pair of bands A and B is set up with their lower edges fitting on top of the lower bands and within the strips D. It will be noticed that the lower edge of each band A is provided with a series of pivoted clips K. These are turned down over the strips D, and thus securely hold the sections one to another. The ends of the second pair of bands A B are of course connected in a similar manner to the first pair of bands. The bands are held together by means of the hooks L, which are pivoted, preferably, on lugs secured to the lower edges of each band. Each band is also provided near its upper edge with eyes M, with which these hooks may be engaged, as shown in Fig. 1. The space between the second pair of bands is then filled up with cement or concrete. By this time the concrete is sufficiently hard to permit of the lower pair of bands being removed. This is done by swinging up the clips K, detaching the hooks L, and disconnecting the ends of the bands. The lower bands are then readily lifted by means

of ropes passed around the hooks N, which are connected with the bands near their upper edges. The lower bands are then placed in position on top of the upper bands, and the process goes on till the proper height is reached. Owing to the taper in the walls it will be seen that the ends of the outer bands gradually overlap more and more, which is of course readily provided for by engaging the levers G with links of the chain F nearer to the points of attachment of the latter. Of course many changes might be made in the details of construction of these features without departing from the spirit of my invention.

The sectional construction of the bands is important, as silos of different diameters and different thicknesses may be produced by adding or taking out one or more sections. It is also important, as the apparatus is thus easily knocked down for transshipment and easily and quickly set up again. Such a centering is shown in Fig. 7 and is preferably made in six sections, as shown, which may be held within the band in any suitable manner.

What I claim as my invention is—

1. In apparatus of the class described the combination of a bottomless annular mold formed in two parts, each part being formed of two independent flexible bands, one of the bands being formed of sections overlapped and adjustably connected so that the lap at the upper edge of the ring may be made less or greater as desired means connected with the band whereby its lap may be adjusted to give its wall a vertical taper; and means whereby either edge of a band may be engaged with one edge of the corresponding band of the other part, so that either part may be set on top of and engaged with the other, substantially as described.

2. In apparatus of the class described the combination of a bottomless annular mold formed in two parts, each part being formed of two independent flexible bands, one of the bands being formed of sections overlapped and adjustably and detachably connected so that the lap at the upper edge of the ring may be made less or greater as desired means connected with the band whereby its lap may be adjusted to give its wall a vertical taper; and means whereby either edge of a band may be engaged with one edge of the corresponding band of the other part, so that either part may be set on top of and engaged with the other, substantially as described.

3. In apparatus of the class described the combination of a bottomless annular mold formed in two parts, each part being formed of two independent flexible bands, one of the bands being formed of sections overlapped and adjustably connected so that the lap at the upper edge of the ring may be made less or greater as desired means connected with the band whereby its lap may be adjusted to give its wall a vertical taper; means whereby either



edge of a band may be engaged with one edge of the corresponding band of the other part, so that either part may be set on top of and engaged with the other; and means for contracting and expanding each inner band after its ends have been connected, substantially as described.

4. In apparatus of the class described the combination of a bottomless annular mold formed in two parts, each part being formed of two independent flexible bands, each having its ends detachably connected to form a ring; a strip riveted to and projecting above the upper edge of each section of each ring; and a series of clips pivoted at the lower edge of each band whereby the lower edge of a band may be held in alinement with the upper edge of the band below it, substantially as described.

5. In apparatus of the class described the combination of a bottomless annular mold formed in two parts, each part being formed of two independent flexible bands, each having its ends detachably connected to form a ring; a strip riveted to and projecting above the upper edge of each section of each ring; a series of clips pivoted at the lower edge of each band whereby the lower edge of a band may be held in alinement with the upper edge of the band below it; a series of hooks pivoted near the lower edge of each band; and a series of eyes near the upper edge of each band, substantially as described.

6. In apparatus of the class described the combination of two bottomless annular molds, each mold being formed of two independent flexible bands; a plurality of chains connected to one end of each band; levers pivoted on the other end opposite the said chains; hooks on said levers adapted to engage the links of the chains; latches adapted to lock the levers; and means whereby either edge of a band may be engaged with one edge of the corresponding band of the other part, so that either part may be set on top of and engaged with the other, substantially as described.

7. In apparatus of the class described the combination of two bottomless annular molds, each mold being formed of two independent flexible bands; means for detachably connecting the ends of the outer bands; latches pivoted near one end of each inner band; clips secured near the other end of each inner band and adapted to receive the latches; means for longitudinally adjusting one of the latches, the said latch being notched to engage one of the clips; and means whereby either edge of a band may be engaged with one edge of the corresponding band of the other part, so that either part may be set on top of and engaged with the other, substantially as described.

Toronto, May 6, 1904.

ARCHIBALD E. HODGERT.

In presence of—

JOHN G. RIDOUT,

J. EDW. MAYBEE.