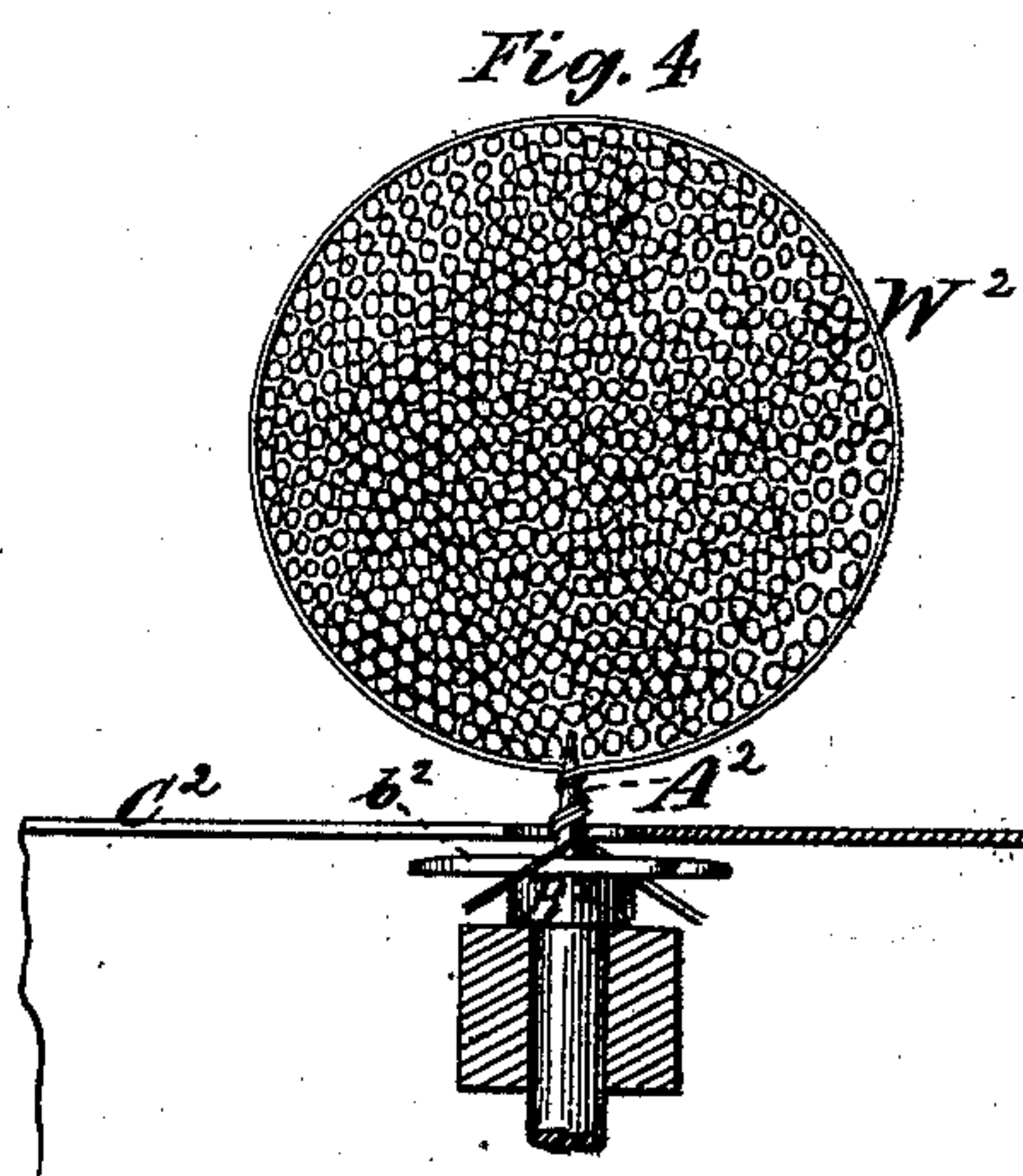
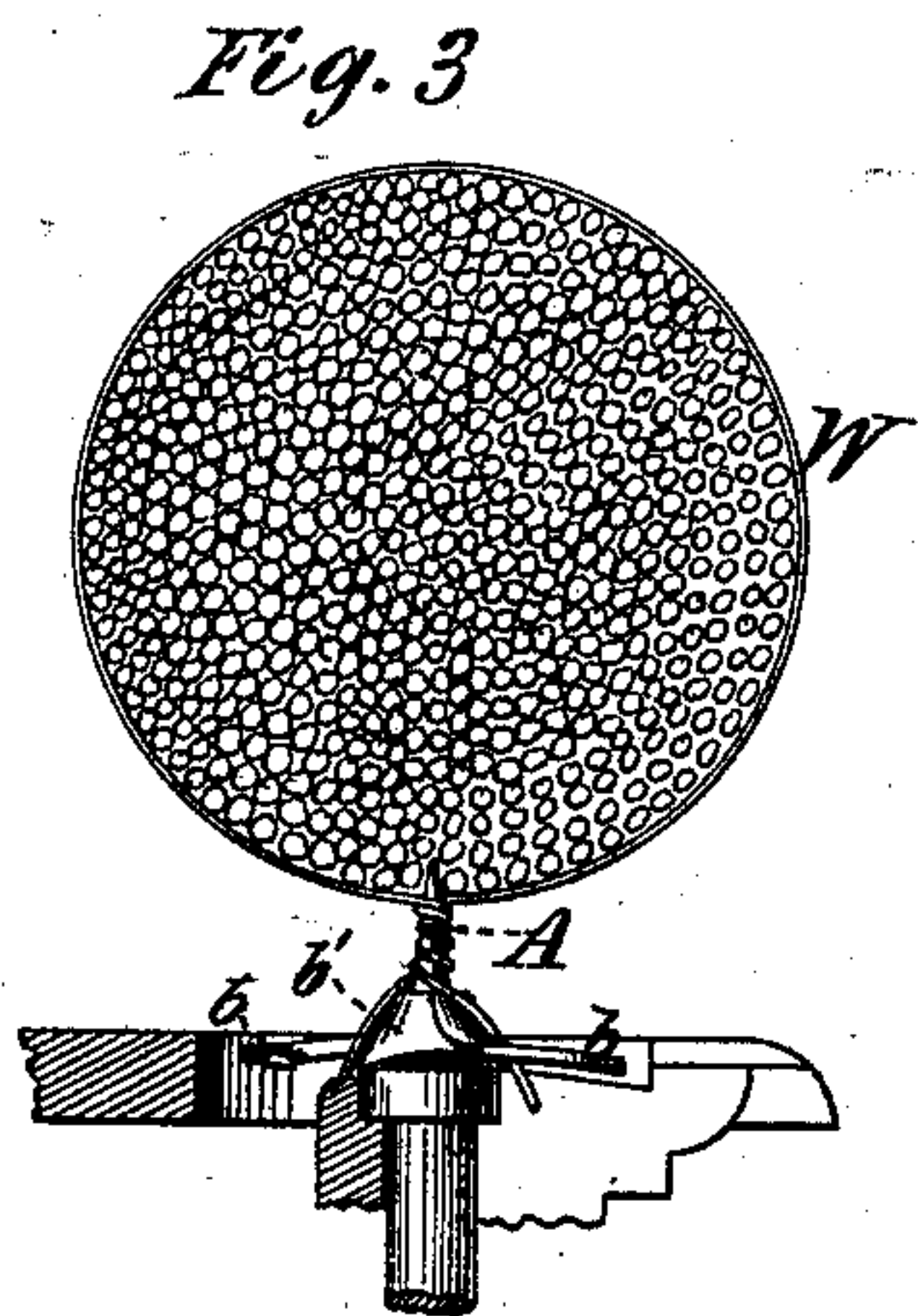
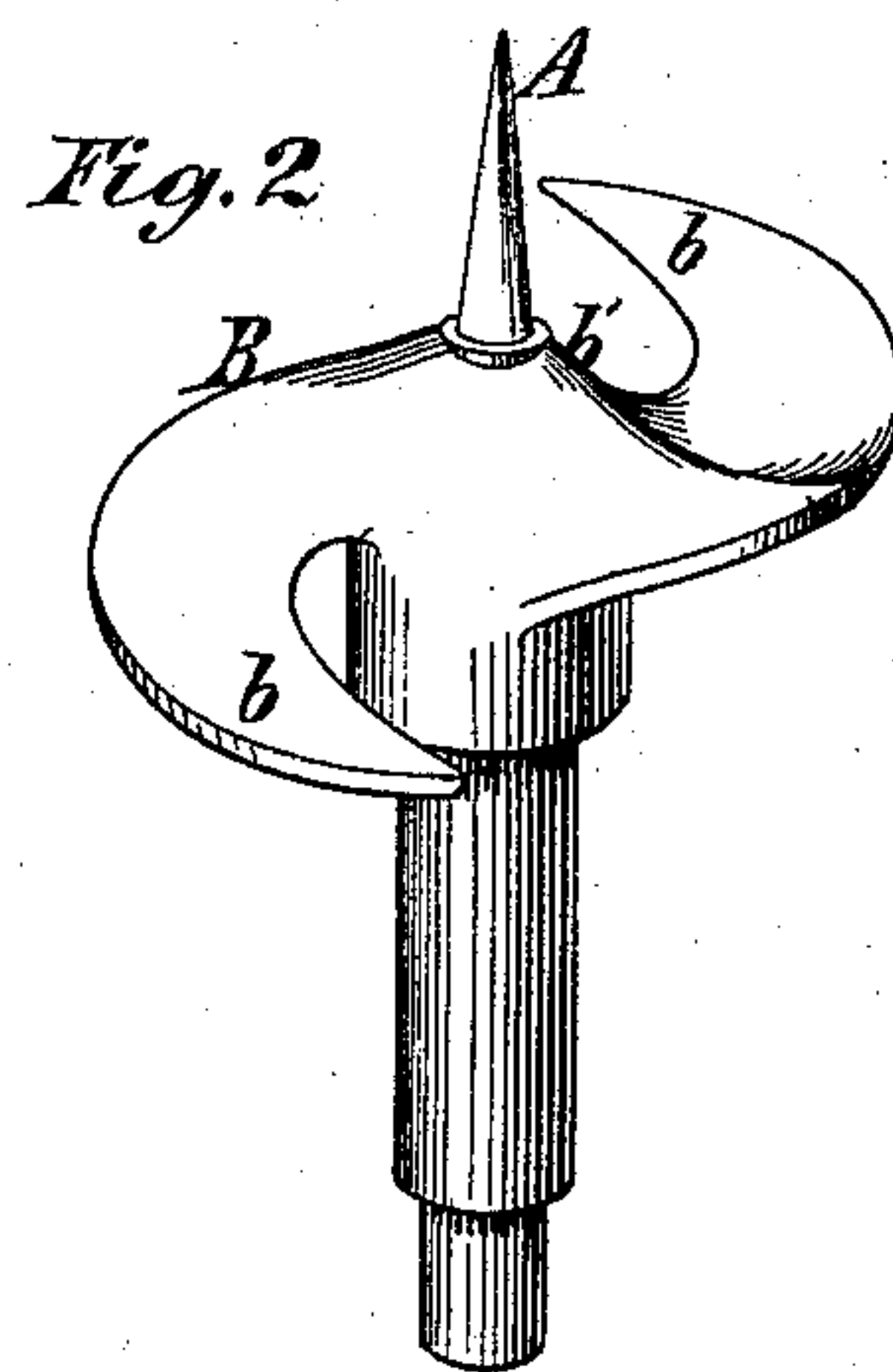
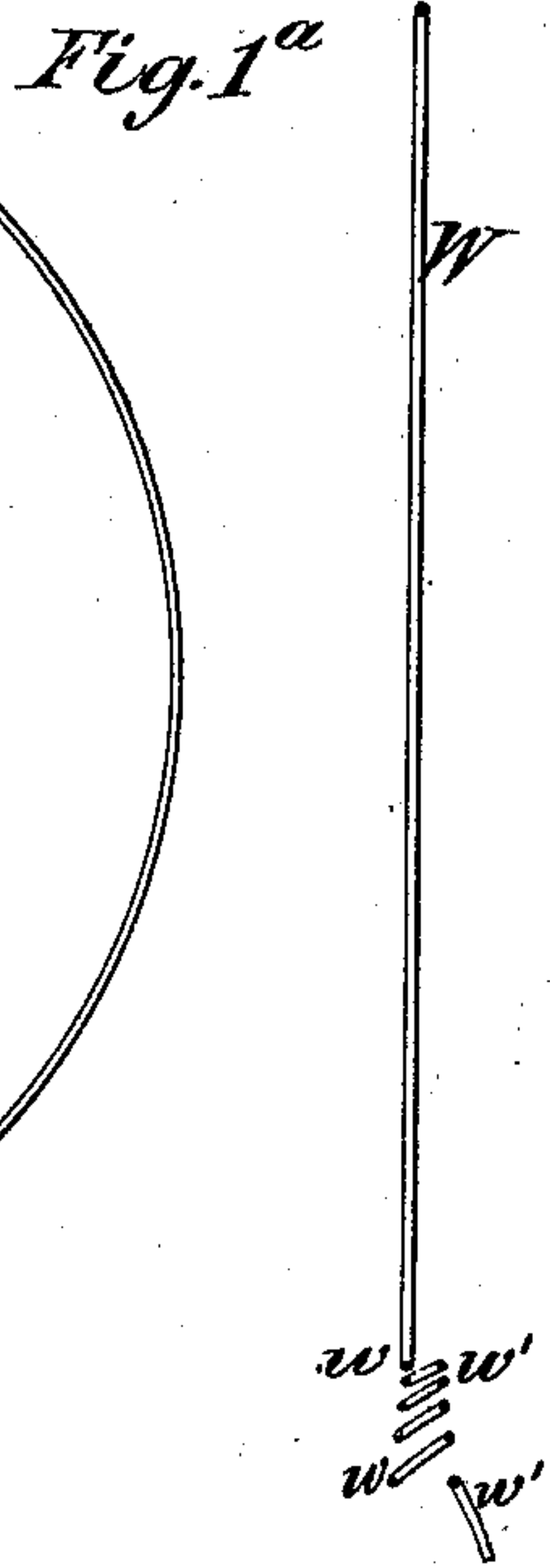
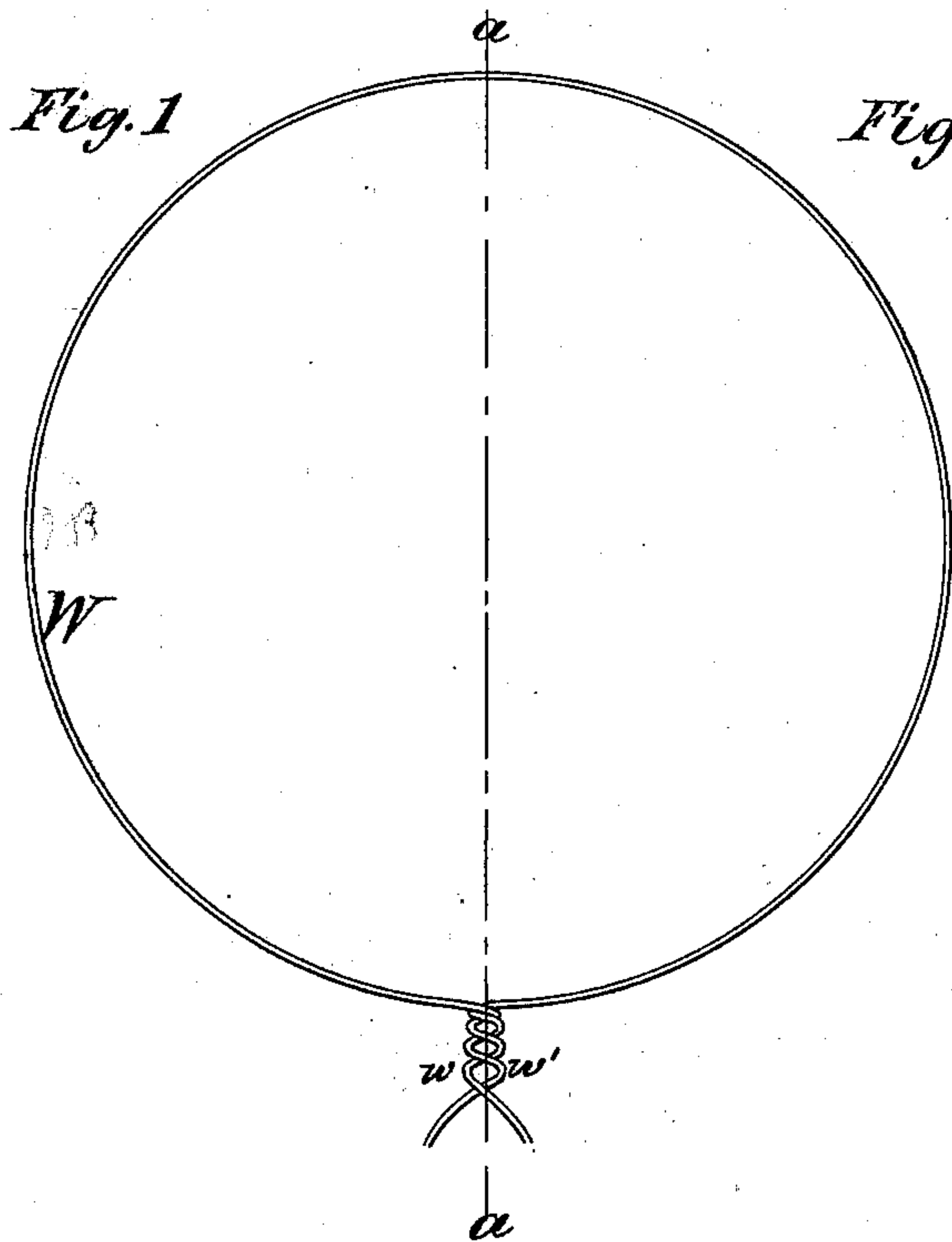


J. GARRARD.  
Grain-Binders.

No. 199,637.

Patented Jan. 29, 1878.



Witnesses:

Charles Goss  
Walter Allen

INVENTOR

Jeptha Garrard  
by Wright & Co. Attorneys.



# UNITED STATES PATENT OFFICE.

JEPHIA GARRARD, OF CINCINNATI, OHIO, ASSIGNOR TO EXCELSIOR GRAIN  
BINDER COMPANY, (LIMITED,) OF NEW YORK, N. Y.

## IMPROVEMENT IN GRAIN-BINDERS.

Specification forming part of Letters Patent No. **199,637**, dated January 29, 1878; application filed  
November 20, 1876.

*To all whom it may concern:*

Be it known that I, JEPHIA GARRARD, of Cincinnati, in the county of Hamilton and State of Ohio, have invented a new and useful Improvement in the Art of Binding Grain with Wire, of which the following is a specification:

This invention relates exclusively to the form of the "lock" or fastening by which the ends of the wire band are united, and to means for giving thereto the peculiar characteristic hereinafter set forth.

The first part of the invention consists in a wire band the ends of which are united by means of interlocked open coils, in contradistinction to a tight twist. The peculiar effects of this form of lock are, first, freedom from liability to break under tension or torsional strain in the binding operation; second, freedom from places weakened by short bends and from strained places, which are liable to break when the bundle is handled; third, greater freedom from liability to rust within the lock more than at other points; and, fourth, reduced strain at the lock when the bundle is handled, owing to the freedom of the coils to move independently, and to slide on each other.

The second part of the invention consists in a tapering pin attached axially to a twister of peculiar form, so as to project into the sheaves or bundles at the axis of rotation, as means for forming said open lock. The wire for the lock intercoils upon said pin instead of twisting upon itself. The taper of the pin causes it to release the coils readily when the bundle is discharged, while said taper is not sufficient to cause the wire to climb on the pin. A tightening ridge or projection is formed on the twister at the base of the pin, and the wire climbs on this projection without undue strain, and so as to tighten the loop preliminary to coiling upon the tapering pin. In combination, the twister and pin form a tight band secured by a short series of open coils.

The invention is principally intended and designed for use in binding grain, as described in the title, but is considered applicable to binding other bundles by mechanical means.

Figure 1 is an elevation or plan view of a wire band locked or fastened according to this invention. Fig. 1<sup>a</sup> represents a section on the

line *a a*, Fig. 1. Fig. 2 is a perspective view of the peculiar twister above referred to, the same being provided with a coil-pin according to this invention. Fig. 3 represents an elevation of said twister and coil-pin and a vertical section of the cover of the twisting mechanism, with a sheaf or bundle upon said cover in process of being bound, the band being shown in elevation. Fig. 4 represents an elevation of another coil-twister and a vertical section of its cover, illustrating substitute devices for making the improved band-lock.

Like letters of reference indicate corresponding parts in the several figures.

The essential peculiarity in the improved lock by which I connect the ends of the wire band *W* consists in a series of interlocked open coils, *w w'*, in contradistinction to a close twist. These coils are formed on a coil-pin or mandrel, *A*, which is made slightly tapering, so that the coils may readily slip off it in discharging the sheaf or bundle when the lock is completed.

In Figs. 2 and 3 a coil-pin, *A*, is shown applied to a twister, *B*, of the form described in my Patent No. 182,655, dated September 26, 1876. This twister has a pair of curved radial arms, *b b*, and a tightening-ridge, *b'*, the latter being formed over the axis of said arms, so as to project above or beyond the plane of the outer portion thereof. Said projection or ridge serves to insure the formation of a tight sheaf or bundle by filling what would otherwise be a blank triangular space at the twisting-point, and compelling the twist or coils to be formed beyond this space in the direction of the center of the bundle. The coil-pin *A* is simply affixed at the axis of this twister at right angles to its plane of rotation, and projects into the grain as it lies upon the cover *C*, so as to operate as a mandrel or core within the twist when the latter is formed by the rotation of the twister.

In Fig. 3 the sheaf or bundle is shown as it appears at the end of the twisting operation. In combination with the coil-pin, said peculiar form of twister operates to lessen the requisite number of coils, and to form the coils upon the pins with the least possible strain on the wire.

The peculiar function of the pins *A*, as be-



fore stated, is to cause the wire to wrap or coil around the same when twisted to secure the ends of the band. The result is a series of securely-interlocked open coils, instead of the tight twist heretofore employed for fastening wire bands.

The close twist is objectionable on account of the frequency of the breakages of the wire, which occur in forming it, and for other reasons. The principal cause of breakage is the twisting of one end or strand of the wire around its own axis when either end gets in line with the axis of the twister, and there is always a great torsional strain on the wire.

The improved lock is formed with the least possible torsional strain, the wire being wrapped or coiled, and not twisted, properly speaking. The open-coil lock is also superior to the old twist in other respects, while it is made by a simple twister provided with a coil-pin, as herein described, without complication of parts.

The other elements of a binder provided with the twister B and coil-pin A may be of any preferred character not inconsistent with the nature and objects of the attachment.

The application of said twister and pin to machines adapted to receive them is all that the present invention contemplates, and this will be readily understood and accomplished

by those skilled in the construction or manufacture of grain-binders and analogous machinery.

In Fig. 4 a coil-pin,  $A^2$ , is shown attached to a twister,  $B^2$ , having a flat top,  $b^2$ , and arranged beneath the cover  $C^2$  of its mechanism. The coil-pin in this case projects upward through an opening in the cover in line with the axis of the twister, said opening serving also to accommodate the wire. The arrangement is considered inferior, and is shown simply to illustrate the fact that the open interlocked coils may be formed by other twistors than the peculiar one above described.

Having thus described this my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. A wire band the two ends of which are secured together by a series of interlocked open coils, substantially as herein set forth.

2. The combination of a twister, B, having a tightening-ridge,  $b^1$ , over the axis of a pair of curved radial arms,  $b$ , and a tapering coil-pin, A, affixed to said twister at its axis of motion, as herein specified, for the purpose set forth.

JEPHTHA GARRARD.

Witnesses:

M. TURNER FORMAN,  
WM. BURNET, Jr.