

A. C. OCHS.

SILLO.

APPLICATION FILED APR. 26, 1911.

1,032,765

Patented July 16, 1912.
2 SHEETS—SHEET 1.

Fig. 1.

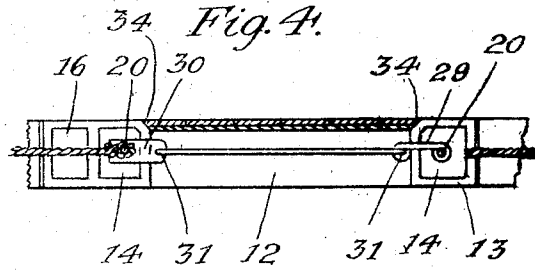
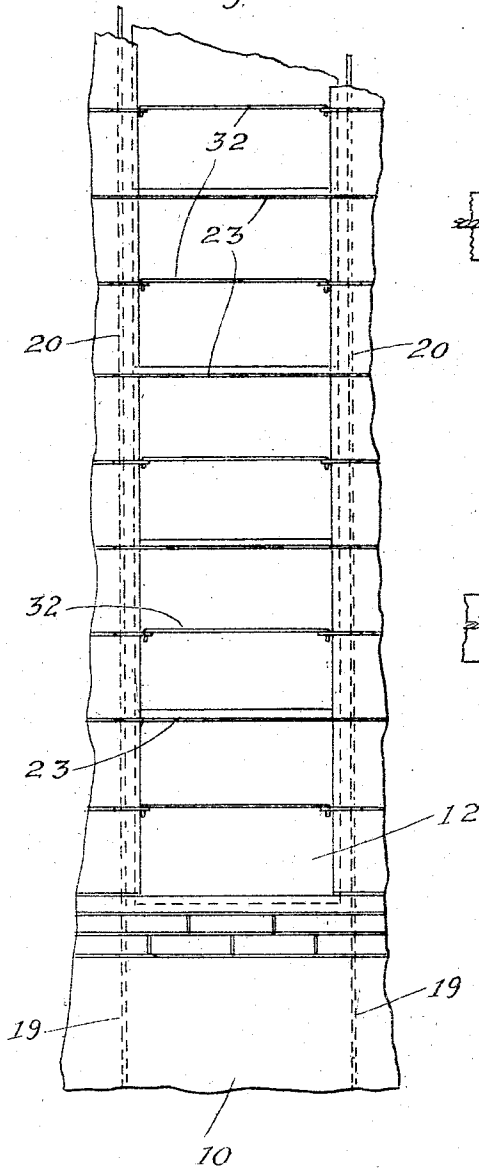


Fig. 3.

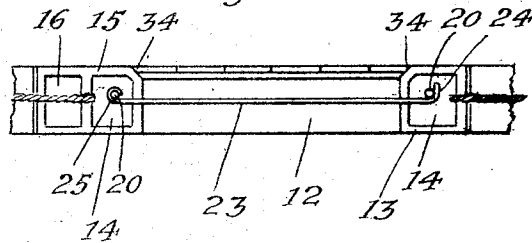
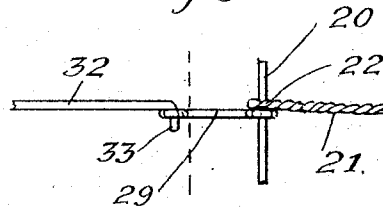


Fig. 5.



Witnesses:
Theo. Lagaard.
H. A. Bowman.

Inventor:
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By F. A. Whiteley
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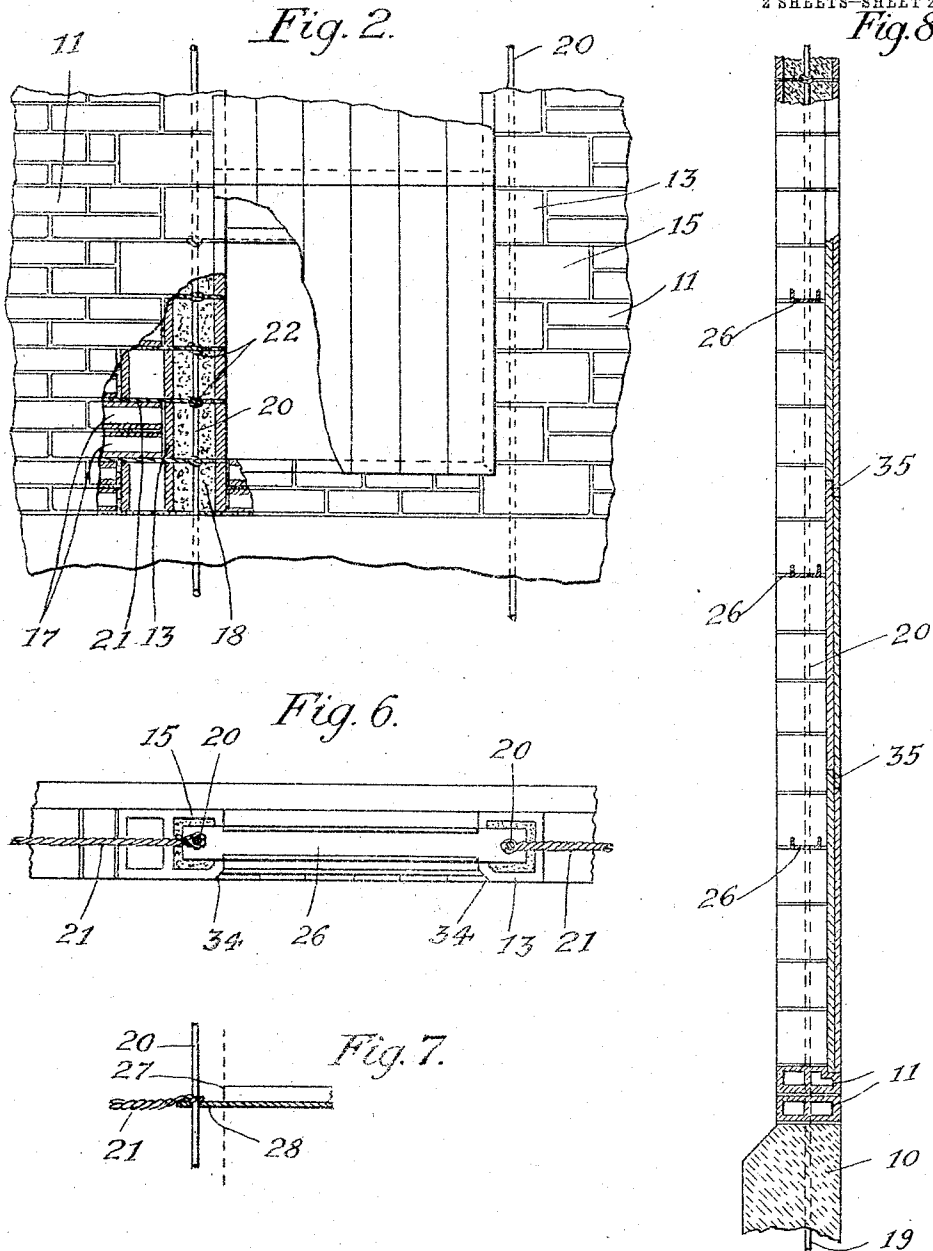
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2 SHEETS-SHEET 2.



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H. Q. Bowman.

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UNITED STATES PATENT OFFICE.

ADOLPH C. OCHS, OF SPRINGFIELD, MINNESOTA.

SILO.

1,032,765.

Specification of Letters Patent.

Patented July 16, 1912.

Application filed April 26, 1911. Serial No. 623,468.

To all whom it may concern:

Be it known that I, ADOLPH C. OCHS, a citizen of the United States, residing at Springfield, in the county of Brown and State of Minnesota, have invented certain new and useful Improvements in Silos, of which the following is a specification.

My invention relates to silos and especially to silos constructed of hollow burnt clay blocks such as that illustrated and described in my application for Letters Patent, Serial Number 623,467, filed April 26, 1911.

It is the object of my invention to provide such silo with a continuous door opening, and to so construct the silo and the said door opening as not to weaken in any way the reinforcement of the walls of the silo against spreading strain caused by pressure of the contents of the silo, and at the same time to stiffen the door post structure so as to enable the silo to withstand external wind pressure without vibrations which might result in cracking of the walls thereof. To this end, at the sides of the door opening which interrupts the wall of the silo, said wall being constructed of hollow burnt clay blocks so arranged as to form continuous circumferential air spaces in the body of the wall, a series of straight hollow blocks are arranged one above the other with the open ends contacting so as to form continuous channels extending vertically at each side of said door opening, reinforcing rods are arranged in the channels to which the reinforcing members of the silo are secured, and the vertical channels are then filled with concrete forming with said post blocks and rods united monolithic door post columns of a comparatively massive and heavy type.

Further objects and advantages of my invention will appear in connection with the detailed description thereof and are particularly pointed out in the claims.

In the drawings illustrating the application of my invention in one form,—Figure 1 is an elevation of a portion of the front wall of a silo showing my invention applied thereto. Fig. 2 is an enlarged view partly in section showing the manner in which the reinforcing members are secured. Fig. 3 is a view of one form of reinforcement across the door opening. Fig. 4 is a similar view of a removable reinforcing member. Fig. 5 is an enlarged detail view with parts removed showing the manner of securing reinforcing members to the central reinforcing

rod. Figs. 6 and 7 are enlarged details of another form of reinforcing member extending across the door opening. Fig. 8 is a sectional elevation taken through the door opening with the doors in position.

Upon a foundation 10 of any desired material the walls of my silo are formed in the manner described in the aforesaid application by means of hollow burnt clay blocks 11. A door opening 12, as indicated in Figs. 1 and 8, is provided extending from at or close to the foundation to the top of the silo. The posts or jambs of said door opening are formed of hollow burnt clay blocks 13 set into the wall so that the openings 14 therein will extend vertically. Some of the aforesaid blocks, as thus shown at 15, will preferably be formed longer than the blocks 13 so that the wall structure formed by these blocks will interlock in the desired manner, as shown more particularly in Fig. 2. In forming these longer blocks 15 it may be desirable to provide an additional passage 16 therein, although it is practicable and falls within the scope of my invention to have but a single passage 14 through each of said blocks. It will be understood that in the silo structure proper, as described in the aforesaid application, the hollow burnt clay blocks used to form the walls of the silo are constructed of flat-sided burnt clay blocks curved in one direction and formed with openings extending through the blocks in the arc of curvature, said blocks being laid with the flat-sides contiguous so that the openings therein will provide circumferential air spaces extending from one side of said door opening to the other, as indicated at 17 in Fig. 2. The passage through the blocks 13 used in the door post structure therefore would, after said blocks 13 are all placed in position, form a vertical passage 18 extending at right angles to the horizontal passages in the body of the wall.

Set within the foundation 10, as indicated at 19 in Figs. 1 and 8, are vertical reinforcing rods 20 of steel or other desired material and of such size and weight as the requirements of the particular structure may demand. The reinforcing rods 20 extend upwardly through the center of the passage 18 formed by the openings 14 in the door post blocks 13. As the silo is raised during the construction thereof the passage 18 is filled with concrete, thus securing together the blocks 13 and 15 and the reinforcing

rod 20 to form a unitary monolithic structure comprising the jamb or post of my continuous silo door. Reinforcing members 21, preferably formed of twisted wire, extend circumferentially within the body of the wall between courses of the hollow burnt clay blocks forming said wall, as described and claimed in my application aforesaid. The reinforcing members 21 are secured at their ends about the rods 20, as indicated at 22, during the construction of the silo. The circumferential reinforcement of the silo is therefore directly secured to the rods 20 forming a part of the posts of said continuous doorway.

To make effective the circumferential reinforcement of the silo and prevent spreading of said walls either at the posts or elsewhere, I have provided means extending across the door opening 12 for tying said posts together in non-spreading relation. In the preferred form shown in Figs. 1 to 5, I use tie-rods 23 which may be simply bars of iron having the ends thereof bent at right angles, as shown at 24 in Fig. 3, or the ends may be bent in hook-like form, as shown at 25. In either case the bars 23 will be laid between courses of the blocks 13 and 15, the angled portions 24 or 25 of said bars extending over the vertical bars 20, so that when the concrete is poured into the channel 18 formed by the openings 14 in the blocks 13 and 15 the cross bars 23 will be rigidly secured to said posts. Where a more powerful cross reinforcement is desired the means shown specifically in Figs. 6 and 7 may be employed, which comprise flange plates 26 extending across the opening, as indicated in Fig. 6, said flange plates having holes in the ends thereof through which the bars 20 pass, the flanges being cut away at 27 where the bottom plate 28 enters the wall structure. After the cement has been poured the members 26 will be rigidly held within and practically integral with the door posts, forming an extremely powerful and efficient construction.

The permanent cross reinforcing members, whether those indicated at 23 or the flange members 26, will be spaced sufficiently far apart to leave a convenient distance between pairs of said members for permitting entry within the silo and the discharge of its contents therefrom. This distance will be too great to permit such members to be used as a ladder-way. I have therefore invented removable reinforcing members to be introduced in the continuous doorway between said permanent members whereby said permanent members in connection with said removable members will form a ladder-way for entrance to any level in the silo. To effect this arrangement I provide short eye-bars which may be bent rods, as shown at 29, or plates, as shown at 30, said eye-bars be-

ing assembled upon the rods 20 and cemented into position between courses of the blocks 13 and 15 so that the eyes 31 thereof will extend out from said door posts and within the door openings 12. Removable members 32, formed of rods having right-angled bends 33 extending within said eyes 31, are provided. When the silo is full and the pressure on the walls of course the greatest these removable cross-bars will all be in position and will operate to assist the permanent cross-reinforcing members in securing the door posts in non-spreading relation. As ensilage is removed the pressure will of course be correspondingly removed from the upper portion of the silo and the removable members 32 may be withdrawn without lessening the relative reinforcement against inner pressure to which the walls of the silo are then subjected.

Each of the blocks 13 and 15 is formed with one edge thereof beveled away, as shown at 34, and these blocks are positioned and plumbed, as the silo wall is being constructed so that the beveled portion 34 thereof will form a continuous beveled jamb surface adapted to cooperate with similar surfaces formed on the sides of the doors to be used with my silo. These doors, which are best shown in Fig. 3, may be formed of two or more layers of wood or other material, as desired, said layers being offset at the ends thereof, as indicated at 35. When the silo is being filled each door is successively placed in position one above the other, as shown, the pressure of the ensilage within the silo operating to force the beveled surfaces of the door against the correspondingly beveled jamb surfaces 34 of the door posts and also holding the overlapping joints 35 between the doors so that the same will be tightly secured, said pressure operating not only to hold the doors in position but also to seal said joints in a practically air-tight manner. Owing to the nature of the joint formed between the individual sections of the door and between the door and the jamb surfaces of the door frame the sections of the door may be removed in succession with the utmost ease as the silo is emptied.

I claim:

1. A circular silo having a continuous door opening extending up one side thereof, the walls of said silo being constructed of flat-sided burnt clay blocks curved in one direction and formed with openings extending through the blocks in the arc of curvature, said blocks being laid with the flat sides contiguous so that the openings therein will provide circumferential air spaces extending from one side of said door opening to the other, a series of straight hollow blocks arranged at each side of said door opening and interlocking with the first set

of blocks, said last named blocks being positioned one upon the other with the open ends contacting so as to form continuous channels extending vertically at each side of said door opening, and concrete filling said vertical channels and forming with said post blocks united monolithic door post columns.

2. A circular silo having a continuous door opening extending up one side thereof, the walls of said silo being constructed of flat-sided burnt clay blocks curved in one direction and being laid with the flat sides contiguous, a series of straight hollow blocks arranged at each side of said door opening and interlocking with the first set of blocks, said last named blocks being positioned one upon the other with the open ends contacting so as to form continuous channels extending vertically at each side of said door opening, concrete filling said vertical channels and forming with said post blocks united monolithic door post columns, and means tying said columns into the structure of the wall and across the door opening.

3. A circular silo having a continuous door opening extending up one side thereof, the walls of said silo being constructed of flat-sided burnt clay blocks curved in one direction and being laid with the flat sides contiguous, a series of straight hollow blocks arranged at each side of said door opening and interlocking with the first set of blocks, said last named blocks being positioned one upon the other with the open ends contacting so as to form continuous channels extending vertically at each side of said door opening, rods centrally disposed within said channels, and concrete filling the channels and forming with said post blocks and rods united monolithic door post columns.

4. A circular silo having a continuous door opening extending up one side thereof, the walls of said silo being constructed of flat-sided burnt clay blocks curved in one direction and formed with openings extending through the blocks in the arc of curvature, said blocks being laid with the flat sides contiguous so that the openings therein will provide circumferential air spaces extending from one side of said door opening to the other, a series of straight hollow blocks arranged at each side of said door opening and interlocking with the first set of blocks, said last named blocks being posi-

tioned one upon the other with the open ends contacting so as to form continuous channels extending vertically at each side of said door opening, rods centrally disposed within said channels, concrete filling the channels and forming with said post blocks and rods united monolithic door post columns, reinforcing members circumferentially disposed in the body of said wall and secured at each end to said rods, and other reinforcing members secured to said rods and extending across said opening.

5. A circular silo having a continuous door opening extending up one side thereof, the walls of said silo being constructed of flat-sided burnt clay blocks curved in one direction and being laid with the flat sides contiguous, a series of straight hollow blocks arranged at each side of said door opening and interlocking with the first set of blocks, said last named blocks being positioned one upon the other with the open ends contacting so as to form continuous channels extending vertically at each side of said door opening, rods centrally disposed within said channels, concrete filling the channels and forming with said post blocks and rods united monolithic door post columns, means tying the body of the wall to said columns, and cross reinforcing members consisting of flanged bars having the flattened ends thereof set within said columns and surrounding said rods, said flanges abutting the surfaces of the columns on the interior of said doorway.

6. A circular silo having a continuous door opening extending up one side thereof, the walls of said silo being constructed of flat-sided burnt clay blocks curved in one direction and being laid with the flat sides contiguous, a series of straight hollow blocks arranged at each side of said door opening and interlocking with the first set of blocks, said last named blocks being positioned one upon the other with the open ends contacting so as to form continuous channels extending vertically at each side of said door opening, and concrete filling said vertical channels and forming with said post blocks united monolithic door post columns.

In testimony whereof I affix my signature in presence of two witnesses.

ADOLPH C. OCHS.

Witnesses:

E. L. RIPPOLT,
JOHN G. LOCKWAY.