J. W. AMES.

SILO.

APPLICATION FILED MAY 3, 1913.

1,093,904.

Patented Apr. 21, 1914.

2 SHEETS—SHEET 1.

Fig. 1.

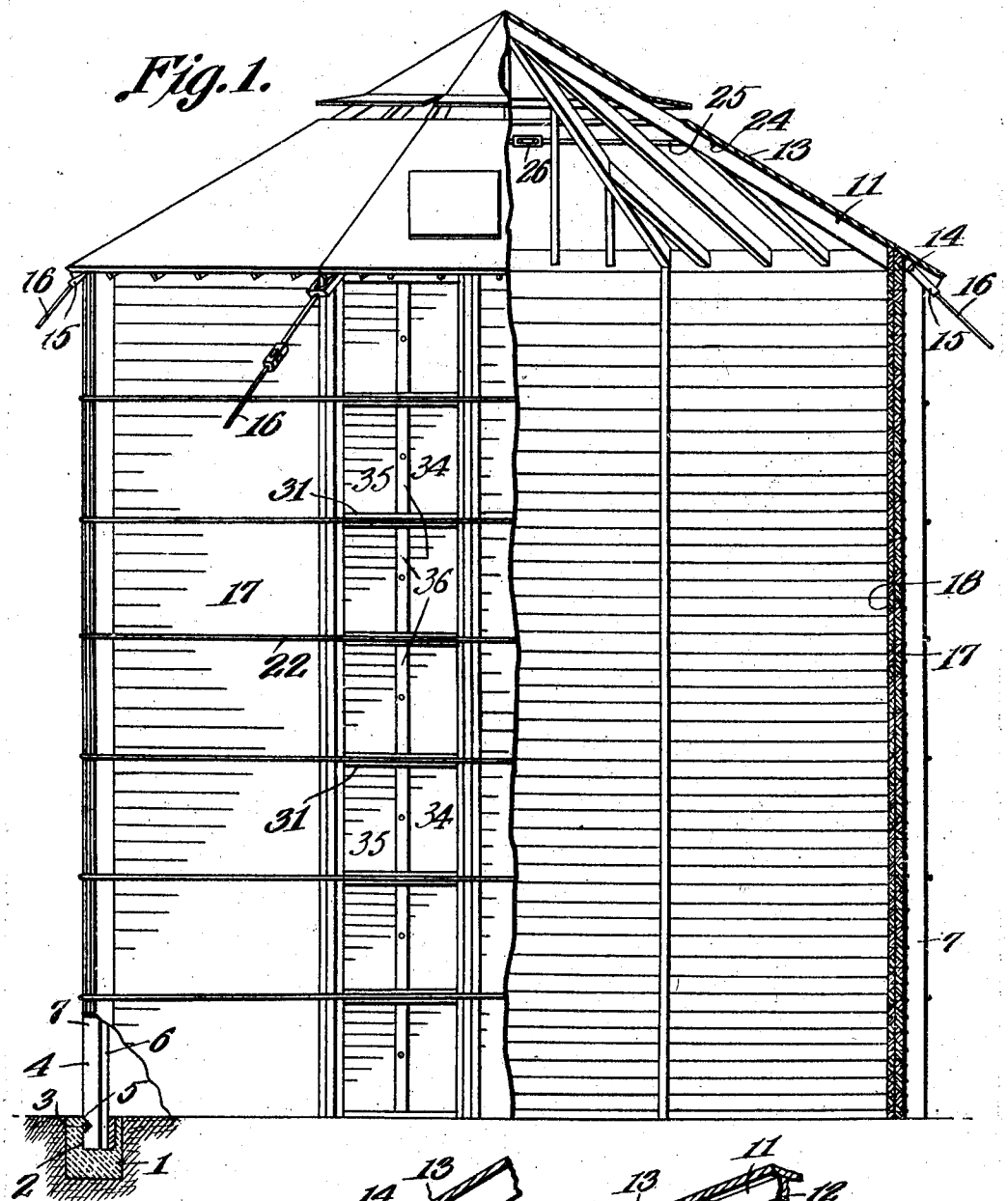


Fig. 3.

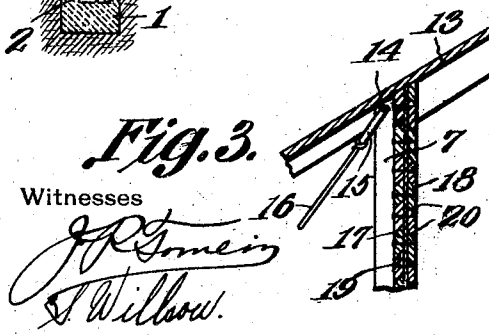
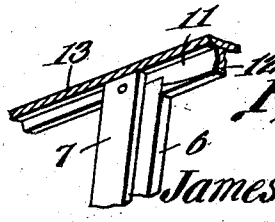


Fig. 4.



Witnesses

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2 SHEETS—SHEET 2.

Fig. 2.

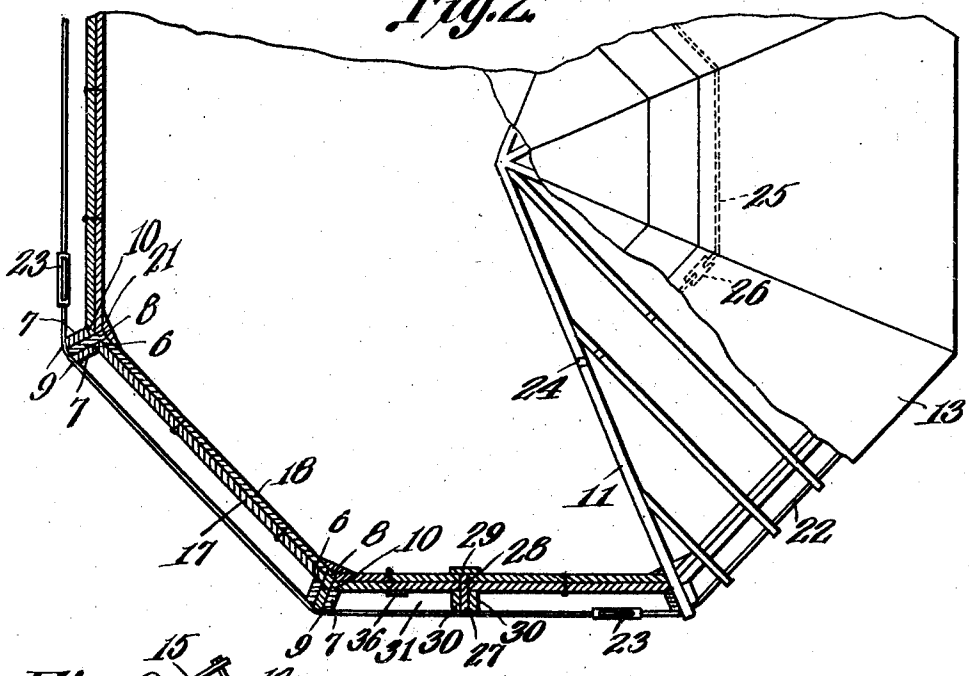
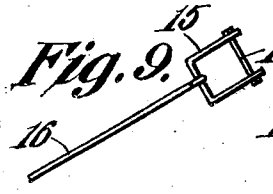


Fig. 9.



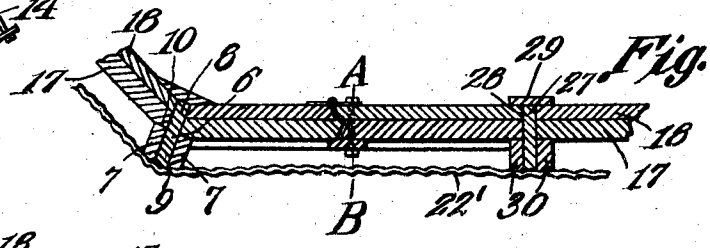


Fig. 5.

Fig. 6.

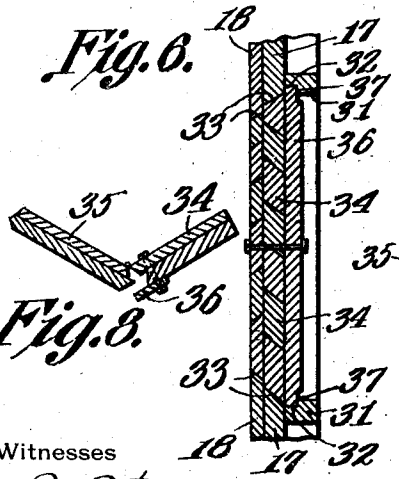


Fig. 8.

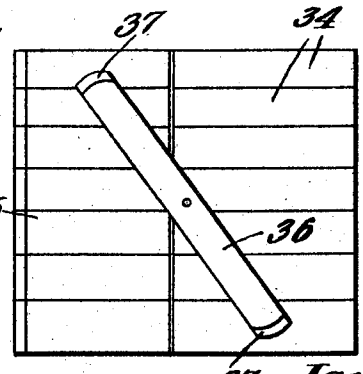


Fig. 7.

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SILO.

1,093,904. Specification of Letters Patent. Patented Apr. 21, 1914.

Application filed May 3, 1913. Serial No. 765,364.

To all whom it may concern:

Be it known that I, JAMES W. AMES, a citizen of the United States, residing at Lubbock, in the county of Lubbock and State of Texas, have invented a new and useful Silo, of which the following is a specification.

This invention relates to silos, one of its objects being to provide a silo made up of sections which can be assembled in any desired numbers so as thus to form a silo of any capacity desired.

A further object is to provide a silo of this character which can be erected without the necessity of employing scaffolding.

A further object is to provide a wooden silo the parts of which are so assembled as to prevent positively the admission of air and moisture to the interior therof.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed, can be made within the scope of what is claimed, without departing from the spirit of the invention.

In the accompanying drawings the preferred form of the invention has been shown.

In said drawings:—Figure 1 is a view partly in side elevation and partly in section of a silo embodying the present improvements. Fig. 2 is a view partly in plan and partly in horizontal section of a portion of the silo, part of the roof being broken away. Fig. 3 is an enlarged vertical section through a portion of the roof and wall. Fig. 4 is a perspective view of the upper end portion of one of the standards and showing the manner in which it is fitted to a rafter. Fig. 5 is an enlarged horizontal section through a portion of a wall and through a door in position therein. Fig. 6 is a section on line A—B Fig. 5. Fig. 7 is an elevation of the door removed from its frame. Fig. 8 is a horizontal section through the door on a reduced scale, said door being shown partly folded. Fig. 9 is a detail view of a portion of one of the guys and its connecting stirrup.

Referring to the figures by characters of reference 1 designates a foundation preferably formed of concrete and having recesses 2 therein at desired intervals, each recess having a projection 3 extending thereinto. The lower end of a standard 4 is adapted to be seated in each recess, this standard being formed with a transverse notch 5 so that, when the standard is shifted toward the projection 3, said projection will become seated in the notch. By then filling back of the standard, the said standard becomes firmly anchored to the foundation.

Each standard is formed of a central timber 6 and side timbers 7, the timber 6 extending inwardly beyond the side timbers so as thus to form a longitudinal rib 8. The outer edges of the side timbers 7 are beveled, as shown at 9 while the inner edges of these side timbers form shoulders or abutments 10.

Resting upon the upper end of each central timber 6 is a rafter 11, that portion of the rafter above the timber 6 being cut away to form a shoulder 12 against which the upper end of the central timber 6 abuts, as shown particularly in Fig. 4. The side timbers 7 extend upwardly so as to lap the sides of the rafter 11, as shown in Fig. 4, the upper ends of these side timbers being in contact with the roof boards 13. A bolt 14 extends transversely through the upper portions of the side timbers 7 of each standard and also through the rafter 11 extending between said side portions or timbers 7. This bolt 14 engages the ends of a stirrup 15 and the stirrup, in turn, is engaged by one end of a guy wire or rod 16 which extends downwardly and outwardly from the standard and is suitably anchored at its lower end. Thus it will be seen that the guy pulls both upon the rafter and the standard and that the bolt used for connecting the stirrup to the silo also serves to bind the several parts together.

The spaces between the standards 4 are filled with outer and inner siding boards 17 and 18 respectively. The boards of the

outer siding have their upper and lower or longitudinal edges beveled as shown at 19, so as to shed moisture outwardly while the boards of the inner siding 18 having their upper and lower edges beveled so as to shed inwardly, as shown at 20. Furthermore the boards of the inner siding lap the joints between the boards of the outer siding and the uppermost boards of the inner and outer sidings are shaped so as to extend tight against and between the rafters and against the roof boarding 13. The angles formed back of the standards 4 where the walls come together are preferably provided with retaining cleats or strips 21 which fit snugly against the adjacent portions of the inner siding and against the inner edges of the ribs 8. These cleats or strips 21 not only serve to more securely retain the sidings in engagement with the standards, but they also reduce the angles formed by the walls and therefore eliminate all danger of ensilage becoming hung within the angles.

It will be noted by referring to Figs. 2 and 5 that the ends of the siding boards are so shaped as to fit snugly against the ribs 8. Furthermore the boards of the outer siding 17 are beveled so as to fit snugly against the shoulders or abutments 10. The various parts of the silo walls are bound together securely by hoops made up of rods 22 connected at suitable points by turn buckles 23. These rods bear against the beveled outer edges of the side timbers 7 and when tightened serve to bind the parts securely together.

For the purpose of tying together the rafters 11, notches 24 are formed therein to receive a rod 25 having a turn buckle 26 whereby it can be tightened in the notches and thus hold the rafters properly assembled. The roof boards or sheets are adapted to be secured upon the rafters and to extend over this rod or rods so as to thereby retain the rod or rods within the notches 24.

One of the walls of the silo is provided with door openings, these openings being located between one of the corner standards 4 and a supplemental standard 27. This supplemental standard is similar in construction to the standards 4 and the inwardly extending rib 28 of the supplemental standard has a retaining cleat 29 secured thereto so as to hold the siding boards 17 and 18 against the side timbers 30 of the standard 27. The space between the standard 27 and the adjacent standard 4 is intersected by the cross strips 31 which are secured at their ends to the adjacent side timbers 7 and 30 of said standards. These strips have rabbets 32 along the inner edges thereof and the siding boards 17 and 18 extend past the strips 31 and are shaped to form stepped beveled upper and lower walls of the door openings, as shown at 33. All of these bevels diverge outwardly so as thus to constitute abutments for a door when inserted into the opening.

Each door is formed of two hingedly connected sections 34 and 35, each section being preferably formed of inner and outer thicknesses of boards beveled along their upper and lower edges in the same manner as are the inner and outer siding boards 17 and 18 and disposed in lapped relation as are said siding boards. This construction has been clearly illustrated in Figs. 6 and 7. Furthermore the meeting edge portions of the two sections 34 and 35 are so arranged as to form a lapped joint, as shown in Fig. 8, the boards of the inner thickness coming together at points out of alinement with the points of contact between the boards of the outer layer of the door. The free or side edges of the door are shaped to fit snugly against the standards forming the sides of the door opening and so as to extend between the side timbers of said standards and the inner cleats connected to the standards. In Figs. 2 and 5 the position of the door when in engagement with the standards has been clearly illustrated.

One section, 34, of each door has a locking strip 36 pivotally connected to it, this strip having reduced ends 37 adapted, when the strip is shifted to a substantially vertical position, to enter the rabbets 32 and thus hold the door clamped tightly against the beveled upper and lower walls of the door opening, (see Fig. 6). In order to open one of the doors it is merely necessary to swing the locking strip 36 out of engagement with the cross strips 31 whereupon the hingedly connected edges of the sections 34 and 35 can be drawn outwardly through the door opening thereby withdrawing the side edges of the door from their seats against the standards 27 and 4.

Importance is attached to the fact that in constructing a silo of any size, practically the same forms of timbers are employed. It is only necessary to make slight changes in the bevels of the end cuts of the siding boards and to change the bevels of the upper ends of the standards where they are connected to the top. Thus it is only necessary to cut the various parts to a predetermined shape at the mills and these parts can be readily changed, as stated, so as to adapt the timbers for use in constructing different sized silos. By constructing the walls as described, any desired number of them can be readily assembled and it has been found, in practice, that these parts can be assembled without the use of scaffolding such as commonly employed.

A silo such as herein described can be made of one size and, at a later date, should

it be desired to increase its capacity, it becomes merely necessary to remove the rafters from the standards, splice additional standards in position on the standards formerly placed, and then replace the roof as before, thus quickly increasing the height of the silo. Furthermore by using the sectional construction described, the silo can be erected on leased ground and can be removed at will to a new location. Furthermore the silo can be taken down and treated with creosote or the like whenever desired, this treatment being effected by treating the material in a vat.

By constructing the walls of the beveled lapping boards or strips, and with the peculiar beveled ends, and by utilizing the hoops engaging the outer surfaces of the standards the silo will accommodate itself to all shrinkage or expansion, both lateral and vertical, it being possible to space the parts of the siding strips or boards so as to allow for shrinkage without, however, opening a joint at any point in the structure. By beveling the joints between the strips of siding, the accumulation of moisture in the joints is largely prevented, and said joints will dry rapidly so as thus to prevent decay such as might occur in tongue and groove connections. Furthermore by utilizing two thicknesses of siding, the outer thickness can be made of ordinary pine or other sheet material whereas the inner thickness can be formed of cypress, fir, or other more durable woods, thus getting all the advantages of a silo made entirely of such more durable wood, without, however, entailing the high cost which would result from the construction of a silo made entirely of this desirable lumber. Obviously, therefore, the construction of a silo having walls of two thicknesses is decidedly advantageous as compared with a silo the wall of which is formed of a single thickness of wood.

It is designed to securely nail or otherwise fasten together the corresponding inner and outer strips of the siding so that the two strips thus constitute a single body capable of shrinking or expanding independently of the next adjoining strips, and always maintaining their predetermined relation to each other.

Importance is attached to the particular construction of the standards as it thus becomes unnecessary to tongue or groove any of the parts and, consequently, there is no danger of splitting the standards. Furthermore by extending the ribs of the standards entirely through the wall, the pressure exerted by the siding boards is equalized upon both sides of the standards and is received solely by the standards, thus providing a construction far superior to that in which the standards extend only partly through the walls and in which certain portions of the siding bear against each other while the other portions bear against the standards.

By providing the construction described, the silo can be mended readi y by cutting out any defective piece, this being done by cutting the piece in the center and removing the ends from engagement with the standards. A new piece may then be inserted and held together where the pieces meet, by placing cleats on the back or front faces of the sections thereby sealing the joint ar d strengthening the inserted parts.

Especial importance is attached to the provision of the bevels at the ends of the siding boards as these coöperate with the strips 7 and cleats 21, for binding the siding strips together, thereby making tight joints between them where they lap, the said laps being kept tight by the hoops.

Instead of employing hoops made of straight metal, said hoops can be corrugated so as thus to exert a constant pressure upon the standards and thereby permit any necessary expansion and at the same time hold the parts tightly together should they shrink. A portion of this form of hoop has been shown at 22′ in Fig. 5.

What is claimed is:—

1. A knock-down silo including standards each comprising a central timber, side timbers, said central timber extending inwardly from the side timbers to form a spacing rib, and a retaining cleat secured longitudinally along the rib, and siding boards fitted at their ends against the ribs and between the side timbers and the retaining cleats.

2. A knock-down silo including standards each comprising a central timber, side timbers, said central timber extending inwardly from the side timbers to form a spacing rib, and a retaining cleat secured longitudinally along the rib, siding boards fitted at their ends against the ribs and between the side timbers and the retaining cleats, and a tie device extending around the silo and engaging the outer faces of the standards.

3. A knock-down silo including standards and siding boards fitted at their ends against the standards, said siding strips being arranged in inner and outer layers, the strips of the outer layers having the upper and lower edges beveled downwardly and outwardly and the strips of the inner layer having their upper and lower edges inclined downwardly and inwardly, said strips of the inner layer lapping the joints between the strips of the outer layer.

4. A knock-down silo including standards, siding strips fitted at their ends against the standards, said siding strips being arranged in inner and outer layers, the strips of the outer layer having the upper and lower edges thereof beveled downwardly and outwardly and the strips of the inner layer hav-

ing their upper and lower edges inclined downwardly and inwardly, said strips of the inner layer lapping the joints between the strips of the outer layer, and an adjustable tie device extending around the silo and engaging the outer faces of the standards.

5. A knock-down silo including standards, each consisting of a central timber and side timbers, said central timber extending inwardly from the side timbers to form a rib, and rafters having their outer ends cut away and bearing downwardly upon the central timbers of the standards, there being shoulders at the inner ends of said cut away portions and abutting against the ribs, the side timbers lapping the sides of the rafters and having their upper ends flush with the upper edges of the rafters.

6. A knock-down silo including standards, each consisting of a central timber and side timbers, said central timber extending inwardly from the side timbers to form a rib, rafters having their outer ends cut away and bearing downwardly upon the central timbers of the standards, there being shoulders at the inner ends of said cut away portions and abutting against the ribs, the side timbers lapping the sides of the rafters and having their upper ends flush with the upper edges of the rafters, siding boards fitted between the standards and bearing against the inner edges of the side timbers, and adjustable tie devices engaging the rafters and the standards respectively.

7. A knock-down silo including standards, each consisting of a central timber and side timbers, said central timber extending inwardly from the side timbers to form a rib, rafters having their outer ends cut away and bearing downwardly upon the central timbers of standards, there being shoulders at the inner ends of said cut away portions and abutting against the ribs, the side timbers lapping the sides of the rafters and having their upper ends flush with the upper edges of the rafters, siding boards fitted between the standards and bearing against the inner edges of the side timbers, adjustable tie devices engaging the rafters and the standards respectively, and roofing secured upon the rafters and constituting means for holding the rafter engaging tie devices in position.

8. In a silo the combination with standards, each including a central timber and side timbers, said central timber extending inwardly to form a rib, of rafters bearing downwardly upon the central timber, each rafter having a shoulder abutting against the adjacent rib, said side timbers being extending along the sides of the rafters and up to points flush with the upper edges of the rafters, stirrups straddling the standards, guys connected to the standards, and means extending through the stirrups and through the lapping portions of the rafters and side timbers for securing said stirrups, rafters and timbers together.

9. A knock-down silo including standards each comprising a central timber and side timbers, siding strips having beveled ends abutting against the inner edges of the side timbers and the side edges of the central timber, and means extending around the silo for binding the standards and siding strips together.

10. A knock-down silo including standards each comprising a central timber and side timbers, said central timber extending inwardly from the side timbers to form a rib, outer siding strips having beveled upper and lower edges inclined downwardly and outwardly, the ends of said outer siding strips fitting against the ribs and being beveled to engage the inner edges of the side timbers, and inner siding strips lapping the joints between the outer siding strips and having their upper and lower edges beveled and inclined downwardly and inwardly, the ends of said inner siding strips being beveled and fitted against the ribs of the standards.

11. A knock-down silo including standards each comprising a central timber and side timbers, said central timber extending inwardly from the side timbers to form a rib, outer siding strips having beveled upper and lower edges inclined downwardly and outwardly, the ends of said outer siding strips fitting against the ribs and being beveled to engage the inner edges of the side timbers, and inner siding strips lapping the joints between the outer siding strips and having their upper and lower edges beveled and inclined downwardly and inwardly, the ends of said inner siding strips being beveled and fitted against the ribs of the standards, each inner siding strip being fixedly secured to the corresponding outer siding strip.

12. In a silo, the combination with spaced standards, each including a central timber and side timbers, said central timber extending inwardly to form a rib, and a retaining cleat secured to the inner edge of the rib, of cross strips secured at their ends to the side timbers and constituting the upper and lower walls of a door opening, said strips being rabbeted along their inner edges, outer and inner siding strips interposed between and connected to the standards and having stepped beveled edges diverging outwardly and constituting upper and lower walls of the door opening, a door including hingedly connected sections, each section consisting of outer and inner layers of strips, the strips of the outer layer being beveled downwardly and outwardly and the strips of the inner layer being beveled downwardly and inwardly, the inner edges

of the two sections forming a lapped joint when brought together, the outer edges of said sections being insertible against the ribs of the standards and against the side timbers and the retaining cleats, and a locking bar pivotally connected to one of the sections and having its ends insertible into the rabbeted portions of the cross strips.

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

JAMES W. AMES.

Witnesses:
HENRY MOUNT,
W. F. SCHENCK.

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