O. BRUMBAUGH.

SILO CONSTRUCTION.

APPLICATION FILED NOV. 10, 1908.

921,586.

Patented May 11, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

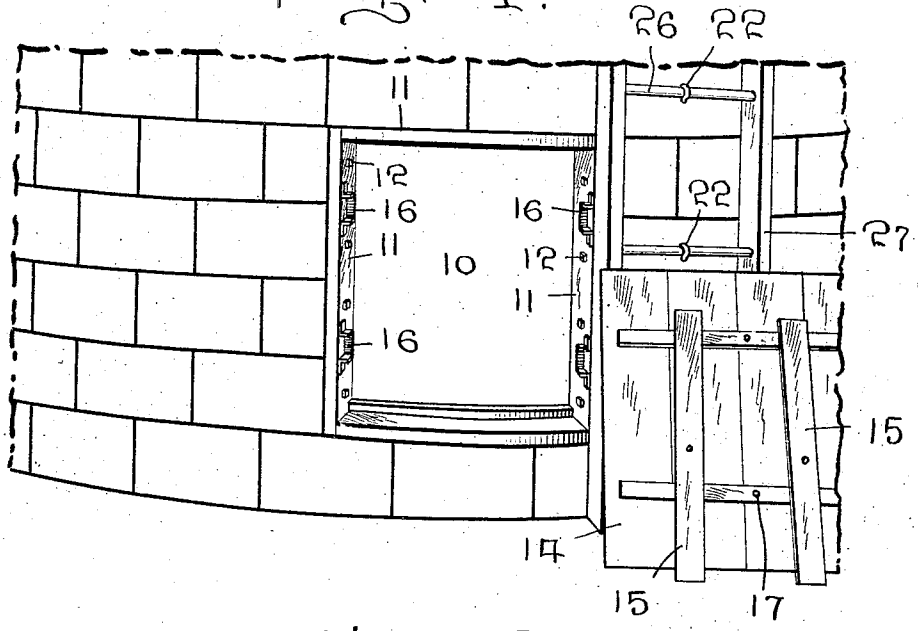
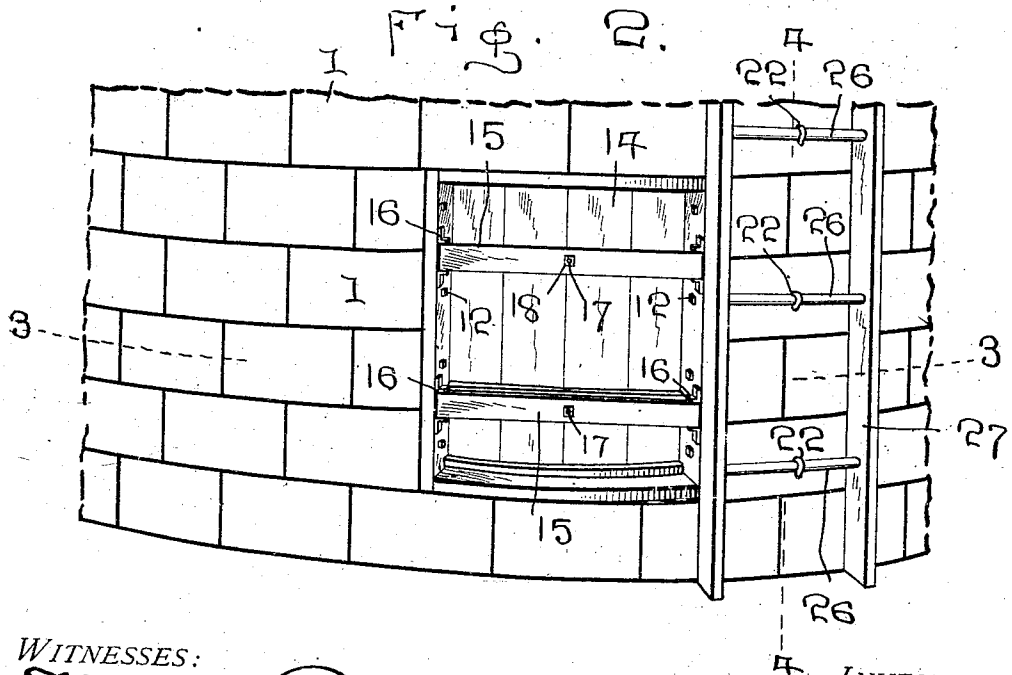



Fig. 2.

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2 SHEETS—SHEET 2.

Fig. 6.

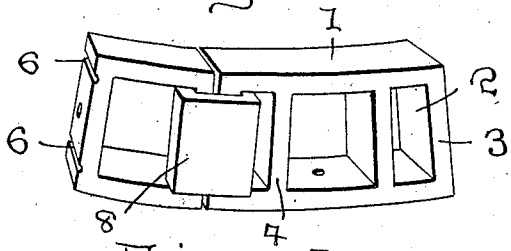


Fig. 4.

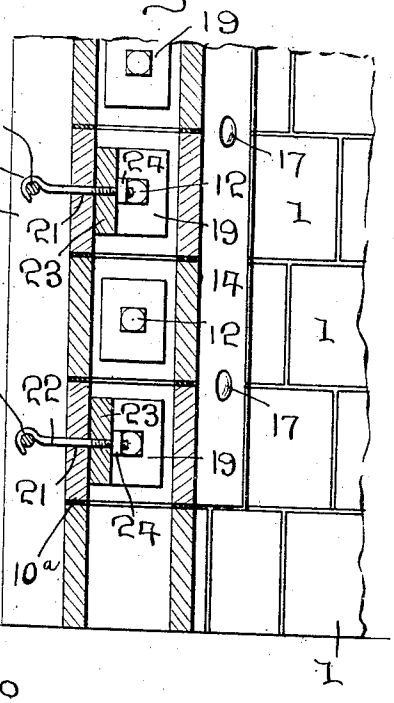


Fig. 5.

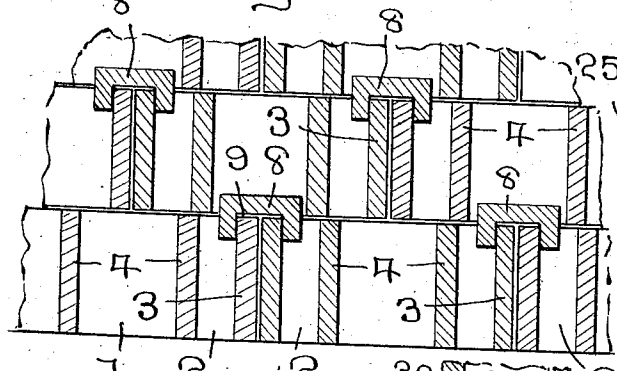


Fig. 8.

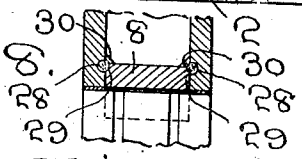


Fig. 3.

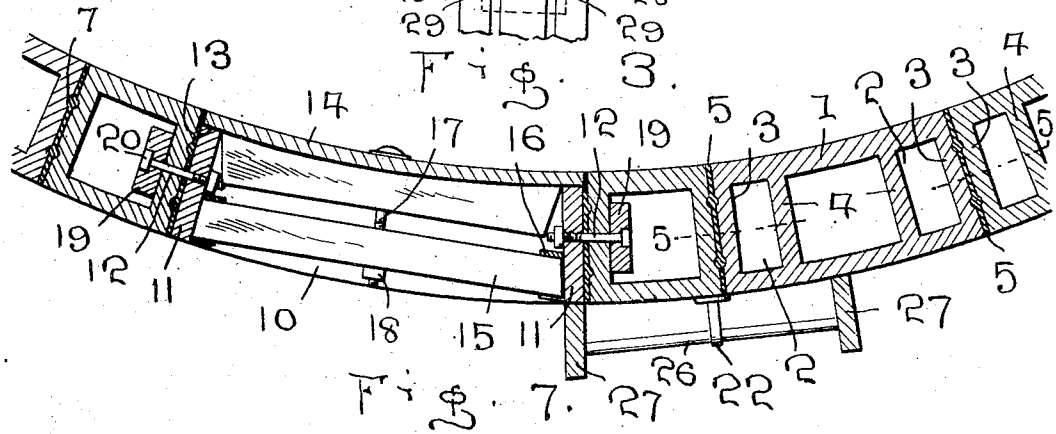


Fig. 7. 27

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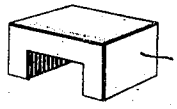


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# UNITED STATES PATENT OFFICE.

OLIVER BRUMBAUGH, OF LOUISVILLE, OHIO.

## SILO CONSTRUCTION.

No. 921,586. Specification of Letters Patent. Patented May 11, 1909.

Application filed November 10, 1908. Serial No. 461,907.

*To all whom it may concern:*

Be it known that I, OLIVER BRUMBAUGH, a citizen of the United States, residing at Louisville, in the county of Stark and State of Ohio, have invented certain new and useful Improvements in Silo Construction; 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.

My invention relates to new and useful improvements in silo constructions and my object is to provide suitable plastic blocks from which the walls of the silo are constructed.

A further object is to provide means for securing the blocks together.

A still further object is to provide a suitable seal for the joints between the blocks.

A further object is to provide means for securing a closure over the opening in the silo and a still further object is to provide means for securing a ladder to the outer face of the silo.

Other objects and advantages will be hereinafter referred to and more particularly pointed out in the claim.

In the accompanying drawings which are made a part of this application, Figure 1 is a fragmentary perspective view of the lower portion of a silo showing the closure removed from the opening therein. Fig. 2 is a similar view showing the closure in position in the opening. Fig. 3 is a sectional view as seen on line 3—3, Fig. 2. Fig. 4 is a sectional view as seen on line 4—4, Fig. 2. Fig. 5 is a sectional view as seen on line 5—5, Fig. 3. Fig. 6 is a detail perspective view of two of the blocks employed for constructing the walls of the silo showing the manner of securing the same together. Fig. 7 is a perspective view of one of the locking clips removed, and, Fig. 8 is a detail sectional view showing a means of securing the locking clips in position on the blocks.

Referring to the drawings in which similar reference numerals designate corresponding parts throughout the several views, 1 indicates the blocks from which the silo is constructed, said blocks being preferably formed in segments of circles so that when they are assembled together, a complete circle will be formed and in order to produce an extremely cheap construction, as well as durable construction, the blocks are preferably molded of clay and burned in the usual manner, said blocks being provided with vertical openings 2 to provide air spaces as well as to lessen the weight of the blocks.

In molding the blocks 1, the openings 2 are preferably formed adjacent the ends and center of the blocks, thereby providing end walls 3 and reinforcing partitions 4 in the length of the blocks and in constructing the silo, a sufficient number of the blocks are placed end to end to form a complete circle, the meeting ends and edges of the blocks having gaskets 5 introduced therebetween to provide a solid wall and prevent leakage between the joints of the blocks. The end walls 3 of the blocks are preferably provided with recesses 6, the recesses in the two meeting ends being so arranged as to aline with each other when the blocks are properly positioned and at this point the gaskets 5 are provided on their opposite faces with ribs 7, which ribs are adapted to extend into said recesses and prevent the gaskets from leaving their positions between the blocks. After the first tier of blocks have been properly arranged, they are securely locked together by means of locking clips 8, which clips are preferably formed of the same material as the blocks and adapted to be introduced over the upper edges of the meeting end walls of each pair of blocks, the channels 9 of the clips being of sufficient depth as to allow the depending edges of the clips to extend a considerable distance along the end walls, thereby forming a permanent lock for the blocks. After the locking clips are thus placed on the first tier of blocks, the next tier is placed in position and so arranged that the ends of the blocks in the second tier will meet midway of the length of the blocks of the first tier, the clips 8 extending into the central opening of the second tier of blocks, it being understood that the joints between the ends of the blocks in each tier are to be staggered with relation to the joints between the ends of the blocks of the adjacent tiers.

An opening 10 is preferably formed adjacent the lower end of the silo, in which is placed a frame 11, said frame being securely held in position in the opening by introducing bolts or the like 12 through the end walls of the blocks surrounding the opening and

through the side pieces of the frame, the width of the frame being preferably less than the thickness of the wall to provide an offset 13, in which offset is placed the edges of a closure 14 and as the offset portion is at the inner edge of the frame, the pressure of the contents of the silo will prevent the closure from accidentally leaving its position. The closure, however, is positively secured in place by extending bars 15 across the opening, the ends of which bars are seated in keepers 16 carried by the side pieces of the frame 1 and the closure is fastened to the bar 15 by means of bolts 17 and by placing nuts 18 on the outer ends of the bolts 17, the closure 14 may be drawn against the inner edge of the frame 11 with sufficient pressure to prevent leakage between the closure and the frame and completely seal the opening 10 and it will further be seen that by making the offset 13 of equal depth with the thickness of the closure 14, the contour of the inner wall of the silo will be uninterrupted when the closure is in position.

The openings in the end of the block 1, through which the bolts 12 extend are formed while the blocks are in a green state and to prevent the pressure of the headed end of the bolt from crushing or breaking the end walls of the blocks through which they extend, said headed ends of the bolts are provided with washers 19 preferably of wood, the heads 20 of the bolts being countersunk in the washers to prevent the bolts from turning while the nuts are turned onto the threaded ends thereof. I have also provided means for securing a ladder to the outer face of the silo, which consists in forming holes 21 through the outer walls of a portion of the blocks, through which are introduced bolts 22, the inner ends of said bolts extending through washers 23 and have nuts 24 thereon, while the outer ends of the bolts 22 are provided with hooks 25, which are adapted to engage the rungs 26 of the ladder 27 and by placing the side rails of the ladder against the outer face of the silo wall and turning the nuts 24 onto the bolts 22, after the hooks have been engaged with the rungs, said ladder will be securely clamped in position.

The bolts employed for holding the frame 11 and ladder 27 in position, are introduced through the openings in the blocks as the wall is built up, said frame and ladder being first placed in position and the bolts successively introduced in place as the height of the wall increases.

In Fig. 8 of the drawings I have shown a means for locking the clips 8 in position over the end walls 3, which consists in forming grooves 28 on the inner face of the side walls of the blocks 1 and a similar depression 29 at the ends of the locking clips 8, the depressions 29 being formed at the upper edge of the clips and after the clip has been placed in position over the abutting end walls 3, the grooves and coöperating depressions are to be filled with any suitable form of plastic material 30 and it will be readily seen that as soon as the filling has properly hardened, it forms a perfect block between the clip and walls of the block.

In constructing the silo, the first tier of blocks are properly assembled and the sealing gasket $10^a$ applied over the upper surface of the blocks, the sealing gasket between the ends of the first tier having been applied when the blocks were assembled together and it will be understood that said gasket is preferably constructed of plastic material, although other substances may be used if desired. The locking clips are then applied to their respective parts and the second tier of blocks placed in position over the first tier, the joints at the ends of the second tier of blocks being preferably located at the longitudinal center of the blocks in the first tier of blocks and after the second tier of blocks are placed in position, the clips are secured in position over the end walls by applying the fillings 30 if that form of clip and block shown in Fig. 8, is employed. As the tiers of blocks are built up, the bolts 12 and 22 are successively placed through the openings in the blocks and applied to their intended use and although I have shown and described but one of the openings 10, it will be clearly understood that any number of the openings may be provided, as desired.

It will thus be seen that I have provided an extremely strong and durable structure and by employing vitrified blocks and introducing the gaskets as shown, the walls of the silo will be impervious to heat and moisture and the ensilage will be preserved far more satisfactorily than could be accomplished with silos constructed from other material. It will further be seen that the weight of the blocks will be materially reduced by forming the openings therethrough and that it will not require the usual form of bands to support the wall and further that in view of the solidity of the wall, the silo will withstand the effects of storms without being injured.

What I claim is:

A silo construction comprising the combination with a plurality of hollow blocks assembled together to form a wall, said wall having openings therethrough and means to lock the blocks together; of a frame to fit the opening through the wall, the width of said frame being less than the thickness of the wall, whereby an offset is formed, bolts extending through the ends of the blocks surrounding the openings and through the frame, washers at the inner ends of the bolts

adapted to prevent breakage of the blocks, a curved closure adapted to close the opening, the edges of the closure entering said offset and resting against the inner edge of the frame and means to clamp the closure in engagement with the frame and seal the opening.

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

OLIVER BRUMBAUGH.

Witnesses:
J. L. Coy,
Flora Coy.