V. C. ARCHER.

SILO.

APPLICATION FILED MAY 16, 1913.

1,125,249. **Patented Jan. 19, 1915.**

2 SHEETS—SHEET 1.

Fig. 1.

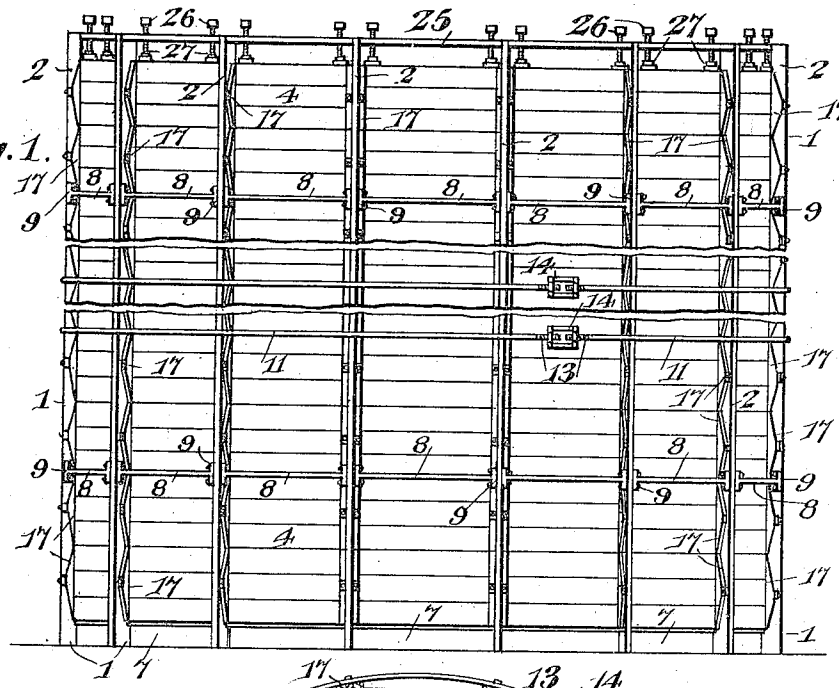
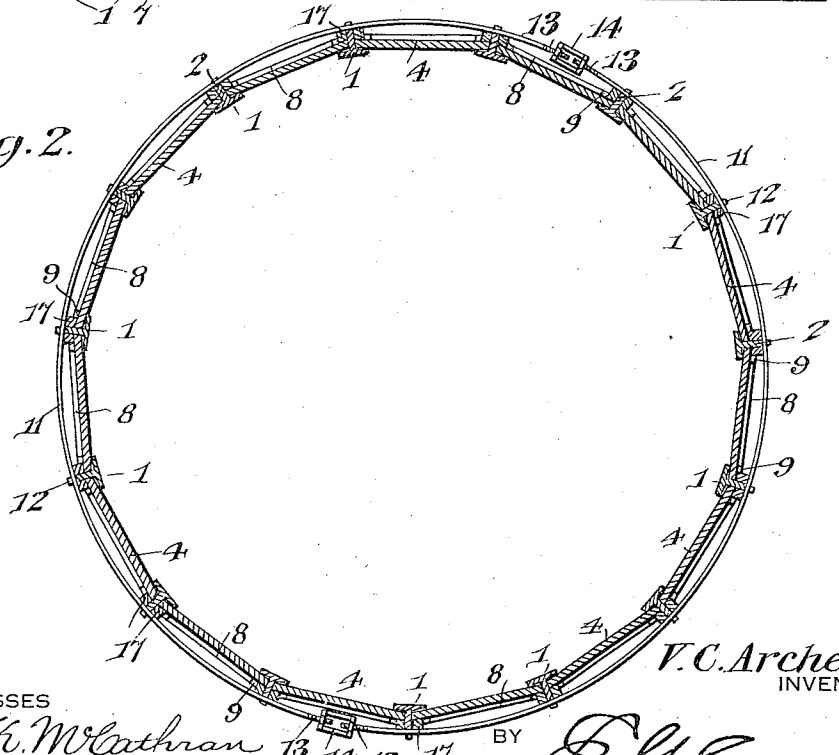


Fig. 2.



WITNESSES

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2 SHEETS—SHEET 2.

Fig. 3.

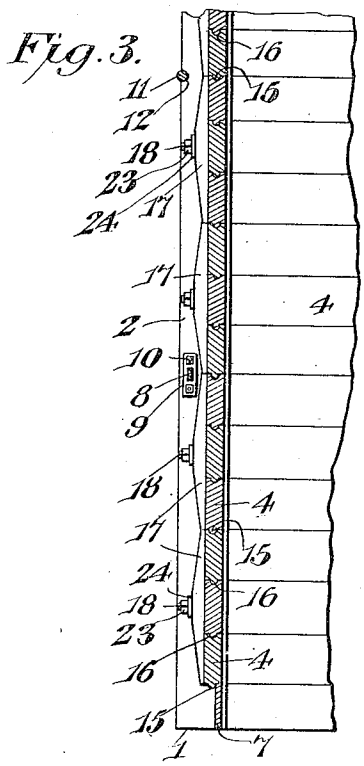


Fig. 4.

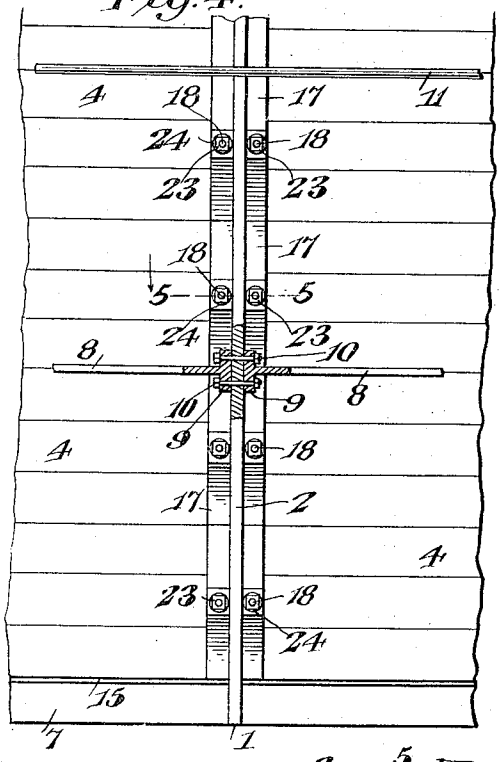


Fig. 5.

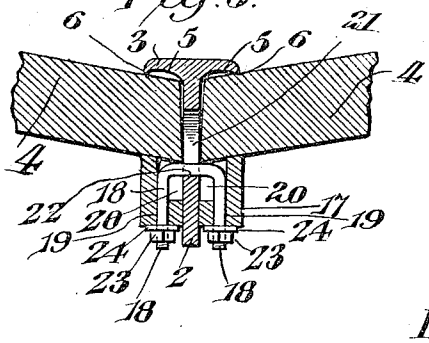


Fig. 6.

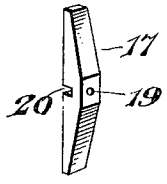


Fig. 7

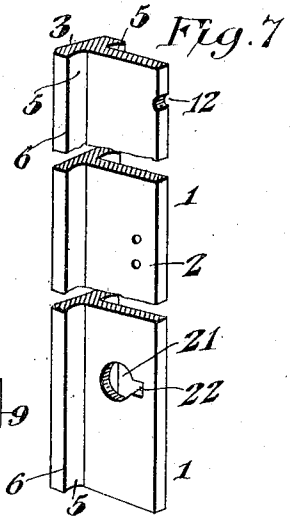
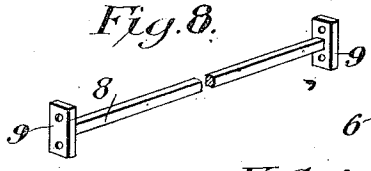


Fig. 8.



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UNITED STATES PATENT OFFICE.

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SILO.

1,125,249. Specification of Letters Patent. Patented Jan. 19, 1915.

Application filed May 16, 1913. Serial No. 768,057.

To all whom it may concern:

Be it known that I, VERNOM C. ARCHER, a citizen of the United States, residing at Colony, in the county of Anderson and State of Kansas, have invented a new and useful Silo, of which the following is a specification.

The invention relates to improvements in silos.

The object of the present invention is to improve the construction of silos, and to provide a simple, efficient and comparatively inexpensive construction of great strength and durability adapted to eliminate special doors, and comprising an annular series of panels adapted to be removed from the exterior when feeding ensilage, whereby such material may be discharged from either side of the silo without elevating it to a door.

A further object of the invention is to provide an air tight structure of a character adapted to permit an easy extension thereof should it be desired to increase the capacity of the silo.

With these and other objects in view, the invention consists in the construction and novel combination of parts hereinafter fully described, illustrated in the accompanying drawings, and pointed out in the claims hereto appended; it being understood that various changes in the form, proportion, size and minor details of construction, within the scope of the claims, may be resorted to without departing from the spirit or sacrificing any of the advantages of the invention.

In the drawings:—Figure 1 is an elevation of a silo, constructed in accordance with this invention. Fig. 2 is a horizontal sectional view of the same. Fig. 3 is an enlarged vertical sectional view of a portion of the silo. Fig. 4 is an enlarged side elevation of a portion of the silo, partly in section. Fig. 5 is an enlarged detail horizontal sectional view on the line 5—5 of Fig. 4. Fig. 6 is a detail perspective view of one of the vertical clamping bars. Fig. 7 is a sectional perspective view of a portion of one of the uprights. Fig. 8 is a detail perspective view of one of the horizontal braces.

Like numerals of reference designate corresponding parts in all the figures of the drawings.

In the accompanying drawings in which is illustrated the preferred embodiment of the invention, the silo comprises in its construction an annular series of spaced metallic uprights 1 arranged at regular intervals, which in practice will be about three feet, but the distance between the uprights may be varied. The uprights consist of a central outwardly extending vertical flange 2 and inner opposite flanges 3, projecting from the side faces of the outwardly extending flange 2 and adapted to have vertical series of horizontal staves 4 fitted against them, as clearly illustrated in Figs. 3 and 5 of the drawings. The outer faces 5 of the side flanges 3 are preferably concave, being grooved longitudinally to provide relatively sharp projecting side edges 6, adapted to be embedded to a greater or less degree in the staves 4, whereby an air tight joint or connection between the staves and uprights is secured. The uprights are connected at their lower ends by bottom braces 7, consisting of metallic bars and suitably secured at their terminals to the uprights at the lower ends thereof and having the lowermost staves 4 resting upon them. The uprights are also connected at points intermediate of their ends by horizontal braces 8, constructed of cast metal or other suitable material and provided at their terminals with vertical attaching flanges 9, fitted against the side faces of the outwardly extending flanges 2 of the uprights 1 and secured to the same by horizontal bolts 10, piercing the said flanges 2 and the attaching flanges of the adjacent horizontal braces. The horizontal braces are arranged in a substantially annular series and are located at spaced points alternately with hoops 11, and they form with the uprights a metallic structure or framework, which is self-supporting independently of the staves. The hoops 11, which extend around the exterior of the silo and bind the structure together, are arranged in suitable seats 12 formed by approximately semicircular notches in the outer vertical edges of the flanges 2 of the uprights. The hoops, which may be of any preferred construction, preferably consist of a pair of approximately semicircular rods having threaded terminals 13 for the reception of turn buckles 14, whereby the hoops are strained to the desired tension.

The staves 4 consist of wooden bars having tongues 15 and grooves 16 in their longitudinal edges to form tight interlocking

joints, as clearly illustrated in Fig. 3 of the drawings, and they are of a length to extend across the spaces between the uprights and they form vertical panels. The staves are clamped against the side flanges of the uprights by vertically disposed metallic bars 17, oppositely tapered, as clearly shown in Fig. 6 of the drawings, and fitted against the outer faces of the staves and also against the side faces of the outwardly extending flange 2 of the upright 3, and secured in pairs to the said flange 2 by approximately U-shaped bolts 18. In practice, the horizontal hoops and the horizontal braces will be spaced apart a distance of about three feet, and the clamping bars 17 are designed to be approximately one foot and a half in length, so that two clamping bars will be arranged at each side of the uprights between each of the annular connecting means formed by the hoops and the braces. The attached terminals of the braces are secured to the outwardly extending flange 2 of the uprights beyond the adjacent ends of the clamping bars. The clamping bars have inner vertical edges or faces to engage the staves and they are provided with central horizontal perforations 19 and have recesses 20 at their inner sides communicating with the inner ends of the perforations 19 and adapted to receive the transverse connecting portion of the U-bolt 18. The U-bolt 18 extends through an opening 21 in the flange 2 and engages a notch or recess 22 in the front or outer wall thereof. The transverse connecting portion of the U-bolt projects beyond the flange 2 into the recesses 20 of the clamping bars at opposite sides of the flange 2, and the side portions of the U-bolt extend outwardly through the perforations 19 and have threaded outer terminals for the reception of nuts 23, adapted to force the clamping bars inwardly into engagement with the staves. Washers 24 are preferably interposed between the nuts and the outer faces or edges of the clamping bars, which force the staves into tight engagement with the side flanges of the uprights 1 and provide air tight connections or joints between the staves and the uprights. Any other suitable device may be employed for securing the clamping bars to the uprights and for exerting the necessary pressure on the clamping bars to force the staves against the flanges 5. The uprights are connected at their upper ends by horizontal top bars 25, suitably secured at their terminals to the uprights and equipped adjacent to the same with vertical screws 26, mounted in threaded openings in the bars 25 and adapted to exert a downward pressure on the staves to form and maintain an air tight connection between the same. The screws 26 are provided at their upper ends with heads, and are equipped at their lower ends 27 with suitable means for engaging the uppermost staves.

The clamping means for holding the staves against the uprights and the means for applying pressure to the upper ends of the panels formed by the staves are adapted to be readily operated from the exterior to permit the staves of any one of the panels to be removed when it is desired to feed the ensilage from the silo. Beginning at the top, the staves are removed as the ensilage is consumed, and this construction enables the contents of the silo to be discharged at any side of the structure, and it obviates the necessity of providing doors and of elevating the material to a door.

What is claimed is:—

1. A silo including spaced uprights, braces connecting the uprights, said uprights and braces constituting a framework, and horizontal staves extending across the spaces between the uprights and having their terminals detachably secured to the same by exterior fastening means and forming vertical panels adapted to be removed from the exterior to provide a door opening of the desired extent at any point.

2. A silo including spaced metallic uprights having laterally projecting side flanges, horizontal braces secured at their terminals to the uprights and connecting the same, said uprights and braces constituting a framework, horizontal staves extending across the space between the uprights and having their terminals fitted against the exterior of the said flanges and forming vertical panels, and exteriorly accessible means for detachably securing the terminals of the staves to the uprights, the staves of the panels being removable from the exterior to form a door opening of the desired extent at any point on the silo for the removal of the contents thereof.

3. A silo including spaced uprights provided with projecting side flanges, means for connecting the uprights to form a framework, horizontal staves extending across the spaces between the uprights and having their ends fitting against the outer faces of the said side flanges, said staves forming vertical panels, and means arranged exteriorly of the silo for detachably clamping the staves against the side flanges of the uprights, whereby the staves are adapted to be removed from the exterior to form a door opening of any desired extent at any point on the silo.

4. A silo including spaced uprights provided with projecting side flanges, means for connecting the uprights to form a framework, horizontal staves extending across the spaces between the uprights and having their ends fitting against the outer faces of the said side flanges, said staves forming vertical panels, vertical clamping bars ad-

justably connected with the uprights and engaging the staves exteriorly of the terminals thereof for detachably clamping the said staves to the uprights.

5. A silo including spaced uprights provided with projecting side flanges, means for connecting the uprights to form a framework, horizontal staves extending across the spaces between the uprights and having their ends fitting against the outer faces of the said side flanges, said staves forming vertical panels, vertical clamping bars located at opposite sides of the uprights and engaging the outer faces of the staves at the ends thereof, and adjustable fastening means piercing the uprights and connecting the clamping bars at opposite sides thereof and adapted to force the same into engagement with the staves.

6. A silo including spaced uprights provided with projecting side flanges, means for connecting the uprights to form a framework, horizontal staves extending across the spaces between the uprights and having their ends fitting against the outer faces of the said side flanges, said staves forming vertical panels, vertical clamping bars located at opposite sides of the uprights and engaging the outer faces of the staves at the ends thereof, and approximately U-shaped bolts extending through the uprights and having their side portions piercing the clamping bars at opposite sides of the said uprights and provided with adjusting nuts for forcing the clamping bars against the staves.

7. A silo including spaced uprights approximately T-shaped in cross section and consisting of an outwardly extending flange having openings, inner side flanges projecting from opposite sides of the said flange, horizontal staves extending across the spaces between the uprights and fitted against the side flanges and forming vertical panels, vertical clamping bars fitted against the staves and arranged at opposite sides of the outwardly extending flanges of the uprights and provided with perforations and having recesses at their inner sides communicating with the openings of the uprights, and U-bolts extending through the openings of the uprights and into the said recesses of the clamping bars and having their side portions passing through the perforations of the clamping bars and provided with nuts for forcing the said bars against the staves.

8. A silo including spaced uprights provided with laterally projecting flanges having concave outer faces forming projecting edges, horizontal staves extending across the spaces between the uprights and having their terminals fitted against the said flanges and engaged by the projecting edges thereof, and adjustable means for forcing the staves against the said edges to provide an air tight connection, said means serving to detachably secure the staves to the uprights and permitting their removal from the exterior of the silo.

9. A silo including spaced uprights consisting of outwardly extending flanges having recesses in their outer edges to form seats, and side flanges projecting from the inner portions of the outwardly extending flanges, bottom braces connecting the uprights at the lower ends thereof, exteriorly detachable staves supported upon the bottom braces and extending across the spaces between the uprights and fitted against the outer faces of the side flanges thereof, horizontal braces connecting the uprights at intervals between the said seats, and hoops encircling the silo and arranged in the seats of the uprights.

In testimony, that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

VERNOM C. ARCHER.

Witnesses:
O. G. FARRIS,
A. F. HUSKEY.

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