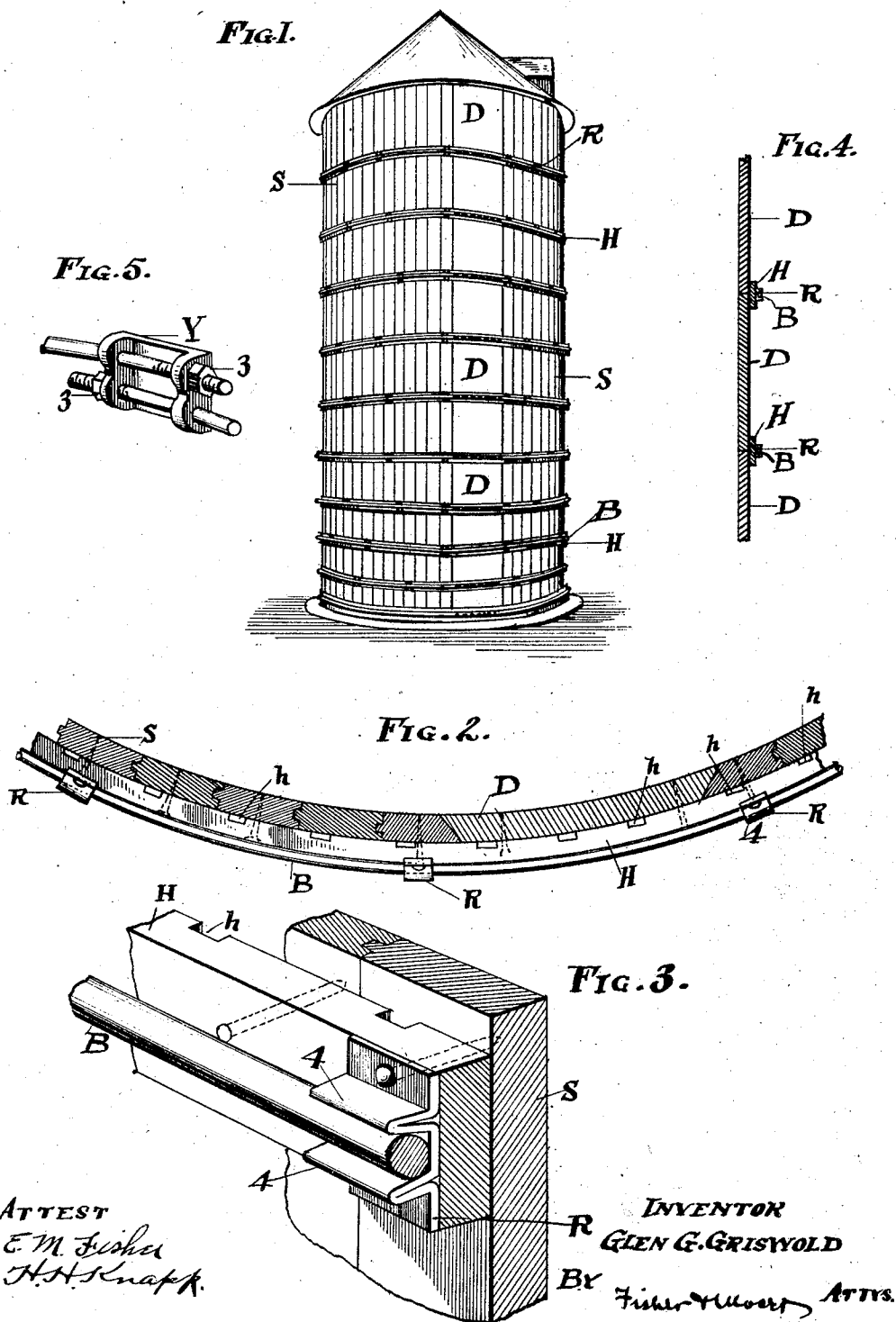


G. G. GRISWOLD.
SILO.
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UNITED STATES PATENT OFFICE.

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SILO.

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To all whom it may concern:

Be it known that I, GLEN G. GRISWOLD, citizen of the United States, residing at Madison, in the county of Lake and State of Ohio, have invented certain new and useful Improvements in Silos, of which the following is a specification.

My invention relates to improvements in silos, and the invention consists in certain details of construction in the style or type of silo which is built with wooden staves, and involves the use of combined metal and wooden hoops, all substantially as shown and described and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a perspective view of a silo complete embodying my improvements, and Fig. 2 is a cross section of a segmental portion thereof on a considerably larger scale than disclosed in Fig. 1. Fig. 3 is a perspective view of a fragment of two staves and a portion of hoop and ring or binder about the hoop and a support for the ring on the hoop, as well as disclosing drain notches at intervals in said hoop. Fig. 4 is a vertical sectional elevation through the doors. Fig. 5 is a perspective view of one of the yokes for adjustably connecting the ends of the hoop with said ends shown therein.

Most of the hoops used on silos at the present day are made entirely of steel, mostly a round steel rod, varying in size from one-half inch up, according to the size of the silo, while still other and older makes use an all-wood hoop. The disadvantages of the steel rod hoop alone are that it has no contraction or expansion in keeping with the wooden staves, and therefore in order to preserve the silo, it is necessary that it should be loosened and tightened and continually watched or the silo is liable to collapse, while in the case of all wood hoops they soon weaken or rot out and allow the silo to burst when it is full and under heavy outward pressure.

My invention is illustrated herewith, and consists of a combined metal and wooden hoop B and II, each varying in size according to the size of the silo, but for the ordinary or common size of silo, twelve by thirty, the wooden part II would be about one and one-half inches to one and three-fourths inches, the steel rod B about one-half to three-fourths inches in diameter, and to prevent the inner or wooden hoop rotting

I provide the same with a transverse groove *h* at frequent intervals on its inside next to stave S, so that there is an open air space (one or more) for each stave which prevents all rotting of either staves or hoops, while at the same time it allows the hoop to bend to a truer circle with reduced strain. I also nail this hoop securely to each and every stave, or each stave to the hoop, as may be desired. By having two wooden surfaces together and nailed securely to each other there can be no noticeable contraction or expansion of either one, and, furthermore the silo can never get out of shape nor be blown down when standing alone or next to buildings in even the highest winds or when it is empty. This wooden hoop should preferably be made of short sections with ends spliced and bent under steam. The groove *h* should be cut approximately one-half inch square.

One of the principal advantages of this construction is that I can use common inch boards in the making of this silo, which materially reduces the cost of same, whereas all silos of the common type require two inch staves. I also have a continuous door opening from top to bottom requiring no expensive door construction, such as all others require, and nearly all manufacturers of silos can embody my invention in their construction. Further, it costs only about half as much to erect this style of silo. In course of time the staves are bound to rot, and will require a new silo in most cases, but under this construction all that is required is new wooding on the inside, simply nailed through onto the old hoops, and still further, I can use in this construction nearly any length of staves, as I require no steel spline but can make all joints on a hoop, and by nailing both ends tight there will be no leak. This also will greatly cheapen the cost of the silo. With this style of silo I require no springs, and the metal hoops rarely if ever have to be tightened, and in no case are loosened. Owing to the large circumference of silos generally I prefer to make the said rods or ties in several pieces which are suitably joined at their ends and provided each with one or more yokes Y adapted to adjustably connect said ends. Each end of the wire or rod is provided with a nut 3, and the said tie can be made as tight upon the hoop as conditions may demand. Any suitable coupling

in lieu of yoke Y may be provided for this purpose.

Referring specifically to the door or doors, it is to be observed that there is shown a single door D for each hoop, and that the ends of the doors are overlapped top and bottom by the hoops, so that said ends are not visible in outside elevation. Again, the said doors are set into beveled jambs, or the jambs of the door are beveled from the inside, Fig. 2, so that each door holds its place without other means of fastening and the hoops take care of the ends and the tendency to bulge outward under pressure. Usually the hoops are nearer together at the bottom of the silo than at the top and they may be so in this case.

It is to be observed that there is little if any draw or taper in silos generally, so that hoops cannot be tightened thereon as they are upon barrels, and hence I provide for nailing or spiking each hoop at intervals to the staves or the staves to the hoops. Then if there be more or less shrinkage because of drying out of the silo the hoops will still hold their place and thus the said nails or spikes become auxiliary in supporting the hoop and in fact best serve their purpose when the tie-rods and hoops may be somewhat slack. Again, I have found it desirable to support the tie or rod B independently upon the hoops and yet in such way that it is confined thereon whether drawn closely or not by the nuts 3. But to do this I have also found that it would be highly objectionable to channel the periphery of the hoop to make a groove to lodge the rod therein because of the injury it would inflict upon the hoop, and hence I have devised or provided a series of metallic rests R, which are fixed to the hoop at intervals and have channels between the outwardly

projecting side walls 4 thereof adapted to support said rods and confine them upon the hoops regardless of its tightness on the silo. That is, if the silo should shrink so as to really loosen the wooden hoop the rod could not get displaced thereon or slip down because it would be confined by said rests. In fact shrinkage and expansion of silos with the seasons, such as summer and winter, must be taken into account in silo construction because these varying conditions are unavoidably present in all of them, and on account of their large size and surface comparatively small drying in any given stave aggregates a large amount in all the staves together. Hence it is material and important to take account of this condition and make due provision for it.

What I claim is:

1. A silo having wooden hoops at intervals top to bottom, tie rods about said hoops and yokes connecting the ends of said rods adapted to tighten the said rods, and rests on said hoops at intervals supporting said rods, said rests being constructed from sheet metal bent into opposite walls and channels between said walls in which said rods rest.

2. A silo having wooden hoops, in combination with tie rods about the same and metallic rests at intervals for said rods fixed on said hoops and having channels adapted to confine said rods, yokes connecting the ends of the rods constructed to tighten the same on the hoops, and said hoops nailed to the staves of silo.

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

GLEN G. GRISWOLD.

Witnesses:

E. M. FISHER,
H. H. KNAFT.