F. J. VAN COTT.

SILO,

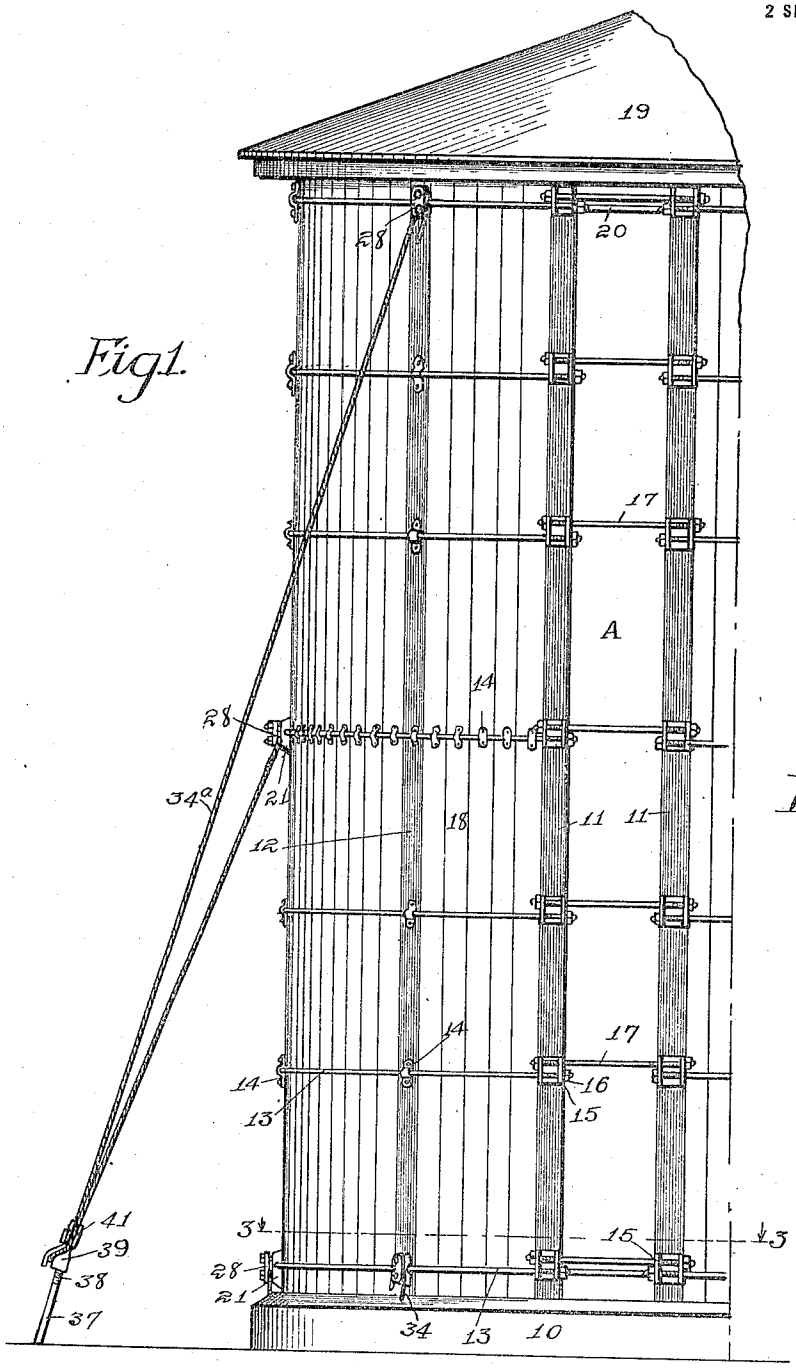
APPLICATION FILED JULY 31, 1916.

1,301,624.

Patented Apr. 22, 1919.

2 SHEETS—SHEET 1.

Fig. 1.



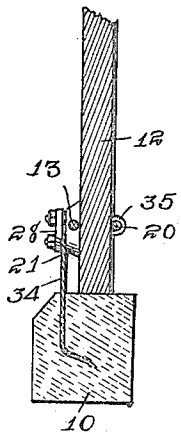


Fig. 2.

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2 SHEETS—SHEET 2.

Fig 8.

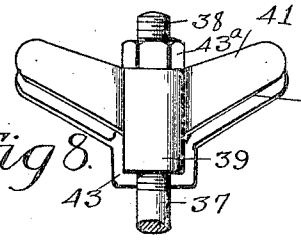


Fig 5

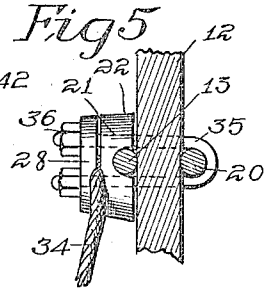


Fig 6

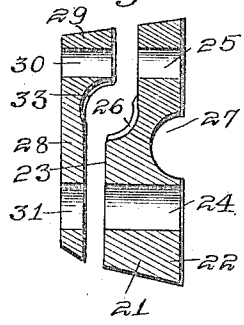


Fig 9.

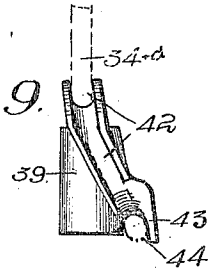


Fig 7

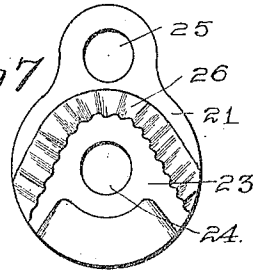
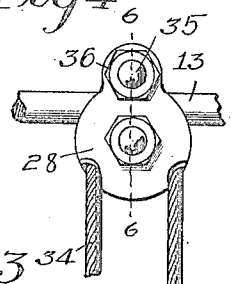


Fig 4



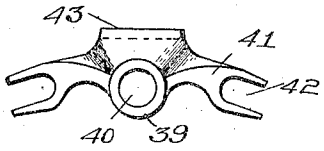
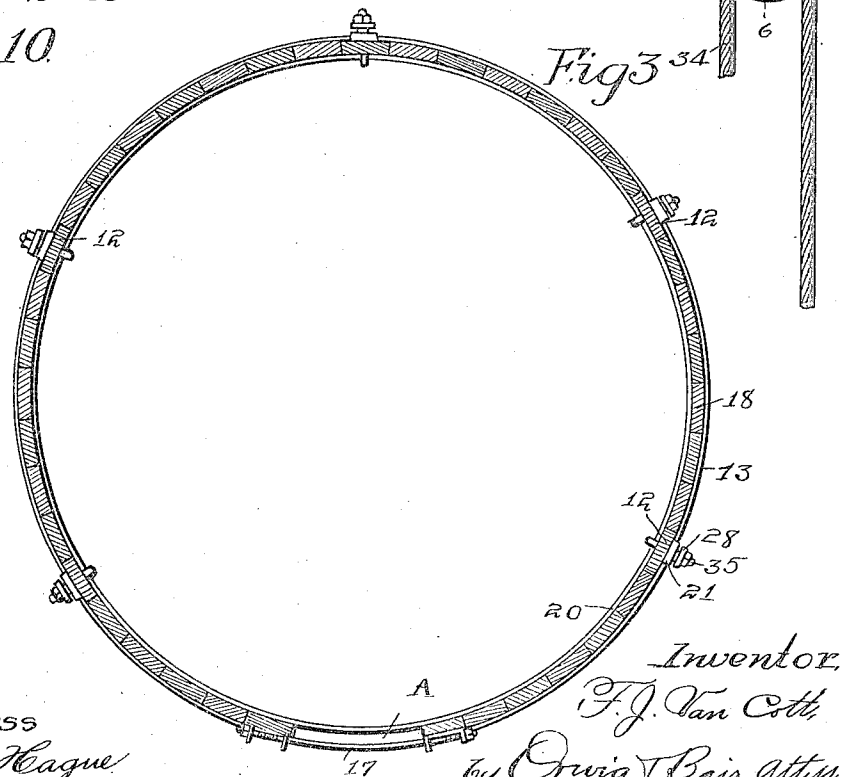


Fig 10.

Fig 3



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UNITED STATES PATENT OFFICE.

FRANK J. VAN COTT, OF UNADILLA, NEW YORK.

SILO.

1,301,624. Specification of Letters Patent. Patented Apr. 22, 1919.

Application filed July 31, 1916. Serial No. 112,431.

To all whom it may concern:

Be it known that I, FRANK J. VAN COTT, a citizen of the United States, and resident of Unadilla, in the county of Otsego and State of New York, have invented a certain new and useful Silo, of which the following is a specification.

The object of my invention is to provide a silo of the stave type having a strong frame, and to provide suitable anchoring means therefor, of strong and novel construction.

A further object is to provide in such a structure, anchoring means requiring a minimum number of anchors.

Still a further object is to provide such anchoring means so arranged as to afford the greatest support against twisting of the silo.

Still a further object is to provide additional anchoring means adapted to secure the lower part of the silo to the foundation on which it is supported, and so arranged as to permit inward and outward movement of the silo wall due to contraction and expansion without destroying the anchoring device.

Still a further object is to provide a device for securing anchoring cables to the silo walls and to a silo hoop.

A further object is to provide a silo of special construction for an anchoring cable.

My invention consists in the construction, arrangement and combination of the various parts of the device, whereby the objects contemplated are attained as hereinafter more fully set forth, pointed out in my claim and illustrated in the accompanying drawings, in which:

Figure 1 shows a front elevation of a portion of a silo embodying my invention.

Fig. 2 shows a vertical, sectional view through the lower portion of the silo wall and the foundation.

Fig. 3 shows a horizontal, sectional view taken on the line 3—3 of Fig. 1.

Fig. 4 shows a front elevation of one of the clamping devices for the anchoring cable.

Fig. 5 shows a side elevation of the same applied to a section of a silo wall.

Fig. 6 shows a vertical, sectional view of the clamping device, taken on the line 6—6 of Fig. 4, the bolt, cable and hoop not being shown.

Fig. 7 shows a front elevation of the inner clamping member.

Fig. 8 shows a detail, front elevation of the saddle viewed from the silo.

Fig. 9 shows a side elevation of the same, and Fig. 10 shows a top or plan view of said saddle.

In the form of my invention illustrated in the accompanying drawings, I have used the reference numeral 10 to indicate generally the foundation upon which my improved silo is mounted, which foundation is preferably of concrete, and is circular in form.

Resting upon the foundation 10 is the silo having a frame comprising spaced upright door frame members 11. Arranged in a circle around the silo and successively spaced from each other are upright frame staves 12.

Arranged at suitable intervals from top to bottom on the exterior of the silo are hoops 13 which are secured to the respective frame staves 12 by metal clips 14. On the door frame members 11 are suitable silo lugs 15 through which the ends of the hoops 13 are extended. The ends of the hoops 13 are provided with ordinary nuts 16. Brace members 17 are extended across the door opening A and through the lugs 15.

Between the successive frame staves 12 are ordinary upright staves 18 which complete the silo wall.

The silo may be provided with any suitable top or cover 19.

At approximately the vertical center of the silo one of the hoops 13 is secured to each of the staves 12 and 18 by means of clips 14.

At the top and bottom of the silo a hoop 20 is placed on the inside of the silo.

It will be seen that the frame staves 12, the door frame members 11 and the hoops form a strong unitary frame structure. The wall is built by means of the staves 18.

For anchoring the silo, I provide the following means.

I use anchoring clamps comprising an in-

ner clamping member 21 of substantially the shape shown in Fig. 7 having a peripheral inwardly extending flange 22 adapted to rest against the exterior of the silo wall and having on its outer surface in its lower central portion an outwardly extending part 23 through which extends an opening 24. A similar opening 25 extends through the upper part of the inner clamping member 21.

A corrugated groove 26 extends from the central portion of the clamping member above the middle thereof on curved lines downwardly and outwardly, as shown in Figs. 6 and 7. The flange 22 is provided on opposite sides of the clamping member 21 with notches 27 shown in Fig. 6.

The outer coacting clamping member 28 is of the general shape shown in Fig. 4, having at its upper portion a thickened flange 29. In the upper portion of the outer clamping member 28 is an opening 30 designed to register with the opening 25 when the parts are placed together. In the lower portion of the member 28 is an opening 31 adapted to register with the opening 24.

Arranged in the rear surface of the body of the member 28 and in the side of the flange or thickened portion 29 which extends downwardly along the side edges of the body 28 somewhat, is a corrugated groove 33 corresponding in form to the groove 26 and adapted to register therewith when the clamping members are placed together.

For anchoring the lower part of the silo directly to the foundation 10, I provide a plurality of anchors each comprising one of the clamps having the members 21 and 28. The members 21 are placed against the silo wall and a wire cable or the like is placed in the groove 26. The outer clamping member is then placed against the inner clamping member with the openings in proper registration, and with the cable 34 gripped between the clamping members, as shown in Figs. 4 and 5.

The shanks of a U-bolt 35 or any other suitable bolts are extended through the silo wall from the inside on opposite sides of the hoop 20 and through the openings 25 and 30 and the openings 24 and 31, as shown in Fig. 5. The nuts 36 are placed on the outer ends of the U-bolt.

The clamp is placed in position with the lower outer hoop 13 received in the notches 27 as shown in Fig. 5 and with the hoop 20 engaged by the U-bolt. One end of the cable 34 is extended downwardly into the concrete base 10 and may be secured to any anchoring body or "dead man" therein, as may be desired.

There is a great advantage in using the clamp and flexible cable over using a rod or rigid anchoring device, insomuch as the contraction and expansion of the silo varies, the diameter and position thereof on the base 10 and the flexible device 34 allows some movement of the silo without breaking any members.

Another advantage of the use of these flexible anchoring devices close to the base of the silo arises from the fact that where a flexible cable has one end fixed in the concrete of the base, the staves, which are ordinarily set up at points considerably outside the lines of the circumference of the finished silo, may be pulled inwardly to the line of said circumference and the flexible anchoring cables will not interfere with said inward movement of said staves. Where a rigid rod or similar anchoring device is used, the rod seriously interferes with the movement of the staves, inwardly, in the manner just described. In the practical construction of stave silos it is the common custom, and is necessary to first set up the staves near the outer edge of the foundation and spaced considerably outside the line of the circumference of the finished silo and then to slide the staves inwardly.

It is well known that it is frequently necessary to tighten or loosen the hoops of a silo of this type. Where my improved flexible anchoring device is used in the manner just described, the flexible cables will permit such loosening or tightening of the hoops much better than will a rigid anchoring device.

The silo is also anchored to some device at a farther distance, as for instance, to a rod 37, suitably secured at a point away from the silo and having a screw-threaded upper end 38. As many of the latter anchoring devices may be used as may be desired.

The rod 37 is connected with the silo at two points thereon, which points may be at different heights and at different places in the circumference of the silo, as clearly illustrated in Fig. 1.

Secured to the upper end of the rod 37 is a saddle comprising a central body portion 39 through which extends an opening 40. The body portion 39 has lateral extensions 41, which are preferably curved slightly inwardly toward the silo when the saddle is installed, and are provided in their lower and side surfaces with grooves 42.

Extending downwardly and outwardly from the central portion of the body 39 is a flange or keeper 43, between which and the body 39 is formed a groove 44.

The saddle is placed with the upper end of the rod 37 extending through the opening 40 as shown in Fig. 8, and a nut screwed on the upper end of the rod 37. Clamp devices are secured to the silo as follows:

One of the clamp devices is secured to the silo in position on the central hoop 13 from the top to the bottom of the silo, having the

larger number of clips 14, and another clamp device is secured in position on the upper hoop 13 at a different point circumferentially of the silo.

The position of the clamps, just mentioned, may of course be varied as desired.

A cable 34ª, similar to that already described is clamped between the members of the two last mentioned clamps and is extended downwardly and around the saddle and through the grooves 42 and 44, as shown by dotted lines in Fig. 9, and in full lines in Fig. 1.

By means of the cable 34ª secured between its ends to one anchor rod 37 by the use of the saddle each anchoring rod is anchored to the silo at different points in the circumference thereof so as to thoroughly anchor the silo against any twisting movement, which result could not be well attained by means of anchoring cables extended from the silo wall downwardly and outwardly in a vertical plane.

It will be noted that when the silo is built, the groove 42 is so shaped and so arranged with relation to the groove 44, that the anchoring cable 34ª extends from the top of the saddle downwardly and thence outwardly and is not curved in a true circle, so that friction would prevent sliding of the cable on the saddle, except under very great strain. I thus accomplish the purpose of frictionally securing the cable between its ends to the saddle without any danger of slippage, except under extraordinary circumstances where some slight slippage is desired.

As many of the anchoring rods 37 may be employed as is necessary for properly anchoring the silo.

The advantages of the construction set forth are largely seen from the foregoing description.

It will be seen that the arrangement of the frame as hereinbefore set forth, with certain upright staves connected together by means of the hoops produces a frame to which the anchoring cables may be secured, so that the anchoring cables are operatively connected with the whole frame.

The use of the inner and outer hoop at the bottom, and if desired, at the top of the silo, and the use of the clamping device, whereby the inner and outer hoops and the staves are secured together makes a strong and rigid construction.

The use of any inner hoop between the top and bottom of the silo, is not desirable, insomuch as such a hoop tends to hold the ensilage and prevents it settling. One of the central hoops, however, is secured to all the staves by means of the clips, whereby the staves are prevented from falling inwardly. Some of the cables are fastened to the last mentioned hoop, thereby connecting all of the staves with the anchoring cables. It is obvious that by connecting the cables to the frame staves and to the ground, as hereinbefore set forth, the silo is braced and reinforced against collapsing and also against twisting either at the top and bottom or in the center.

In some instances of silo construction, cables are used in connection with turnbuckles, whereby adjustment can be secured, one turnbuckle being provided for each cable. With the use of the cables and saddles, as hereinbefore described, it will be seen that a turn-buckle for each cable is dispensed with, and yet adjustment can be had of the stretches of a cable by means of the nuts 43ª, and two cables can be adjusted at a time.

The use of the saddle permits of some equalization of the strain on the two ends of the cable secured thereto. With my simple method of releasing the lower part of the cables it is easy to loosen the cable 34ª and let it swing against the silo for permitting a wagon to be moved close to the silo. In this connection it may be mentioned that the saddles are preferably made of malleable metal, so that the flange 43, may if desired, be bent over toward the body 39 with a hammer for locking the cables to the saddle.

It thus appears that the cable can be detachably secured to the anchoring rods or nondetachably fastened thereto.

The lower anchoring devices utilize the strength of the stave and the two hoops. By using my clamp device, I am able to secure the anchoring rods to the cables and to the silo with a minimum number of clamps or clip devices. In many silo constructions two or more clips or clamps are necessary for accomplishing the purpose of my clamp.

The construction of my clamp is such that it can be used for the longer cables or for the base anchor, so that I am able to use the same clamp and am able to avoid the necessity for using clamps of different kinds for the different anchors.

Another advantage in using a flexible cable and clamping device, as herein shown, arises from the fact that the lower ends of the cables 34, which are secured to the foundation, may be placed in position when the foundation is made and any slight variation in the position of the silo, which may be made will not make it necessary to change the anchoring devices which were embedded in the foundation and will not interfere with properly connecting the flexible cables 34, which are extended into the foundation with the clamping members on the lower hoop 13. The cables are made of any suitable flexible material such as wire or the like.

It is my intention to cover by this application any use of mechanical equivalents or modified forms of structure which may be included within the scope of my claim.

I claim as my invention:

In a device of the class described, the combination of a foundation, a silo supported thereon, a plurality of spaced flexible anchoring devices having their ends secured in said foundation in a circle around said silo, outside the silo but near thereto, and means for detachably securing the upper ends of said flexible anchoring devices to the lower part of the said silo.

Des Moines, Iowa, July 25, 1916.

FRANK J. VAN COTT.

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