T. K. MASSIE.

SILO.

APPLICATION FILED JULY 22, 1916.

1,335,747.

Patented Apr. 6, 1920.

2 SHEETS—SHEET 1.

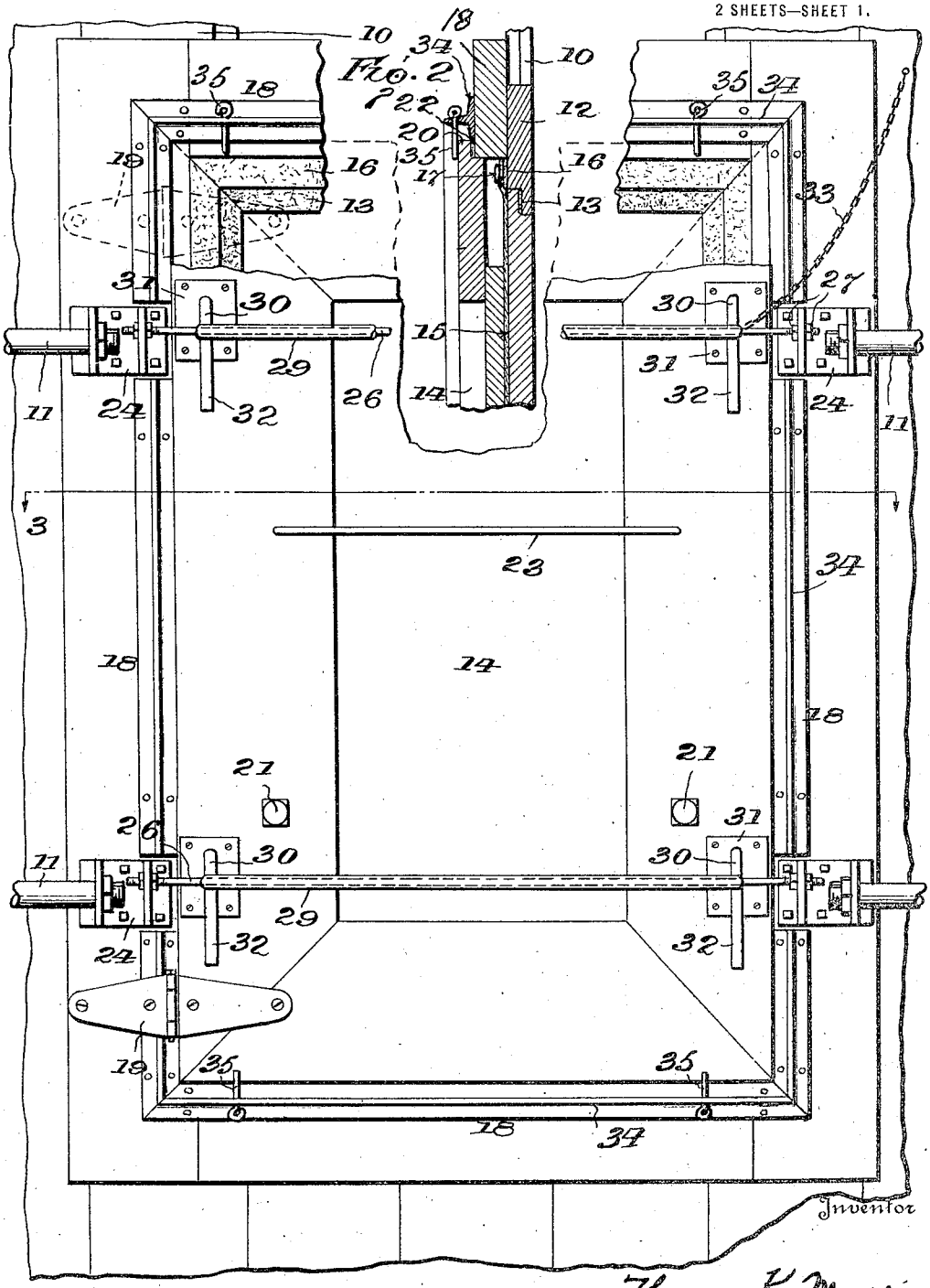


FIG. 1.

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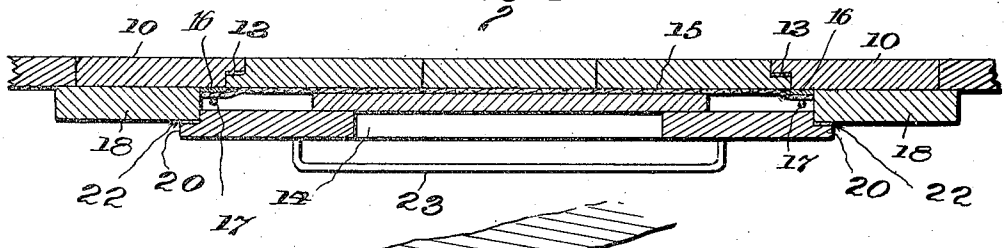
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2 SHEETS—SHEET 2.

Fig. 3.



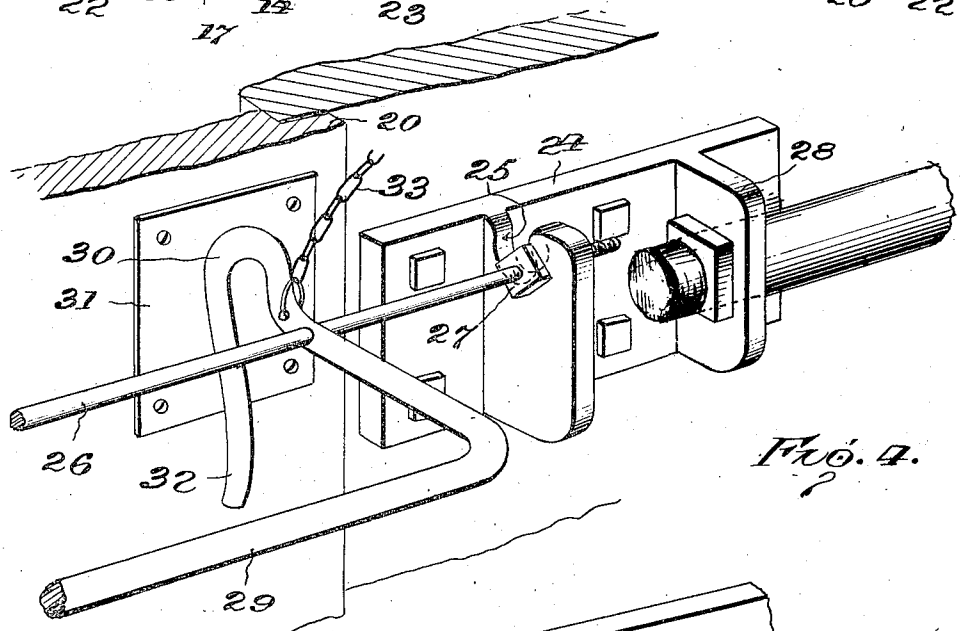
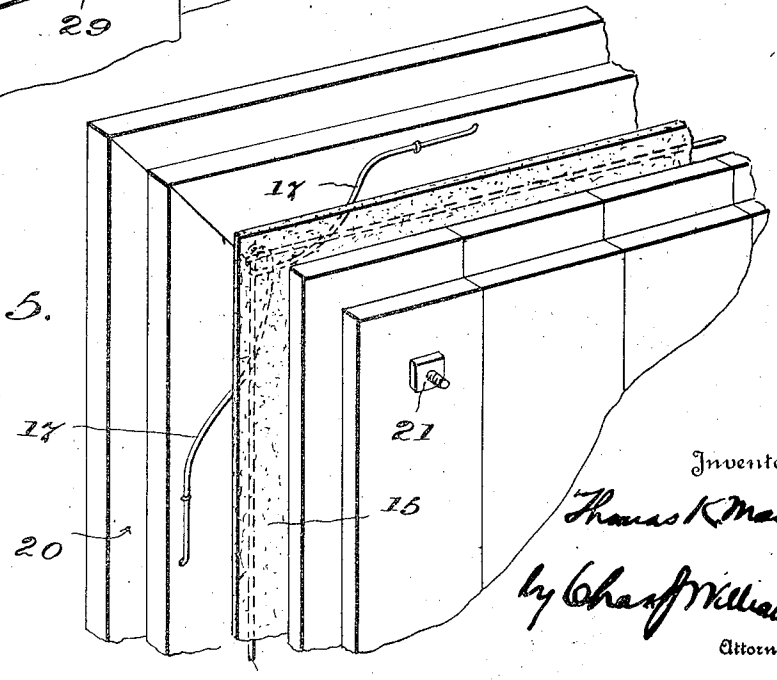


Fig. 4.

Fig. 5.



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UNITED STATES PATENT OFFICE.

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SILO.

1,335,747. Specification of Letters Patent. Patented Apr. 6, 1920.

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To all whom it may concern:

Be it known that I, THOMAS K. MASSIE, a citizen of the United States, and resident of Athens, in the county of Mercer, and in the State of West Virginia, have invented a certain new and useful Improvement in Silos, and do hereby declare that the following is a full, clear, and exact description thereof.

The object of my invention is to provide for access to a silo by the formation of a door opening by cutting, or by what in effect is cutting away certain staves, or a portion of the side wall, and thus avoid the necessity of employing a special door frame for the silo opening, and to provide a closure for such opening which will efficiently close the door opening in an air tight manner and will successfully withstand the pressure to which it will be subjected from the contents of the silo, and, secondary to my object thus generally stated, the provision of a construction which will be simple, scientific and practical, whose parts will be easily manipulated or operated, and which will involve no impairment of the structural strength of the silo, or cause inconvenience in the use thereof.

In the accompanying drawings which illustrate an embodiment of my invention—

Figure 1 is a front view of enough of a silo to illustrate my invention;

Fig. 2 is a vertical section;

Fig. 3 is a horizontal section on the line 3—3 of Fig. 1;

Fig. 4 is a detail view, in perspective showing one of the hoop connections at the door clamp;

Fig. 5 is a detail view in perspective of a portion of the door viewed on the inside.

The silo construction shown in the drawings is in the use of vertical staves 10 and the hoops 11 around the latter, of ordinary construction, and in the wall formed by the vertical staves I cut, or provide a square opening or doorway whose opposite vertical sides are two of the staves and at top and bottom are parallel horizontal cross pieces 12 that extend between said two staves, and half lapped into the said staves so as to hold them firmly together. The inner edge of each of said two staves on its outer side is provided with a groove, or rabbet, and a similar groove, or rabbet is provided in the edge of each of said cross pieces that adjoins the door opening, and at the bottom of each of said rabbets, or grooves is a packing strip 13, of some suitable material, such as rubber, or felt for coöperating with the door 14 when closed to form an air tight joint. The door on each of its four sides on its inner face is rabbeted so that it enters into and overlaps the said rabbet in the staves and said cross pieces so as to form the air tight joint. The door 14 is built up of layers, preferably two, formed each of strips placed side by side with the strips of one layer running at right angles to those of the other, and between the two layers is secured a sheet 15 of acid proof paper which projects beyond each of the four edges of the door so that the latter is thus provided on each of its four sides with an outwardly projecting flexible lip that when the door is closed lies against the surfaces adjacent the door opening around the rabbets above described, and which surfaces are also preferably covered with a strip 16 of acid proof paper. Each of said flexible lips is supported on its inner side by a spring 17, which, as shown in the drawings is formed of wires, and which is attached to the door, so that when the door is closed the flexible lip of acid proof paper will be yieldingly, but nevertheless powerfully pressed in contact with the acid proof paper covering of the surface of the door opening. Thus a tight joint is assured, but without danger of that wear or injury which would come were both strips supported rigidly, or unyieldingly.

Preferably a facing 18 is applied around the doorway on the outer side thereof, which consists simply of two vertical and two horizontal strips of wood that are bolted, or otherwise secured to the two staves at opposite sides of the door opening, the horizontal strips being half lapped or gained into the vertical strips and the door is hinged to this facing by hinges 19 of the separable removable pintle type to enable the ready removal of the door should it be necessary, or desirable, as will be the case when it becomes necessary to renew the acid proof paper which provides the flexible packing lips at the door edges. Pref-

erably the door on its outer side is provided with a rim 20, which at its outer side overlaps the inner edges of the facing 18, and said rim and the two layers which compose the door are separably secured together by bolts 21 in order that the door layers may be separated for the renewal of the acid proof packing paper. Preferably the edges of the door rim 20, which overlap the door facings are covered with a strip 22 of packing material.

A handle 23 is fastened to the door by being attached to the vertical sides of the rim, for the convenient opening of the door.

The cutting, or provision of the door opening necessitates the severing, or interruption of the continuity of one, or more of the silo hoops. I, therefore, to avoid weakening the structure provide a remedy for this situation. At each side of the door upon the facing 18 where the severed end of the hoop comes, I attach to the hoop thereat an outwardly projecting lug 24 in the upper edge of which is a notch 25, and I extend between the alining lugs an iron bar 26 which drops in said slots and projects beyond the same and at each side of the lug has a nut 27 on a threaded portion of the rod between which nuts the lug will be clamped, and thus a rigid connection formed from one lug to the opposite lug and thus the continuity of the silo encircling band restored. By slacking off the nuts on the rod, the rod may be lifted out of engagement with the lugs when it is necessary, or desired to open the door. The lugs 24, which may be of cast metal, are bolted to the outside silo staves and door casing, and besides the notched projection for engagement with the rod 26, there is a second projection 28 to which the severed end of the hook is bolted.

Rigidly attached to the rod 26 is a U-shaped bar 29, a portion of which extends parallel with said rod, and two portions of which at the end of the rod extend at right angles and terminate in rounded eccentric arms 30, which, by the rocking of said bar and rod when the door is closed, bear against the outer sides of the door rim (and preferably upon a metal wear plate 31 thereon) and cam or crowd the door to a tightly closed position, at which time the bar 26 occupies a horizontal plane and forms a ladder step or rung of the series on the outside of the silo to enable one to ascend and descend the side of the silo. The cam-forming rim 30 has a tail, or extension 32 which contacts with the outer side of the door rim when the bar 26 is in its horizontal position and thereby prevents downward movement of said bar and firmly supports it under the weight of one using the bar as a step, or ladder rung. To prevent the loss, or misplacing of the rod 26, and the bar 29, attached thereto, when they are removed from the lugs and from the door, I preferably attach thereto one end of a cord, or chain 33, whose other end is attached to the door facing sufficiently to one side of the door so that hanging suspended by the chain said rod and bar will be out of the way.

On each side of the doorway close to the edge thereof, I bolt an angle iron which may be a T-iron 34, the horizontal flange of which overhangs the edge of the door facing 18, and I provide the horizontal member of the angle iron with one or more holes adapted each to receive a pin 35 of sufficient length to project over the margin of the door facing 18. Thus, the structure is stiffened by the employment of the angle iron and a simple means afforded to add to the security of the closure of the door so that it is amply held against any silage pressure on the inside that tends to push the door open, and by letting air around its edges result in molding of the silage.

As will be evident from a consideration of the structure which I have shown in the drawings and described, my invention provides a complete and perfect silo door system, comprised completely in a doorway and door of simple and highly efficient construction, and one that, by the number of shouldered and packed abutting surfaces it provides, assures an air tight closure, and which in no degree impairs the strength of the structure, or its convenient use; and an important feature is the avoidance of the use of a special costly door frame built in, or around the door opening, for by my invention all the elements entering into the structure are built upon, or applied to the silo stave structure on the outside thereof. Besides serving as an excellent means of connecting the ends of the hoops on opposite sides of the door opening, the device that I use for that purpose also affords a powerful lock for holding the door tightly closed against pressure from the inside, and provides one of the steps, or rungs of the silo ladder. And the silo is in no way weakened in its construction because the pressure from the inside can be no greater over the door than it is around the body of the silo.

Of course, changes in detail of construction may be made without departure from the principle of my invention.

Having thus described my invention what I claim is—

1. A silo having a door way, a door, a hoop terminating at each side of the door, brackets secured at the door sides, to which said hoops are connected a door clamp in the form of a bar that extends across the door, and pivotally and removably connected to said brackets on an axis that extends cross-

wise of the doorway, and having a cam form door engaging member with a stop finger to limit the downward swing of the bar.

2. A silo having a doorway, a door, a hoop terminating at each side of the door, brackets at both sides of the door with which said hoop ends are connected and a removable rod connected at opposite ends to said hoop brackets and extending across the door, and a rocking door clamp connected with said rod, consisting of a U-shape bar having at each end a cam-forming arm, and a stop finger extending from the arm.

In testimony that I claim the foregoing I have hereunto set my hand.

THOMAS K. MASSIE.