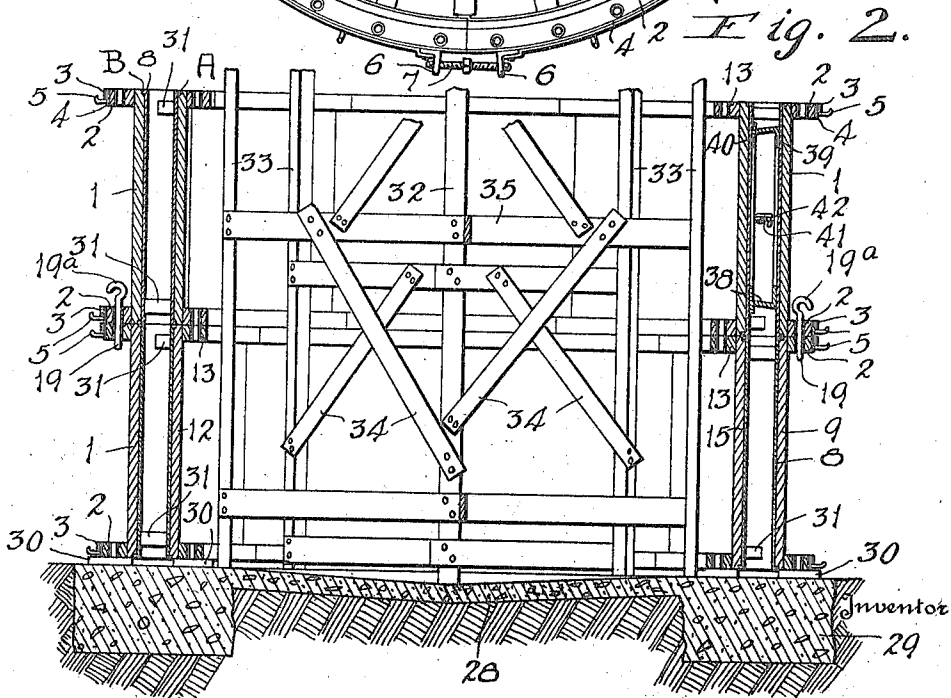
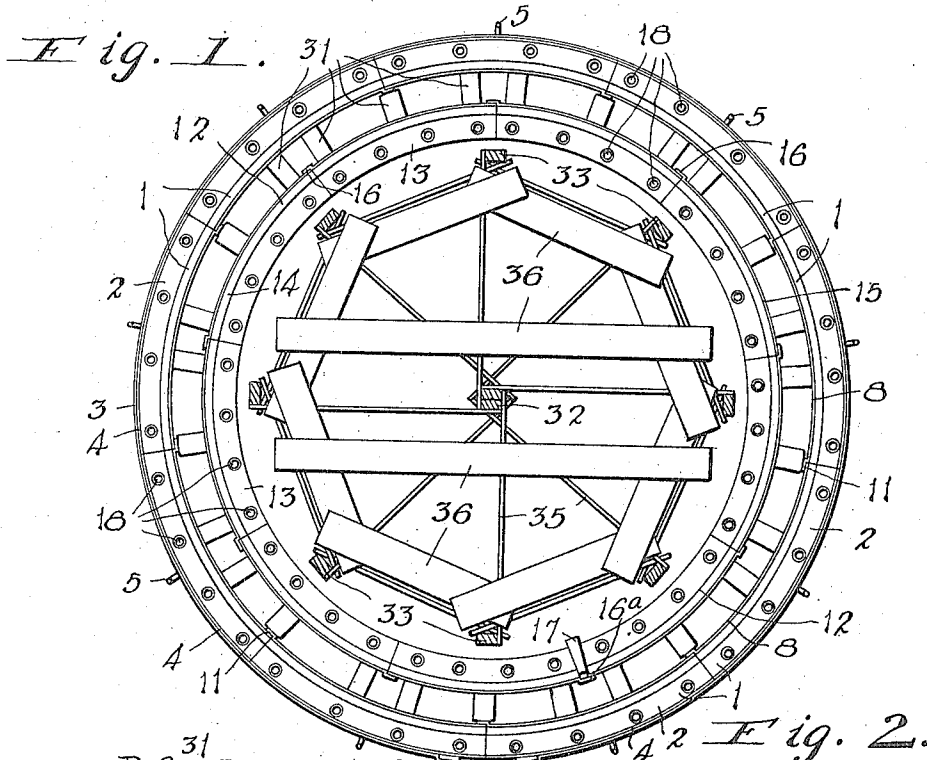


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 FORM FOR CONSTRUCTING CONCRETE SILOS.
 APPLICATION FILED DEC. 20, 1916.

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2 SHEETS—SHEET 1.



By

J. T. GANDY—

H. S. KEE

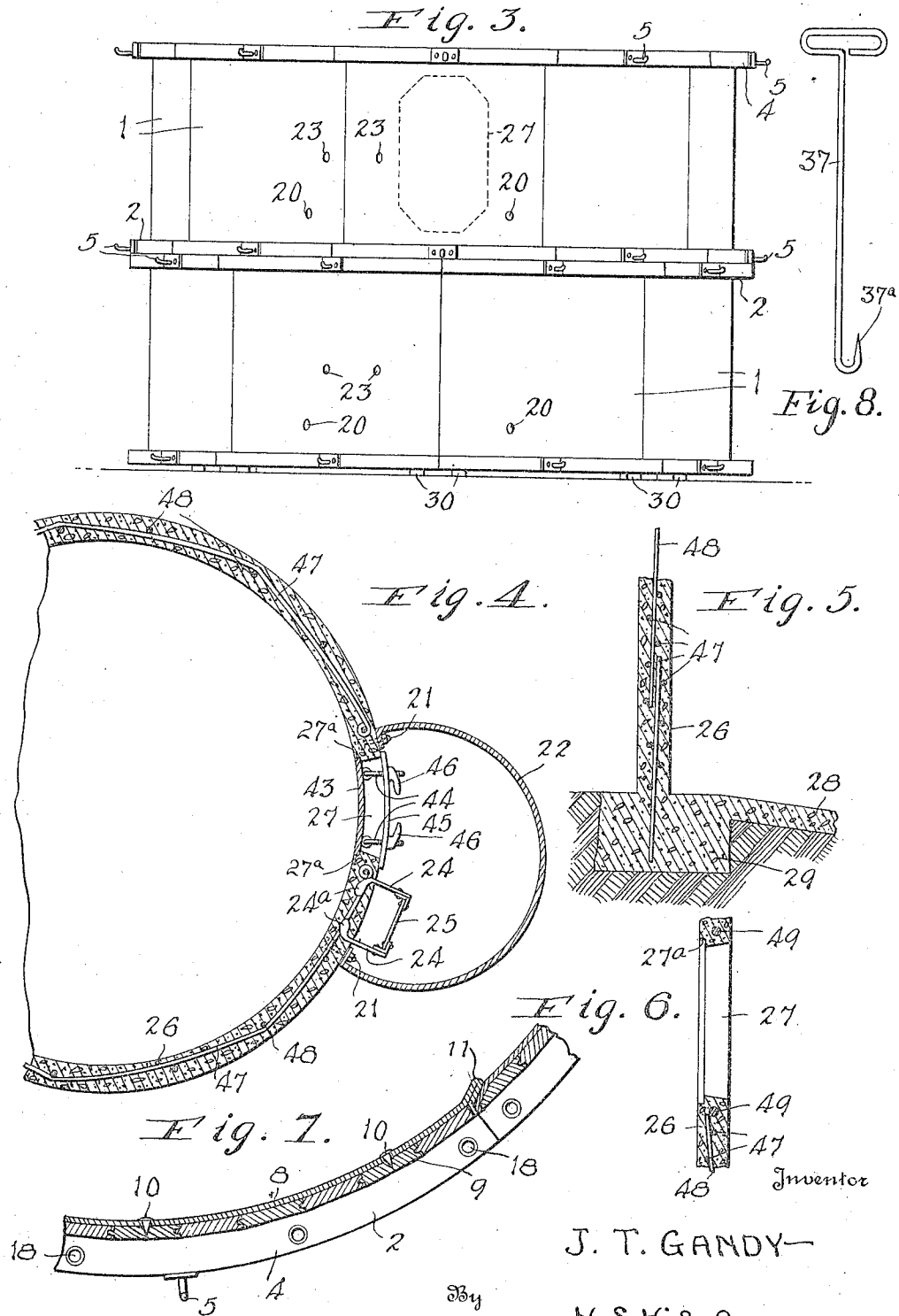
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2 SHEETS—SHEET 2.



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FORM FOR CONSTRUCTING CONCRETE SILOS.

1,237,774.

Specification of Letters Patent. Patented Aug. 21, 1917.

Application filed December 20, 1916. Serial No. 133,005.

To all whom it may concern:

Be it known that I, JOHN T. GANDY, a citizen of the United States, residing at Maplesville, in the county of Chilton, State of Alabama, have invented a new and useful Form for Constructing Concrete Silos; and I do hereby 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.

The present invention relates to a form for constructing concrete silos, and has for its object to provide a device of this character which embodies novel features of construction whereby a concrete silo can be quickly and inexpensively constructed without the use of skilled labor.

Further objects of the invention are to provide a form for making concrete silos which is comparatively simple and inexpensive in its construction, which can be handled with comparative ease, which forms the silo walls in one reinforced monolithic structure, and which will give the same results as the heavy and cumbersome solid metal forms.

With these and other objects in view, the invention consists in certain novel combinations and arrangements of the parts as will more fully appear as the description proceeds, the novel features thereof being pointed out in the appended claims.

For a full understanding of the invention, reference is to be had to the following description and accompanying drawings, in which:—

Figure 1 is a top plan view of a form for building silos, said form being constructed in accordance with the invention and a suitable arrangement of scaffolding being shown within the silo.

Fig. 2 is a vertical sectional view through the same.

Fig. 3 is a side elevation thereof.

Fig. 4 is a transverse sectional view through a portion of a silo which has been constructed by the use of the forms.

Fig. 5 is a vertical sectional view through one side of the base of the silo.

Fig. 6 is a similar view, showing one of the door openings.

Fig. 7 is a horizontal sectional view through a portion of one of the segmental elements of the form.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

In carrying out the invention a pair of similar and interchangeable annular molds are provided, said molds being designed to be superposed upon each other, and each including an inner wall A and a spaced outer wall B. The outer wall B of each circular mold is formed of a series of interchangeable segmental sections 1, said sections being provided at the upper and lower edges thereof with outstanding reinforcing flanges 2 which are adapted to be engaged by clamping bands 3 to draw the segmental sections together and hold them rigidly in operative position. These outstanding flange members 2 are preferably formed of wood, and metal seats 4 are applied at intervals to the ends thereof to provide bearings for the bands 3, said seats having outstanding arms or hooks 5 at the lower ends thereof for the support of the bands 3 before the latter are tightened. The extremities of each band 3 are shown as provided with angular heads 6 which are respectively engaged by the right and left hand threaded ends of a clamping bolt 7. With this construction it will be obvious that after the clamping bolt has been placed in position the ends of the band 3 can be forcibly drawn together and the several segmental sections 1 forming the outer wall B of the circular mold element thereby held securely in proper position. The inner face of each of the sections 1 is provided with a sheet metal lining 8, said lining being secured to a wood backing 9 which may be conveniently formed of vertically disposed tongue and groove strips connecting the reinforcing flanges 2, as indicated quite clearly by Fig. 7. Any suitable fastening means such as the nails 10 may be employed for securing the lining 8 to the wooden backing 9, and at one side of each of the segmental sections the sheet metal lining 8 terminates in a tongue or extension 11 which is adapted to overlap the sheet metal lining of the next adjacent segmental section when the sections are assembled, thereby covering up any possible space between the abutting ends of the segmental sections and enabling a perfectly smooth concrete wall to be formed.

The inner wall A of each circular mold element is likewise formed of a series of

similar and interchangeable segmental sections 12, each of the sections including an upper and lower inwardly extending reinforcing flange 13, said flanges being connected by the wooden backing or sheathing 14 to which the sheet metal lining 15 is applied. As in the previous instance, the sheet metal lining of each of the segmental sections is provided at one end thereof with an extension or tongue 16 which is adapted to overlap the lining of the next adjacent segmental section to cover up or bridge over any space which might otherwise exist between the abutting ends of the segmental sections when they are assembled in operative position. The extension 16^a of one of the segmental sections is somewhat longer than the other extensions, in order to bridge over a wider space or gap between the segmental mold sections. After the segmental sections 12 have been properly positioned, a wooden wedge element 17 is designed to be driven between these two segmental sections for the purpose of forcing them apart and holding the segmental sections securely in operative position.

The flanges 2 of the segmental sections 1 of the outer wall and also the flanges 13 of the segmental sections 12 of the inner wall are provided with openings 18 adapted to receive positioning pins 19, said pins being shown as provided with hooked finger pieces 19^a. Reinforcing sleeves 18^a may be fitted within the openings 18. In constructing a silo two of these split circular mold elements are employed each mold element including a sectional outer wall and a sectional inner wall. These mold elements are superposed upon each other with the vertical joints broken and in a staggered relation to each other, the upper flanges of the lower mold element and the lower flanges of the upper mold element being fastened together by inserting the positioning pins 19 in the openings 18, thereby holding the faces of the mold elements accurately in alignment with each other. As the walls of the silo increase in height, the then lowermost annular mold element is removed section by section and placed upon the upper mold element. In this manner the walls of the silo are molded zone by zone until the desired height is reached. Certain of the outer segmental sections 1 are provided with openings 20 to receive the bolts 21 which are left with the threaded ends thereof projecting from the walls of the silo for the purpose of enabling the chute 22 to be subsequently placed in position without difficulty. Openings 23 are also provided for the bolts 24 upon which the ladder 25 is mounted, the inner ends of the bolts being preferably bent angularly at 24^a so as to obtain a firm bearing upon the concrete. This ladder 25 extends the full height of the silo, the walls

of which are indicated at 26, and is arranged at one side of the door openings 27. The ladder may be of any conventional construction, and the chute 23 may also be formed of any suitable material, said chute being arranged to span the door openings 27 and the ladder 25, and the edges thereof being secured to the silo walls 26 by means of the bolts 21.

In erecting a silo with the present mold, a suitable excavation is made and the concrete floor 28 and annular foundation 29 placed in position, the floor 28 preferably sloping toward the center of the silo, and the foundation 29 being of a suitable width and depth to provide the necessary footing for the walls of the silo which it is intended to erect. One of the circular mold elements is next assembled upon the foundation 29, being preferably permitted to rest upon small blocks or strips 30 which can be withdrawn preparatory to removing the mold element, section by section, after the first zone of the wall has been completed. The second annular mold element is superposed upon the first annular mold element, as indicated by Fig. 2, the outer walls B and inner walls A of the mold elements being held the proper distance apart by spacing strips 31 which are inserted in position between the same and removed as the filling in of the molds progresses. It will be understood that plastic concrete of the proper mixture and consistency is filled in the space between the outer and inner walls of the mold sections, said concrete being preferably lightly tamped in order to force it tightly against the sides of the mold. Owing to the fact that the faces of the mold elements are lined with sheet metal, the concrete wall will have a smooth surface and present a finished and workman-like appearance. When the uppermost mold section has been filled with concrete and the concrete within the lowermost mold section has set sufficiently, the positioning pins 19 are withdrawn, the bands 3 and wedges 17 of the lower mold section removed, and the said lower mold element taken out of position section by section. The faces of all of the sections are then properly cleansed and assembled in position upon the previously upper mold element. The segmental sections containing the bolt openings 20 and 23 are first placed in position in order that the vertical rows of bolts 21 and 24 may be in accurate alignment, and after the segmental sections have all been assembled the clamping bands 3 and wedge blocks 17 are placed in position, and the positioning pins 19 inserted through corresponding openings of the flanges.

For convenience in handling the segmental sections of the annular mold elements, a scaffolding is erected at the center of the silo. This scaffolding is shown as including

a central upright 32 and an annular series of uprights 33, said uprights being connected by the diagonal brace members 34 and also at proper intervals by horizontal strips 35, thereby providing a perfectly rigid construction. These horizontal strips 35 provide supports for the platform boards 36 upon which the operator or operators may stand. After the silo wall has reached such a height that the segmental sections of the mold elements can not be manipulated from the ground, tools 37 are employed, said tools being formed with hooked lower ends 37^a. As the positioning pins 19 are removed, one bolt is loosely inserted in position for supporting each of the lower segmental mold sections. These lower sections are permitted to hang by the bolts until the workmen are ready to raise the same. The upper flange of each segmental section is then engaged by the hooked ends 37^a of a pair of lifting tools 37 in the hands of workmen, and while the section is thus supported the bolt is removed. The section can then be raised and placed in position, the hooked ends 37^a of the tools being preferably sharpened, so as to bite into the wooden flanges and prevent any danger of slipping.

The door openings 27 are formed at proper intervals in the silo wall 26 by means of door forms 38. These door forms have an annular formation, being preferably constructed of sheet metal, and flaring toward the outer edges thereof, said outer edges being provided with inturned stiffening flanges 39. In the present instance the door forms or frames are substantially hexagonal in shape, the vertical sides thereof being elongated in order to provide a vertically elongated door opening. A frame 40 fits tightly against the inner edge of each door form 38 and projects outwardly beyond the periphery thereof in order to provide an undercut or rabbeted portion 27^a at the inner edge of each door opening 27. These plates 40 are shown as provided with hooks 41 which engage eyes 42 on the flanges 39 of the door forms, thereby providing a means for holding the plate securely in position. These door forms 38 are properly positioned between the outer and inner walls of the annular mold elements at those places where it is desired to provide door openings in the silo wall. Owing to the fact that the edges of the inner plate 40 project outwardly beyond the periphery of the door frame or form 38, the inner edges of the door openings 27 will be rabbeted, as indicated by 27^a. The silo doors 43 (see Fig. 4) are fitted within these rabbeted edges 27^a of the door openings and provided with bolts 44 which pass through transverse strips 45 and are capped by the nuts 46. The strips 45 span the door openings so that by tight-

ening the nuts 45 the doors 43 can be tightly clamped in position.

In constructing the silo wall annular wire reinforcements 47 are embedded at proper vertical intervals within the concrete, and one or more annular series of vertical reinforcing wires 48 are embedded in each zone of the wall as it is formed, the lower ends of the vertical wires 48 of each series slightly overlapping the upper ends of the corresponding wires of the lower series. It will also be observed that horizontal reinforcing rods 49 are embedded in the concrete wall above and below each of the door openings 27. With this construction it will be obvious that a strong and thoroughly reinforced wall will be erected, and the wall can be carried up to the desired height by successively superposing the annular mold elements upon each other. After the wall has been completed, the ladder 25 is applied to the projecting ends of the bolts 24 so as to extend the full height of the silo on one side of the door openings 27, while the chute or shield 22 is secured in position by the projecting ends of the bolts 21, said chute projecting outwardly from the wall and spanning the door openings 27 and ladder 25.

Having thus described the invention, what I claim as new and desire to secure by Letters Patent, is:—

1. A form for erecting concrete silo walls including a pair of interchangeable superposed annular mold elements, each mold element including an inner wall and an outer wall and the walls being formed in segmental sections and having upper and lower reinforcing flanges, seats applied to the reinforcing flanges of the outer walls, clamping bands extending around the flanges and engaging the seats, arms projecting outwardly from the lower ends of the seats for supporting the clamping bands, means for locking the segmental sections of the inner walls together, and means for detachably connecting the adjacent flanges of the superposed annular mold elements to hold the mold elements in operative position.

2. A form for erecting concrete silo walls including a pair of interchangeable superposed annular mold elements, each mold element including an inner wall and an outer wall and the walls being formed in segmental sections, wedge members inserted between adjacent segmental sections of the inner walls, sheet metal linings applied to the faces of the segmental wall sections and provided at one end of each section with an extension to overlap the next section, means for locking the segmental sections of the outer walls together, and means for detachably connecting the superposed mold elements to hold them in proper relative position.

3. A form for erecting concrete silo walls, including a pair of interchangeable super-

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 posed annular mold elements, each mold element including an inner wall and an outer wall and said walls being formed in segmental sections, and having upper and lower reinforcing flanges, clamping bands extending around the reinforcing flanges of the outer walls, arms for supporting the clamping bands, wedge members inserted between the sections of the inner walls, sheet metal linings applied to the faces of the segmental wall sections and provided with end extensions adapted to overlap the adjacent wall section, and means for detachably connecting the adjacent flanges of the superposed mold elements to hold the mold elements in operative position.

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 4. A form for erecting concrete silo walls, including spaced outer and inner walls, a skeleton door form inserted between the walls of the form, and an offset plate at the back of the door form, the edges of the plate projecting beyond the edges of the door

form so as to leave a rabbeted door opening in the silo wall.

5. A form for erecting concrete silo walls, including spaced outer and inner walls, a skeleton door form inserted between the outer and inner walls and having inwardly extending flanges at the front thereof, an offset plate fitted removably against the back of the door form and projecting beyond the edges thereof so as to leave a rabbeted door opening in the silo wall, and fastening members detachably connecting the offset plate to the reinforcing flanges at the front of the door form.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JOHN T. GANDY.

Witnesses:

J. C. MERCHANT,
 L. LANCASTER.

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