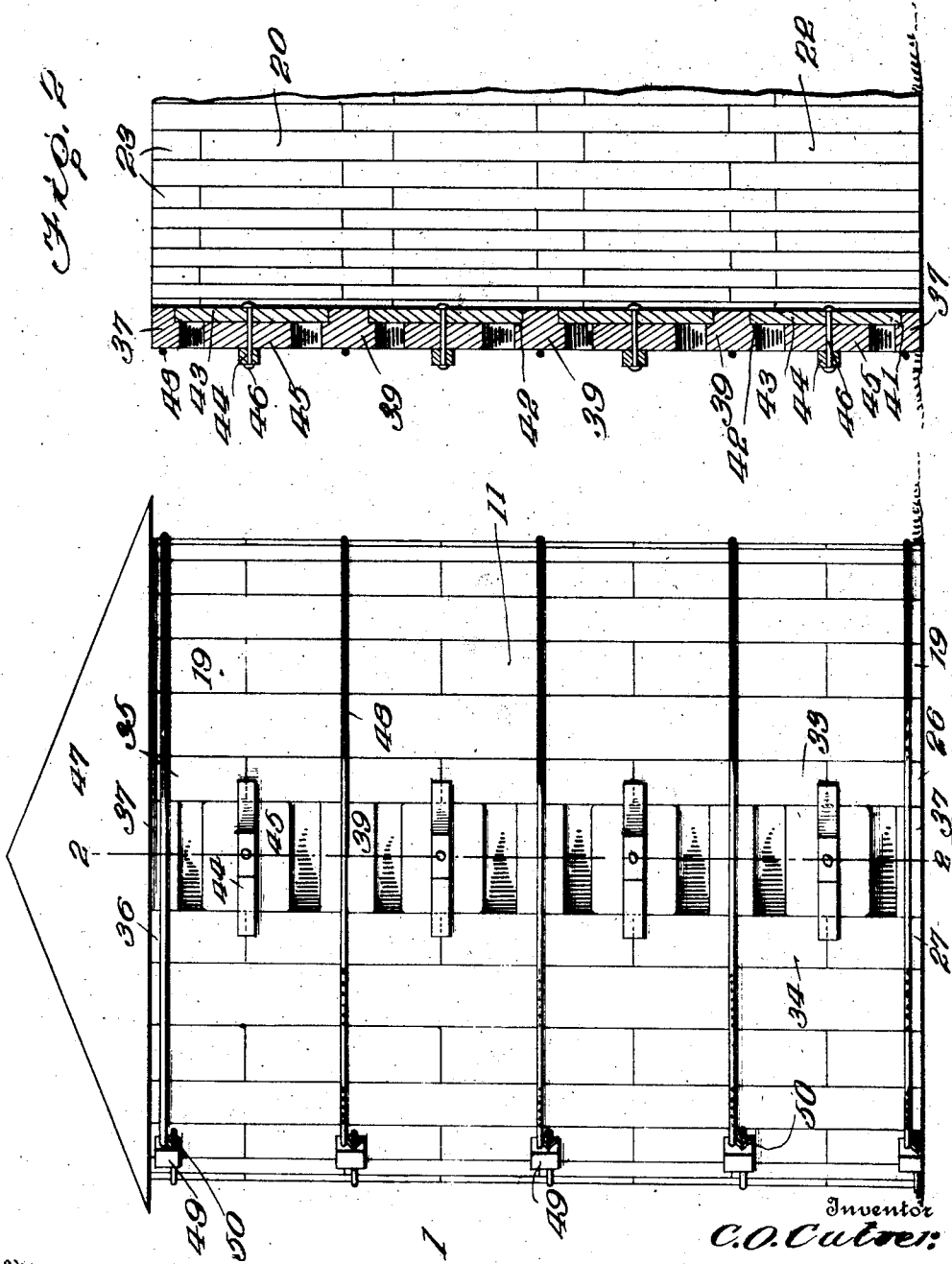


C. O. CULVER.
 CONCRETE SILO.
 APPLICATION FILED AUG. 7, 1914.

1,148,151.

Patented July 27, 1915.

2 SHEETS—SHEET 1.



Witnesses
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Fig. 1

By

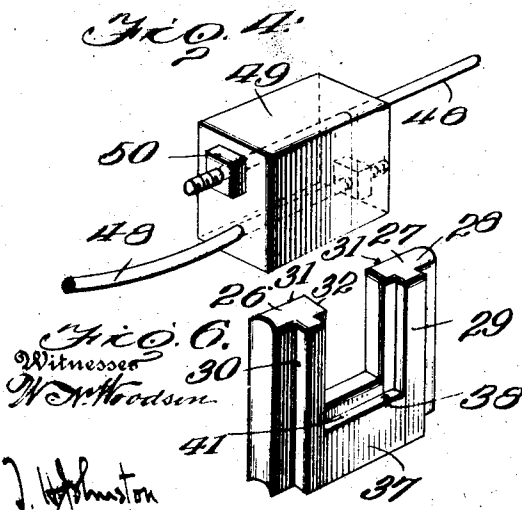
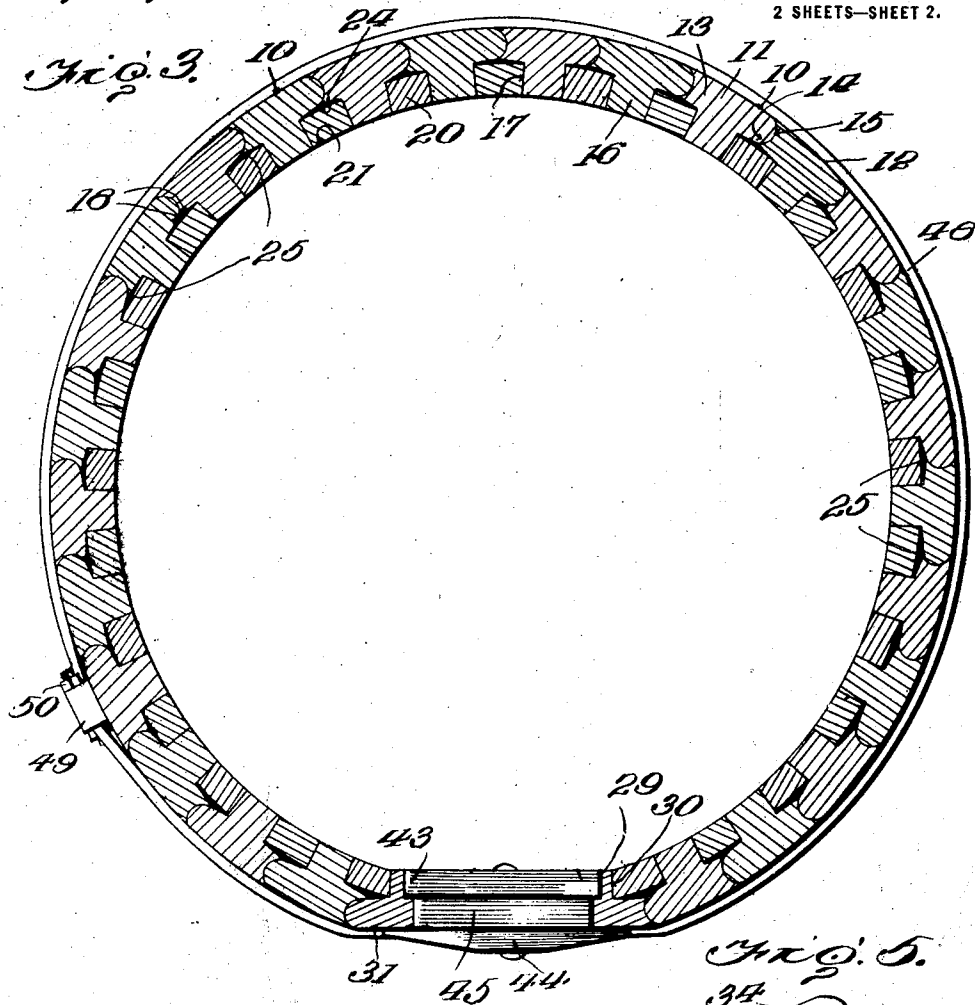
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1,148,151.

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 2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

CUMINGS O. CULVER, OF SMITHFIELD, ILLINOIS.

CONCRETE SILO.

Specification of Letters Patent.

Patented July 27, 1915.

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To all whom it may concern:

Be it known that I, CUMINGS O. CULVER, citizen of the United States, residing at Smithfield, in the county of Fulton and State of Illinois, have invented certain new and useful Improvements in Concrete Silos, of which the following is a specification.

This invention relates to an improved construction of concrete silo which is formed of a plurality of blocks or strips and has as its primary object to provide a silo of this character which will be thoroughly rigid, and which will provide an air-tight inclosure.

The invention has as a further object to provide a plurality of blocks or strips so constructed that they may be assembled in interlocking relation to form the circular walls of the silo and which, when so assembled, will form continuous faces upon the inner and outer sides of the silo.

A further object of the invention is to provide a silo wherein the blocks employed are so proportioned that when assembled to form the wall of the silo, the joints of the several blocks will be arranged in staggered relation, and wherein the several blocks are so constructed as to provide vertically extending air spaces within the wall of the silo, when assembled in interlocking position.

The invention has as a further object to provide a concrete silo having suitable windows and wherein a closure is provided for said windows which may be readily attached to or detached from the silo. And a further object of the invention is to provide a silo wherein a plurality of blocks are provided of such construction that when properly assembled, said blocks will have interlocking relation with the adjacent portions of the walls of the silo and will provide window openings adapted to detachably receive the closures therefor. And a still further object of the invention is to provide in a silo of this character, a plurality of braces so arranged as to support the wall circumferentially and a plurality of other braces arranged to support the walls of the window openings.

With these and other objects in view my invention will be more fully described, illustrated in the accompanying drawings and then specifically pointed out in the claim which is attached to and forms a part of this application.

In the accompanying drawings, Figure 1 is a perspective view of my improved silo particularly showing the arrangement of the window openings and the closures therefor as well as the braces disposed to support the walls of the window openings. Fig. 2 is a fragmentary vertical sectional view particularly showing the type and arrangement of the blocks provided adjacent the window openings. Fig. 3 is a horizontal sectional view taken through the silo, Fig. 4 is a detail perspective view of one of the terminal bearing blocks for the hoops, Fig. 5 is a detail perspective view of one of the terminal bearing blocks for the braces, and Fig. 6 is a detail perspective view of the block arranged adjacent the window opening at opposite ends of the wall of the silo.

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.

As best shown in Fig. 3 of the drawings, the body portion 10 of my improved silo is substantially cylindrical and in forming the wall thereof, I employ a primary block 11 which is of a thickness at its widest part corresponding to the thickness of the wall, the outer faces 12 of said blocks being transversely curved to provide a continuously curved surface upon the outer face of the body portion of the silo. Each of the blocks 11 includes a head 13 one longitudinal edge of each of which is cut away to provide a tongue 14, while the opposite longitudinal edge of the head of each of said blocks is grooved as shown at 15, the tongue of one block being arranged to seat within the groove of the next adjacent block, the several blocks being, in this manner, arranged to interlock. Extending laterally from the head 13 of each of said blocks is a medially disposed longitudinally extending wedge-shaped tongue 16, the side walls 17 of each of which are disposed to converge toward the free extremity thereof for a purpose which will presently appear, while the adjacent inclined faces 18 of the head 13 of each of said blocks are cut away to incline from the adjacent side walls 17 outwardly away from said walls toward the longitudinal edges of each of the heads 11.

The blocks 11 are arranged vertically within the wall of the silo and disposed between said blocks in the first and last courses of the blocks of said wall are spacer blocks

19, said spacer blocks being similar in construction to the blocks 11 but being relatively, of only one-half the length of said blocks. By this arrangement, the meeting edges of the blocks 11 and 19 are disposed in staggered relation as best shown in Fig. 1 of the drawings. Arranged upon the interior of the wall of the silo and engaging between the tongues 16 of the adjacent blocks 11 are substantially wedge-shaped locking blocks 20, the side edges thereof converging toward one side face thereof to engage the similarly converging walls of the adjacent side faces of the tongues 16. The inner faces 21 of the locking blocks 20 provide together with the inner faces of the tongues 16 a continuous surface upon the interior of the silo, and as will be clear, said locking blocks 20 are so arranged as to hold the blocks 11 securely in position.

In the first and last courses of blocks in the wall of the silo, I provide spacer locking blocks 22 and 23. Said blocks are similar in construction to the locking blocks 20, the blocks 22 being preferably arranged in the first course of blocks in the wall of the silo and being of a relative length substantially three-fourths of the length of each of the blocks 11, while the blocks 23 are preferably arranged in the last or upper course of blocks in the wall of the silo and are of a relative length of one-fourth of that of each of the blocks 11. In other words, the combined length of one of the blocks 22 and one of the blocks 23 is equal to that of one of the blocks 11. This is best shown in Fig. 2 of the drawings and it will be observed that by such arrangement, the meeting edges of the blocks 20, 22, and 23 are disposed in staggered relation to the meeting edges of the blocks 11 and 19.

The inner faces 24 of each of the blocks 20 as well as the inner faces of the blocks 22 and 23 are substantially flat, as shown, said faces being disposed adjacent the oppositely inclined faces 18 of adjacent portions of the head 13 of the blocks 11. A plurality of circumferentially spaced and vertically extending air spaces 25 are thus provided medially of the wall of the silo, one of said spaces being arranged between each pair of blocks 11. In a structure of this character, said air spaces are particularly desirable since moisture is thus prevented from collecting within the wall of the silo which would result in the molding of the ensilage.

In connection with the advantageous arrangement of blocks, above described, I have provided other blocks which are so disposed within the wall of the silo as to provide window openings, the arrangement of said window openings being most clearly shown in Fig. 1 of the drawings. Arranged within the first course of blocks of the wall of the silo are oppositely disposed blocks 26 and

27, which at their widest part extend entirely through the wall of the silo and are each provided with a head 28 adjacent one longitudinal edge of each of which projects a longitudinally extending laterally disposed tongue 29, the tongues 29 being each provided with one inclined side face 30 arranged to engage the contiguous inclined wall of the adjacent locking block.

The blocks 26 and 27 are of a relative length substantially one-half of that of one of the blocks 11, as best shown in Fig. 1 of the drawings, and are preferably provided with outer flat faces 31, the oppositely arranged longitudinal edges of the heads of said blocks being one provided with a groove to engage the tongue of the adjacent block while the other is provided with a tongue to engage within the groove of the adjacent block 11. The inner faces 32 of the heads of said blocks are preferably inclined and provide a portion of the side walls of the adjacent window opening.

Arranged vertically above the blocks 26 and 27 are a plurality of blocks 33 and 34 which are of a construction similar to the construction of the blocks 26 and 27 and are each of a relative length equal to the length of one of the blocks 11. In the last or upper course of blocks in the wall of the silo are provided terminal blocks 35 and 36 which are a counterpart of the blocks 26 and 27.

Arranged between the blocks 26 and 27 and between the blocks 35 and 36 are terminal transversely extending blocks 37 which extend entirely through the wall of the silo and are provided with outwardly diverging end walls arranged to engage the obliquely arranged edges of the adjacent blocks, the said blocks 37 being formed, adjacent the inner faces thereof, with longitudinally extending flanges 38 arranged to seat against the adjacent inner faces of the heads of the blocks 26 and 27, and 35 and 36. Arranged in the wall of the silo intermediate the terminal blocks 37 are a plurality of transversely extending longitudinally spaced blocks 39 which extend entirely through the wall of the silo and are provided with inclined end walls disposed to engage between the similarly inclined edges of the adjacent blocks, each of said blocks 39 having transversely extending flanges 40 formed thereon adjacent the rear face thereof disposed to seat against the adjacent faces of the heads of the contiguous blocks.

A plurality of window openings are thus provided and the blocks 37 and 39 are cut away upon adjacent edges thereof as shown at 41 and 42 to receive suitable closures 43. Each of the closures 43 carries a button 44 which is mounted upon a block 45 interposed between the button and the closure, said button being connected with the closure by a bolt or other suitable pivot pin 46. As

shown in Fig. 1 of the drawings, the buttons 44 are so arranged upon the closures 43 as to engage against the outer face of the wall of the silo when the closures are applied in position, said buttons bearing against the flat faces of the adjacent blocks. It will be noted that the closures 43 may be readily applied or removed as desired and that the adjacent blocks are so formed that when the closures are seated in position, access of the outer air to the interior of the silo is effectually shut off.

In Fig. 1 of the drawings, I have shown the several blocks above described, assembled in the manner indicated to form a complete silo, the closures being indicated as in position within the window openings formed therein and the silo being shown as provided with a roof 47 which is conventionally illustrated. To brace the walls of the silo circumferentially, I preferably employ a plurality of longitudinally spaced hoops 48, the extremities of each of which are threaded and disposed to extend loosely through bearing blocks 49, the terminal nuts 50 being arranged upon the extremities of each of said hoops and disposed to engage the bearing blocks. This is best shown in Fig. 4 of the drawings, and as will be clear, the hoops may be tightened by properly adjusting the terminal nuts 50 thereof.

It will thus be seen that I provide a very efficient construction of silo of this character wherein the blocks forming the wall thereof are arranged in overlapping relation to each other to thus form a practical integral structure and wherein the several blocks are so constructed as to interlock in such a manner as to prevent lateral bulging of the wall of the silo. In this connection, particular attention is directed to the peculiar formation of the tongues of the blocks 11 and the locking blocks 20 whereby this result is accomplished, the locking blocks being adapted to wedge between the tongues of adjacent blocks 11 to prevent radial movement of said blocks.

It will further be seen that I provide a silo of this character having vertically ex-

tending air spaces within the wall thereof 50 and wherein access may be readily had to the interior of the silo through the window openings provided, said openings having detachable closures therefor, so constructed and arranged as to efficiently exclude the 55 outer air from the interior of the silo when in position.

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

A structure of the character described including a plurality of blocks provided with heads adapted to interlock, each of said heads having a tongue formed thereon, a plurality of locking blocks adapted to engage between the tongues of said first mentioned blocks in overlapping relation to the meeting edges of said blocks, a plurality of blocks adapted to coact with certain of said first mentioned blocks arranged adjacent 70 thereto, said last mentioned blocks being provided with heads each having a laterally extending tongue formed thereon, the heads of certain of said last mentioned blocks being provided with a groove upon one longitudinal edge thereof adapted to receive the tongue of the adjacent block and the heads of certain other of said blocks providing a tongue upon one longitudinal edge thereof adapted to engage within the groove of the 80 adjacent block, a plurality of transversely extending blocks adapted to extend between said last mentioned blocks to engage therewith, said transversely extending blocks being arranged in spaced relation to each 85 other to provide window openings, and detachable closures for said openings, said closures being arranged to seat against contiguous portions of the heads of adjacent blocks to bear at their extremities against 90 adjacent sides of the tongues formed thereon. In testimony whereof I affix my signature in presence of two witnesses.

CUMINGS O. CULVER. [L. s.].

Witnesses:

G. H. JOHNSON,
A. H. FREEMAN.