

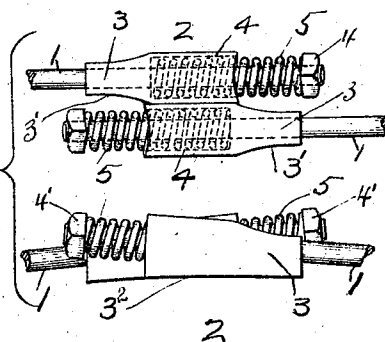
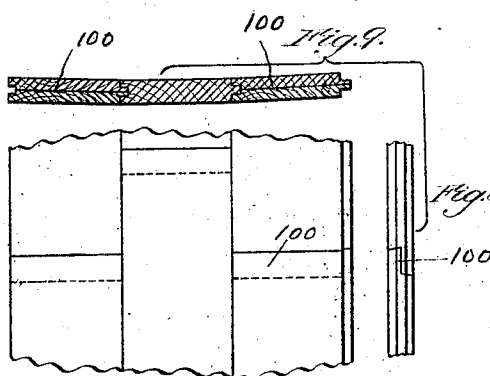
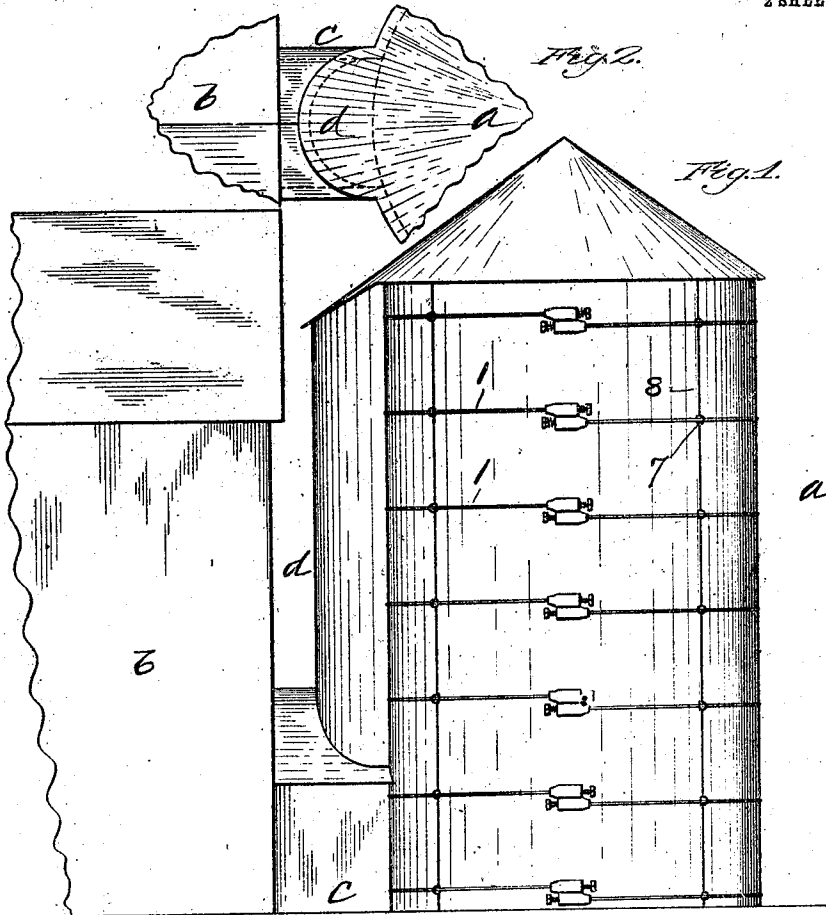
E. HILLARD.
SILO.

APPLICATION FILED JULY 11, 1906.

950,134.

Patented Feb. 22, 1910.

2 SHEETS—SHEET 1.



Witnesses:

C. F. Stone

L. H. Remond

Inventor

E. Hillard

per

J. E. Hart
Attorney

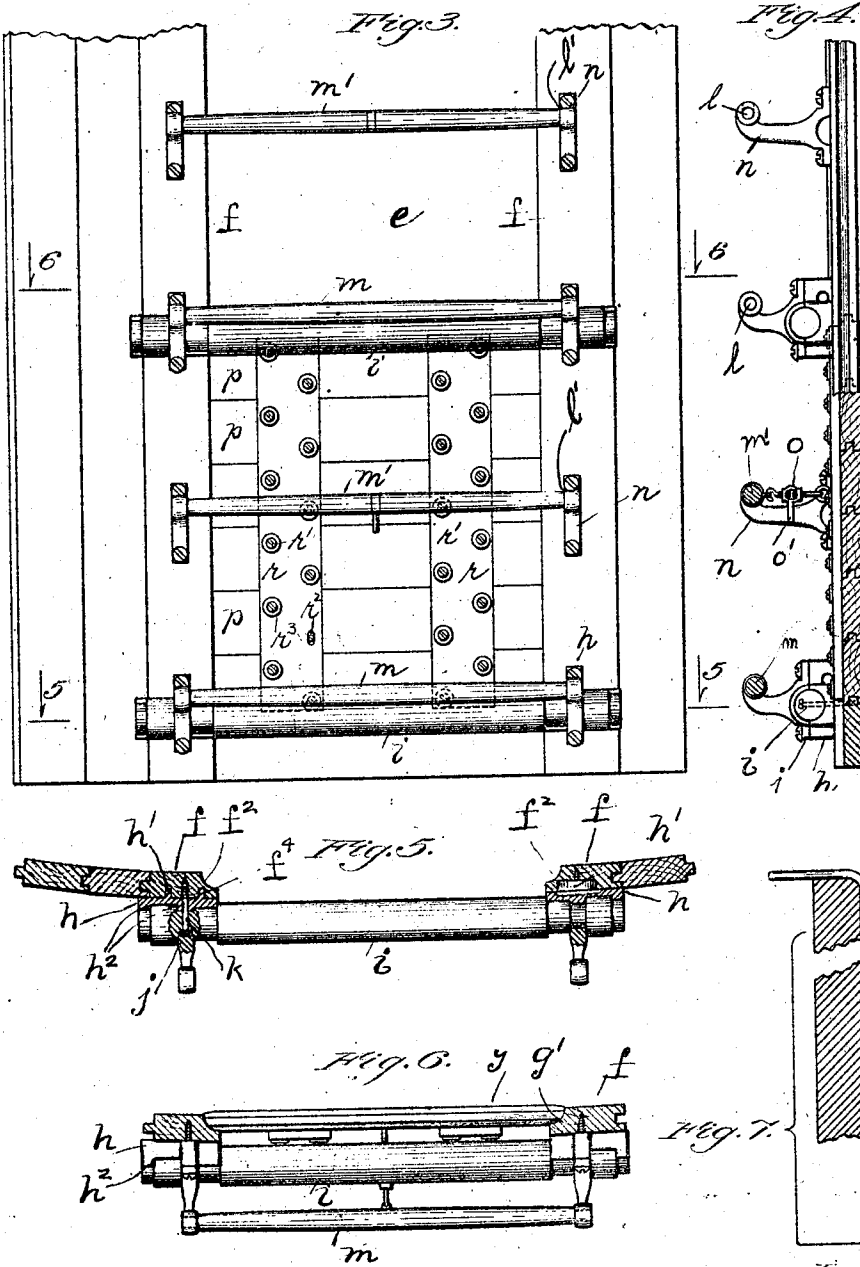
E. HILLARD.
SILO.

APPLICATION FILED JULY 11, 1906.

Patented Feb. 22, 1910.

2 SHEETS—SHEET 2.

950,134.



Witnesses:

C. F. Storrs

A. Heimsch

Inventor

Clapham Hillard
per J. E. Scott
Attorney

UNITED STATES PATENT OFFICE.

ELIPHALET HILLARD, OF MERIDEN, CONNECTICUT.

SILO.

950.134.

Specification of Letters Patent.

Patented Feb. 22, 1910.

Application filed July 11, 1906. Serial No. 325,639.

To all whom it may concern:

Be it known that I, ELIPHALET HILLARD, citizen of the United States of America, residing at Meriden, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Silos, of which the following is a specification.

The particular object of this invention is to produce a knockdown silo; that is to say, a silo, the parts of which can be manufactured at a mill or wherever the lumber is available and which can be taken down and shipped in comparatively small pieces to be again set up at the place of use with great certainty and facility.

My invention also includes many details of construction which are of decided advantage and which will be more particularly described hereinafter.

Referring to the drawings—Figure 1 is a general side elevation of a silo showing its arrangement with respect to a barn. Fig. 2 is a small plan elevation showing the connection part between the silo and the barn. Fig. 3 is a detail view on enlarged scale showing the opening in the silo and the ladder front therefor. Fig. 4 is a side view of Fig. 3, part being shown in section. Fig. 5 is a sectional view on the line 5—5 of Fig. 3. Fig. 6 is a sectional view on the line 6—6 of Fig. 3. Fig. 7 is a detail view showing the supporting means for the hubs. Fig. 8 shows a plan and side view of a compensating lug. Fig. 9 shows a sectional side and edge view of construction of the silo wall.

The silo is indicated in general at *a*, the barn at *b*, the connecting passage at *c*, and the chute at *d* covering the opening through which access may be had to the silo.

The wall of the silo is built of the usual tongue and groove staves. The ends of the staves are reduced in thickness about one-half as illustrated in the edge and sectional views of Fig. 9, so that they will overlap each other forming a rather deep splined joint, as indicated at 100. The ends of these staves are chamfered off, slanting upwardly from the outer side of the stave as indicated in the edge view of Fig. 9, so that the line on which the ends of the staves join one another is inclined from the outside and inside upwardly. Before the ends are put together they are covered with white lead to seal the joint. In this way a joint is provided which will prevent water or moisture from work-

ing through the joint from the out to the inside or the in to the outside of the silo. When the staves are put into position an opening *e* is left which is continuous from the top to the bottom of the silo. The staves *f* which form the sides of this opening are grooved on their inner edges as at *f*² and the doors *g* are rounded on their edges as at *g*¹ to fit in these grooves. Spaced at intervals along the edge staves *f* annular grooves *f*¹ are cut to receive the hollow hubs *h*¹ of socket castings *h*. These socket castings have transverse bores which have interior circumferential grooves forming shoulders *h*² to receive the shouldered ends of the tie-rods *i*, the socket being provided with a removable cap *j*. Screws *k* pass through the cap and the base of the socket castings into the staves to hold these socket castings in position. It will be seen that these socket castings by reason of their hubs entering the grooves in the staves are held firmly against movement and that the screws which fasten the sockets to the staves are relieved of a considerable amount of duty; that the tie-rods are shouldered in the sockets so that they cannot move lengthwise with respect thereto and are firmly held therein, constituting a rigid spacing support for the staves *f* *f* which form the edges of the continuous opening. The caps of these sockets are extended to form brackets provided with recesses *l* to receive the ends of the ladder rounds *m*. These tie rods *i* are not spaced near enough together to form in themselves a ladder so that between each pair of tie-rods there are secured to the staves brackets *n*, one of which has a transverse bore for one end of a ladder round *m*¹, the other bracket having a recess *l* to receive the other end of the round. This continuous opening in the silo is closed by a series of doors each of which is of sufficient length to extend between each pair of ties *i*, bringing the center of each door section about under the intermediate ladder rounds *m*¹. Each door section is connected with the ladder round which it underlies by a turn buckle *o* provided with a little handle *o*¹ for operating it. By means of this turn buckle the door sections are drawn into place with their curved edges *g*¹ seated firmly against the grooved edges *f*² of the staves *f*, forming a tight joint and holding the door firmly in place. The tops and bottoms of the door sections are tongued and grooved so that one will fit on the other to close cracks between

the several door sections and form a tight closure for the opening. The doors are made of transverse strips π tongued and grooved to which are secured a pair of cleats r by lag screws r' . The holes r^2 in the cleats through which these lag screws pass are larger than said screws, washers r^3 being provided under the heads of the screws to give them a bearing. When the doors shrink the screws can be loosened and the strips hammered together and the screws tightened up. By this method of construction I provide a door which can always be kept perfectly air tight.

Another part of my invention relates to an attachment and support for the customary hoops which encircle the silo to hold the staves in place against expansion and contraction. These hoops are indicated in Figs. 1 and 8 at 1. They are preferably round metal rods extending around the silo at intervals from top to bottom. I provide a compensating lug 2 made up of a pair of identical oppositely directed tubular members 3 through which the ends of the hoops pass. These tubular members are chambered out as at 4 to receive springs 5 which surround the ends of the hoops. These hoops are bent around the silo, the ends pass through the tubular members 3 of the compensating lugs, the springs are slid on over the threaded ends of the hoops taking bearings against the shoulder in the chamber 4 and the ends are then tightened by drawing the hoop firmly around the silo and compressing the springs by means of the nuts 4'. The members are slightly tapered as at 3' to facilitate the manipulation and free action of the spring ends and said nuts 4'. The rear face 32 of the lug is slightly curved to fit the exterior surface of the silo. If the silo expands the springs allow for expansion; if the silo contracts the springs take up any looseness in the hoops. Thus by the use of this compensating lug the hoops are continually drawn tightly around the silo insuring a perfectly tight wall. In order to facilitate the putting on of the hoops and to prevent them from dropping down I provide rings 7 which are suitably supported and spaced as on the depending wires 8, the hoops being passed through these rings and thus kept in alignment. The construction and support of these hoops is clearly shown in Fig. 7.

It is customary at the present time in connecting the silos with the barn to form a connecting chamber which extends from the top to the bottom of the silo. Such an arrangement is objectionable for the reason

that it forms a pocket for wind and snow which exerts a very heavy strain on the silo and often throws it over or destroys it. I provide a connecting passage from the barn to the silo, indicated at c , which is of a height sufficient to allow a person to walk through, and from the top of this passage I provide a semicircular chute d which covers the opening in the side of the silo and extends to the top thereof but leaves a clear passage between the silo and the barn, thus relieving to a very large extent wind strains on the silo.

As a result of this construction the several parts of the silo can be made up according to fixed patterns and measurements and the parts shipped before assemblage. They can be very readily assembled at the place of use at very small cost.

I claim as my invention:

1. A silo having a continuous opening from bottom to top thereof, sectional doors for said opening, ladder rounds extending across said opening, sockets secured to the edge staves of said opening, tie rods secured in said sockets and held therein against longitudinal movement, brackets secured at intervals along the edges of said opening to receive and support said rounds, and connections including a turn buckle between the door sections and the rounds.
2. A silo having a continuous opening from bottom to top thereof, the exterior edges of the edge staves of said opening being formed into a curved seat, sectional doors for said opening having curved edges fitting into the curved seats, sockets secured to said edge staves of the opening, the rods having their ends secured in said sockets against longitudinal movement, brackets secured at intervals to the edge staves of said opening, sectional doors for said opening, and a ladder round carried by each door and connected therewith by a turn buckle, said round being adapted to be received in and supported by said brackets.

3. A silo having a continuous opening from bottom to top thereof, recesses formed at intervals in the outer face of the edge staves of said opening, sockets having bosses fitting into said recesses, and tie rods having their ends secured in the said sockets against longitudinal movement.

In testimony whereof I affix my signature in presence of two witnesses.

ELIPHALET HILLARD.

Witnesses:

GEO. B. WARD,

D. S. KREIWENDT HL.