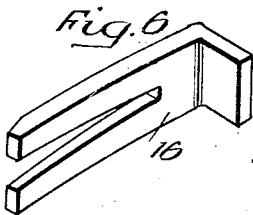
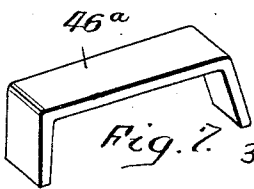
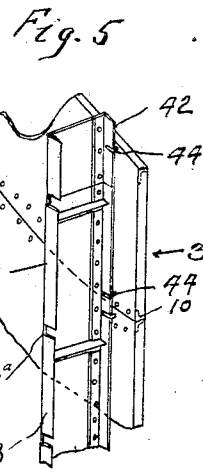
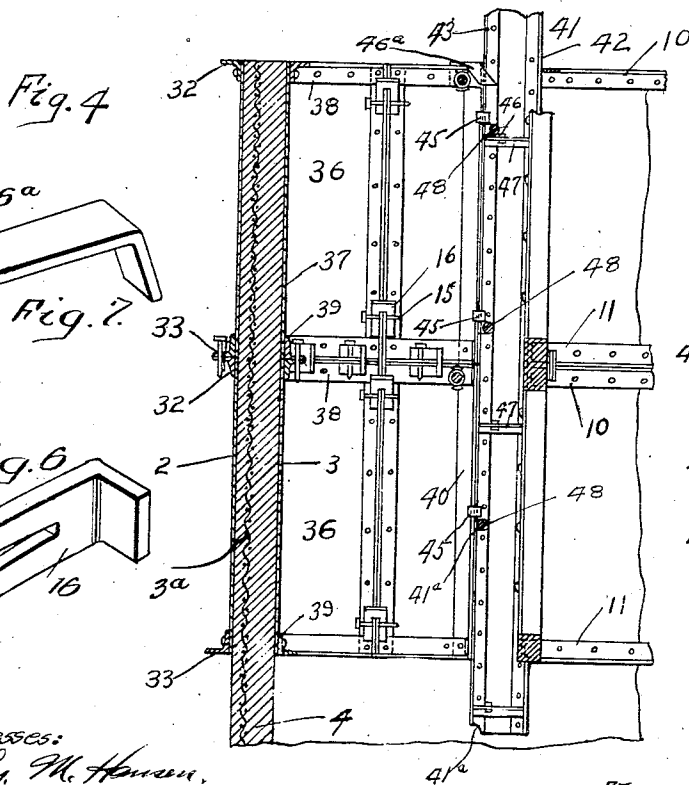
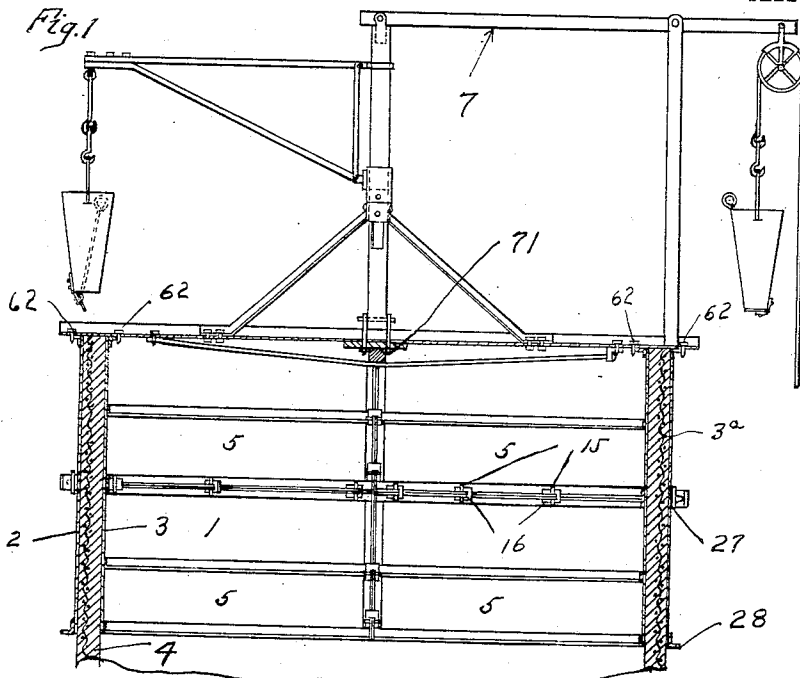


A. J. STOESER.
MOLD FOR FORMING SILOS OF CONCRETE AND THE LIKE.
APPLICATION FILED FEB. 8, 1913.

1,122,329.

Patented Dec. 29, 1914.

2 SHEETS—SHEET 1.



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John M. Hansen.
Arthur W. Nelson.

Inventor:
Alexander J. Stoesser.
[Signature]

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2 SHEETS—SHEET 2.

Fig. 2

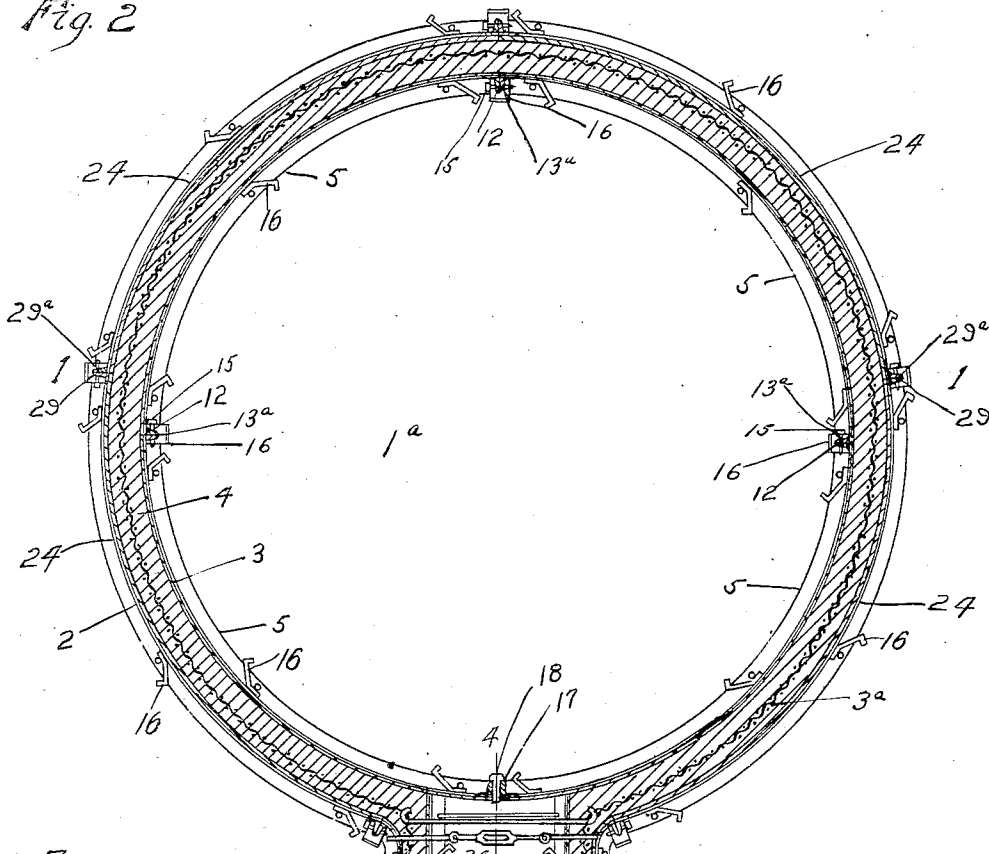
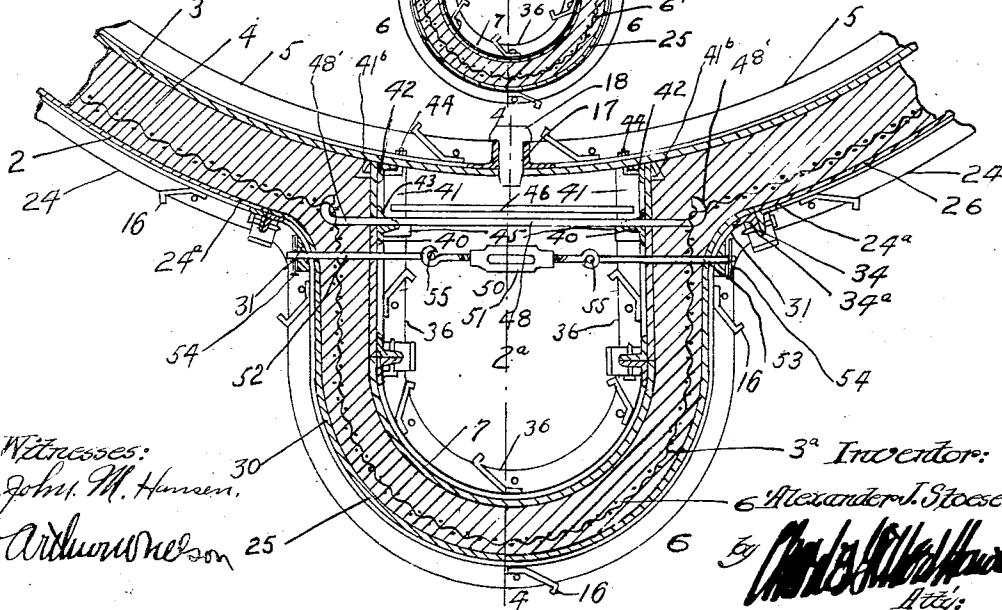


Fig. 3



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by *Charles H. [Signature]*
Att'y:

UNITED STATES PATENT OFFICE.

ALEXANDER J. STOESER, OF CHICAGO, ILLINOIS.

MOLD FOR FORMING SILOS OF CONCRETE AND THE LIKE.

1,122,329.

Specification of Letters Patent.

Patented Dec. 29, 1914.

Original application filed December 22, 1911, Serial No. 867,345. Divided and this application filed February 8, 1913. Serial No. 747,987.

To all whom it may concern:

Be it known that I, ALEXANDER J. STOESER, a citizen of the United States, and a resident of Chicago, Cook county, Illinois, have invented certain new and useful Improvements in Molds for Forming Silos of Concrete and the like, of which the following is a specification.

The general object of my invention is to provide a mold for erecting concrete silos with less labor and at lower cost than is possible with molds hitherto devised, and a further object is to provide a mold where-with the body portion of the silo and the chute can be simultaneously made to form a continuous wall of substantially uniform strength.

This application is a division of my pending application Serial No. 667,345, filed December 22nd, 1911, entitled "Apparatus for erecting concrete structures."

My invention consists generally in a mold for concrete silos comprising a substantially cylindrical outer wall having a relatively small substantially U-shaped protruding portion, a cylindrical inner wall spaced from the outer wall and a supplemental inner wall arranged within the protruding portion of the outer wall and forming a chute mold space continuous with the mold space of the main wall.

My invention consists further in a mold for erecting concrete silos, comprising a plural section cylindrical inner wall and a plural section substantially cylindrical outer wall spaced therefrom, one portion of the outer wall having a substantially U-shaped protruding portion and supplemental inner wall arranged within the protruding portion of the outer wall spaced therefrom and forming a substantially U-shaped mold cavity continuous with the mold cavity formed by the inner wall and the cylindrical portion of the outer wall.

My invention also consists in a mold for making concrete silos comprising a cylindrical inner wall composed of upper and lower forms each consisting of a plurality of sections removably secured together, an outer wall, the major portion of which is cylindrical in form, spaced from the inner wall and a minor substantially U-shaped protruding portion detachably connected to the major portion, a plural section U-shaped supplemental inner wall arranged within the pro-

truding portion of the outer wall, the free ends thereof abutting the inner wall and the supplemental inner wall forming, with the protruding portion of the outer wall, a chute mold space continuous with the mold space of the main wall.

My invention consists further in molds for erecting concrete structures wherewith the objects named above and several other objects which will hereinafter appear are attainable.

My invention will be more readily understood by reference to the accompanying drawings which illustrate the preferred embodiment thereof and in which—

Figure 1 is a central vertical section showing two sets of mold forms arranged in operative position with concrete elevating and distributing mechanism mounted thereon. Fig. 2 is a transverse sectional view of the mold forms. Fig. 3 is an enlarged transverse section of the chute portion of the mold; Fig. 4 is a vertical section on the line 4-4 of Fig. 3; Fig. 5 is a perspective view of the ladder member showing its relation to the main wall of the mold. Fig. 6 is a perspective view of one of the clamps or straddle members for holding the segments of the form together; and Fig. 7 is a perspective view of one of the U-shaped clamps for straddling the outer and inner walls of the mold.

A silo which is circular in cross section is better adapted to the proper preservation of silage than a square or rectangular one. The reason for this is that silage can be more tightly packed in a circular silo than in a square one, with the result that there is less danger of air passages to cause fermentation of the silage. The silage should be removed in layers of two or three inches per day and in order that this may be conveniently done a vertical slot, preferably the entire height of the structure is formed at one place in the circumference and at this place a chute is provided through which the silage can be thrown to the ground, and through which a person can climb to the top of the silage. With apparatus hitherto devised it has been difficult if not impractical to build a chute simultaneously with the main body of the structure and hence in erecting concrete silos, the body portion has usually been erected first, and then a chute of wood or other material added later. This is not

only a laborious and expensive mode of construction, but also results in a structure which is liable to crack at the juncture of the chute with the body portion.

5 I shall now describe my mold with which the silo body portion and chute can be constructed simultaneously in an easy and inexpensive manner and thereby producing a structure which will not crack at the juncture of the body chute portions and one 10 which is substantially air tight. I usually provide two complete forms which are alternately placed one upon the other for forming successive courses of wall. As these 15 are identical in construction, a description of one will serve for both. For the sake of ease in description, I shall refer to the forms shown as upper and lower forms. The lower form 1 comprises an outer wall 2 and 20 an inner wall 3. These are spaced apart to form a mold cavity for receiving the concrete forming the concrete wall 4. The inner wall 3 is cylindrical and comprises a plurality of segments 5 which are detach- 25 ably connected in a manner to be described in detail hereinafter. The outer wall 2 is cylindrical throughout substantially all of its extent, but at one portion protrudes in manner to form a substantially U-shaped 30 portion 6. The portion 6 in conjunction with a supplemental wall 7 serves to provide a cavity for forming a chute portion 6' of the silo.

The segments 5 of the inner wall 3 consist of sheet metal braced above and below 35 by angle irons 10 and 11 respectively and at each end by vertical angle irons 12. The segments 5 are suitably alined by pins 15 passing through the flanges 13^a. Clamps 16 which straddle the adjacent flanges serve to hold the forms rigidly but removably 40 together. Two of the segments 5 are slightly spaced apart at 17 by wedge blocks 18 which may be knocked out to permit 45 contraction of the inner wall and thereby enable easy removal of the various segments. The outer wall 2 comprises a plurality of segments 24 constituting the main or body portion of the wall and the member 25 constituting the chute portion. The segments 24 are similar in construction to the segments 5 of the inner wall comprising a sheet member 26 braced above and 50 below by angle irons 27 and 28 respectively and at the ends by vertical angles 29. The flanges 29^a of the angles 29 are provided with registering holes through which pins 15 pass to aline the segments. Clamps 16 55 straddle the adjacent flanges 29^a and serve to hold the segments removably together in the same manner as the segments of the inner wall. The chute member 6 comprises a substantially U-shaped sheet 30, and I curve the free ends 31 outwardly to meet 60 the ends 24^a of the main outer wall. The

sheet 30 is braced at the top and bottom by angle irons 32 and 33 respectively and at the ends by vertical angle irons 34. The flanges 34^a of the vertical angles 34 have 70 holes to register with the holes in the flanges 29^a of the main outer wall and through these alined holes pins 15 are passed. Clamps 16 serve removably to hold the chute member 6 to the outer wall. While 75 I have shown the outer wall of the chute mold as consisting of but one member, it may be made of several members if desired, but by giving a slight taper to the side walls thereof, I am able with a single member to form the wall and easily remove the mold 80 therefrom. By curving the ends of the outer wall to meet the main wall a gentle sweep is formed in the concrete wall which is proof against cracking.

The inner wall 7 of the chute form comprises a plurality of segments 36, each of 85 which consists of a sheet 37 strengthened at the top and bottom by angle irons 38 and 39 respectively and at the ends by vertical angles 40, the adjacent flanges of which 90 are provided with registering holes and the members are removably attached by pins 15 and clamps or wedges 16. The members 36 are spaced a short distance from the inner wall 3 and the space there- 95 between is occupied by wall members 41 which are not properly part of either the upper or lower form, but which act in conjunction with both to complete the form. The wall members 41 are braced by vertical 100 angles 42 and 43, the angles 42 contacting the inner wall 3 of the main form and the angles 43 contacting and alining with the angles 40 of the adjacent segment 36. L 105 bolts 44 passing through the walls and engaging the angles 42 serve to hold one edge of the member 41 in position. The other edge is properly held in position by a plurality of U clips 45 which are riveted at 110 the angle 43 and which straddle the flanges of the adjacent angle irons 40. The members 41 are further strengthened against collapse by spacing bars 46 which have 115 turned down end portions for engaging the flanges 47 of the members 41. In some instances, I further brace the members 41 by means of U clips 46^a, (see Fig. 4).

In order that the silage can be easily gotten at it is necessary to have a ladder in the chute and for this purpose I arrange 120 cross rods 48 properly spaced which have their ends 48' embedded in the concrete as is well shown in Figs. 2 and 3. The members 41 are cut away at 41^a to accommodate the ladder rods 48. When the silo is 125 filled it is necessary to close the continuous opening or passage between the main silo space 1^a and the chute space 2^a. This is done by placing a plurality of door sections across the passage between the two spaces 130

To hold the door sections against the pressure of the silage and to provide vertically sliding ways for the door, I provide the members 41 with projecting portions 41^b which form substantially V-shaped recesses in the inner sides of the chute walls. These recesses accommodate the ends of the door sections (not shown) and permit vertical movement thereof for the purpose of providing opening of limited size at different heights through which the silage can be thrown. The plastic concrete exerts great pressure upon the mold walls, and to prevent the ends of the U from moving outwardly I provide temporary braces. The braces consist of turn buckles 50 which comprise a turn buckle portion 51 and end links 52 and 53 which extend through the outer wall 6. Through the ends of the links 52 and 53 I place stop pins 54. As it is necessary to remove the turn buckle braces after the formation of the wall both to permit removal of the outer chute wall and to provide an uninterrupted chute passage, I provide hook eye connections 55 between the turn buckle parts, one being formed to permit entire separation thereby enabling the turn buckle portion to be swung at right angles to the other end 53, so that the portion in the wall can be removed in the limited chute space. It should be noted that the mold for making the main wall and that for making the chute portion are rigid and virtually constitute a single wall. In conjunction with the main inner wall and the supplemental inner wall a continuous passage is provided whereby an integral main wall and chute can be made. Further to tie the chute and main walls together I pass reinforcing material 3^a from the main wall around the chute wall and back.

The upper form is vertically alined with and placed upon the lower form and is provided with holes which register with holes in the adjacent angle irons of the lower form. Pins 15 are passed through these registering holes and serve to aline the upper and lower forms. By means of clamps or wedges 16, the upper and lower forms are removably but rigidly attached. The means for connecting the upper and lower forms is therefore the same as that for securing the various segments of the outer and inner walls together.

I have shown concrete elevating and distributing mechanism 7 mounted upon the upper form, but as this is the subject matter of my pending application mentioned above, I shall not describe the same in detail. I will state, however, that the web or base 71 of the apparatus serves to hold the outer and inner walls of the mold in proper spaced relations. This is accomplished by means of limit pins or bolts 62 spaced apart the desired distance, which extend through

the base of the apparatus and engage the outer and inner walls of the form. These pins serve to hold the walls against the pressure of the concrete, and by varying the distance between the pins or bolts 62 and providing properly sized mold walls a mold space of any desired size can be secured.

The use of my apparatus is substantially as follows: The material is raised by means of the concrete elevating and distributing mechanism and deposited in the forms until they are both filled as shown in Fig. 1. I aim to make the upper and lower forms of such height that when placed together they form a mold cavity of such depth that as many men as can conveniently and economically walk upon the structure can fill the same in a day. Hence after filling the mold one day the concrete will have set sufficient by the next day to permit removal of the mold walls. I proceed first to remove the segments of the lower inner wall form and place them upon the inner wall of the upper form, there suitably securing them by means of the pins and wedges. The various sections of the outer wall are then taken from below, placed upon the upper outer wall, and there suitably secured. The various sections of the supplemental inner wall are also taken from below placed above and connected to the inner wall. In this manner a new mold cavity of one form height is formed which is filled with concrete and then, the now lower form, may be removed and placed upon the mold containing the green concrete. In this manner two courses of wall can be formed in a day. Of course, if found convenient three or more complete forms may be provided whereby any desired number of courses can be built in a day without interruption. My mold is simple in construction and can be used by one who is not especially skilled in the art. The forms are self-supporting, that is they do not need support from the ground or from rods or pipes embedded in the wall.

The objects outlined above are attainable by the apparatus here described, but because this disclosure will suggest to others apparatus of different modified forms whereby the objects can be substantially attained, I do not care to limit myself to the specific structure herein shown and described.

I claim:

1. In molds for forming silos of concrete and the like, the combination, an inner wall, an outer wall, a substantially semi-circular protrusion on the outer wall, and a supplemental inner wall, acting in conjunction with said protrusion to form a chute mold, said inner wall bridging the space spanned by the supplemental inner wall, substantially as described.

2. In molds for forming silos of concrete and the like, the combination of segmental,

- outer and inner walls, spaced apart to form a mold cavity, a protruding portion on the outer wall, a supplemental inner wall arranged within the protruding portion of the outer wall forming a chute mold cavity, continuous with the main mold cavity, said inner wall bridging the space spanned by the supplemental inner wall, substantially as described.
3. In molds for forming silos of concrete and the like, the combination of an inner and an outer wall, each comprising a plurality of segments removably secured together, a protruding segment of the main outer wall forming therewith a continuous outer wall, a supplemental inner wall arranged within said protruding segment, said inner wall bridging the space spanned by the supplemental inner wall, as and for the purpose specified.
4. In molds for forming silos of concrete and the like, the combination of outer and inner walls, each comprising a plurality of segments removably secured together, a protruding portion on the outer wall removably attached thereto, a supplemental inner wall arranged within said protruding portion and comprising a plurality of members removably secured together, the extreme members thereof being removably secured to the inner wall of the main form, substantially as described.
5. In molds for forming silos of concrete and the like, a circular inner wall comprising a plurality of segments removably secured together, a substantially circular outer wall spaced therefrom, in combination with a substantially U-shaped protruding portion on the outer wall, a supplemental inner wall spaced within said protruding portion and comprising a plurality of segments removably secured together and ending a short distance from the inner wall of the main form, members arranged between the inner wall and the ends of said supplemental wall, means removably securing same to the inner wall, and means removably securing same to the end members of the supplemental wall, substantially as described.
6. In molds for forming silos of concrete and the like, the combination of outer and inner walls, each comprising a plurality of segments removably secured together, a protruding portion on the outer wall removably attached thereto, a supplemental inner wall arranged within said protruding portion and comprising a plurality of members removably secured together, the extreme members thereof being removably secured to the inner wall of the main form, the inner wall bridging the space spanned by the supplemental inner wall, and V-shaped members on the supplemental inner wall projecting into the mold recess for forming dovetail grooves in the finished wall.
7. In molds for forming silos of concrete and the like, a multiple segment outer wall and a multiple segment inner wall, a protruding portion on the outer wall removably attached thereto, a supplemental inner wall arranged within said protruding portion to form a suitable mold cavity continuous with the main mold cavity formed by the outer and inner walls, in combination with means holding the outer and inner walls in any desired spaced relation and means holding the supplemental inner wall in desired spaced relation to the protruding portion of the main outer wall.
8. In molds for forming silos of concrete and the like, an inner mold wall, an outer mold spaced therefrom to form a mold cavity, said outer wall having a protruding portion, a supplemental inner wall arranged within said protruding portion and spaced therefrom to form a mold cavity communicating with the main mold cavity, a turn buckle brace extending through the protruding portion of the outer wall and the supplemental inner wall for tying opposite sides of the protruding portion of the outer wall together, said brace being easily collapsible for purpose of removal after formation of the wall.
9. A mold for forming silos of concrete and the like, comprising a cylindrical inner wall composed of upper and lower forms, each consisting of a plurality of sections removably secured together, an outer wall composed of upper and lower forms, each consisting of a plurality of sections detachably connected, the major portion of the outer wall being cylindrical in form and spaced from the inner wall, a minor substantially U-shaped protruding portion on the outer wall detachably connected to the cylindrical part of the outer wall, a U-shaped supplemental inner wall arranged within the protruding portion of the outer wall, and abutting the inner wall and the inner wall bridging the space spanned thereby as and for the purpose specified.
10. A mold for forming silos of concrete and the like, comprising a cylindrical inner wall composed of upper and lower forms, each consisting of a plurality of sections removably secured together, an outer wall composed of upper and lower forms, each consisting of a plurality of sections detachably connected, the major portion of the outer wall being cylindrical in form and spaced from the inner wall, a minor substantially U-shaped protruding portion on the outer wall detachably connected to the cylindrical part of the outer wall, and a U-shaped supplemental inner wall arranged within the protruding portion of the outer wall, the free ends thereon abutting the inner wall and the supplemental inner wall forming with the protruding portion of the

outer wall a chute mold space continuous with the mold space of the main wall.

11. In a mold for forming silos of concrete and the like, the combination of a plural section cylindrical inner wall, a plural section outer wall cylindrical in form throughout substantially all its extent, a substantially U-shaped member detachably connected at the free ends of the U to the cylindrical portion of the outer wall, a plural section substantially U-shaped supplemental inner wall arranged within the protruding portion of the outer wall, means detachably securing the segments of the supplemental inner wall together, and means detachably securing the free ends of the supplemental inner wall to the main inner wall.

12. In a mold for forming silos for concrete and the like, a plural section outer wall substantially cylindrical in form, a U-shaped member detachably secured to the outer wall and connecting the ends of the cylindrical portion of the outer wall, a plural section inner wall concentrically arranged within the cylindrical portion of the outer wall, two of the adjacent segments of the inner wall between the ends of the cylindrical part of the outer wall being brought close together, wedges between the ends of the inner wall and adapted for easy removal to permit the collapse of the inner wall, and a supplemental U-shaped inner wall having its free ends detachably secured to the inner wall substantially equally distant from the center of said space, and the supplemental inner wall extending into the protruding portion of the outer wall, as and for the purpose specified.

13. In a mold for forming silos of concrete and the like, a plural section inner wall, means detachably securing the sections together, and means holding two continuous sections slightly apart, a plural section outer wall cylindrical throughout substantially its whole extent and cylindrically spaced from the inner wall, a substantially U-shaped member provided with outwardly flaring free ends curved to meet the ends of the cylindrical portions of the outer wall, means detachably securing the U-shaped member to the outer wall, and a supplemental inner wall arranged within the U-shaped member and extending into engagement with the inner wall, at points spaced from the slightly separated section ends as and for the purpose specified.

14. In molds for forming silos of concrete and the like, an inner mold wall, an outer mold spaced therefrom to form a mold cavity, said outer wall having a protruding portion, a supplemental inner wall arranged within said protruding portion and spaced therefrom to form a mold cavity communicating with the main mold cavity, means extending through the protruding portion of the outer wall and the supplemental inner wall for temporarily tying the opposite sides thereof together, said means being formed for easy removability after the formation of the concrete wall.

In testimony whereof, I have hereunto set my hand, this 25th day of January, 1913, in the presence of two subscribing witnesses.

ALEXANDER J. STOESER.

Witnesses:

ARTHUR W. NELSON,
M. SIMON.