

W. P. GOOLMAN.

Revolving Harrow.

No 25,301.

Patented Aug. 30, 1859.

Fig. 1.

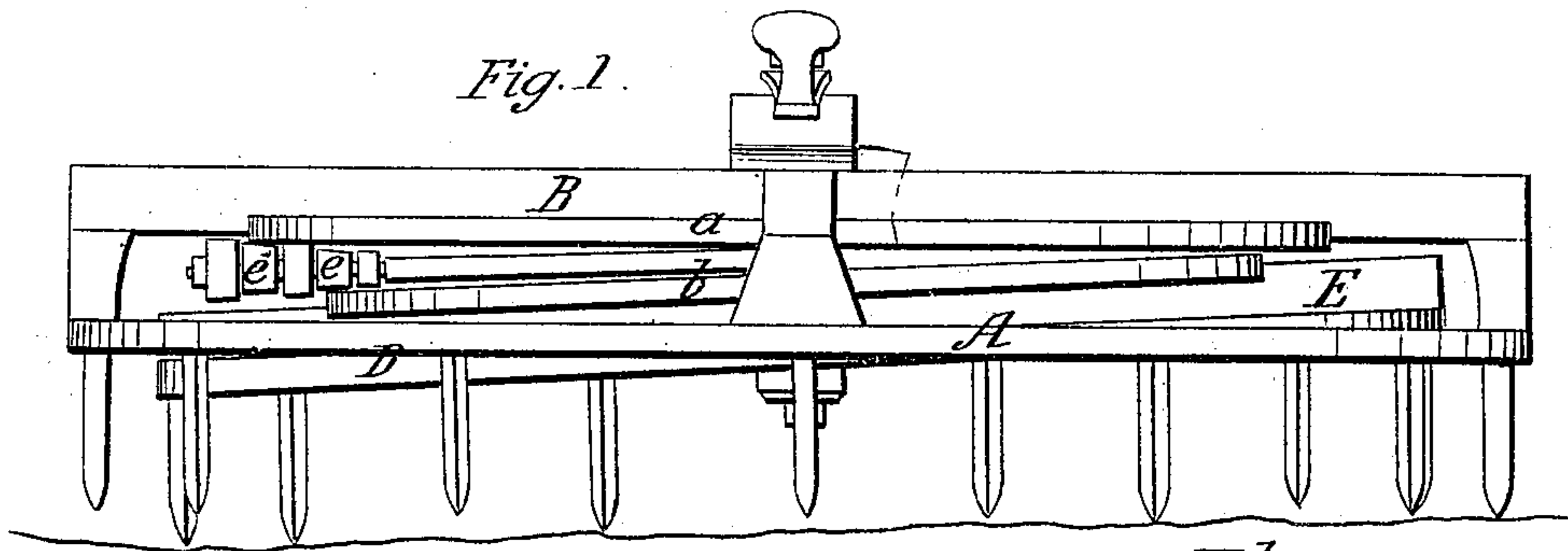


Fig. 3.

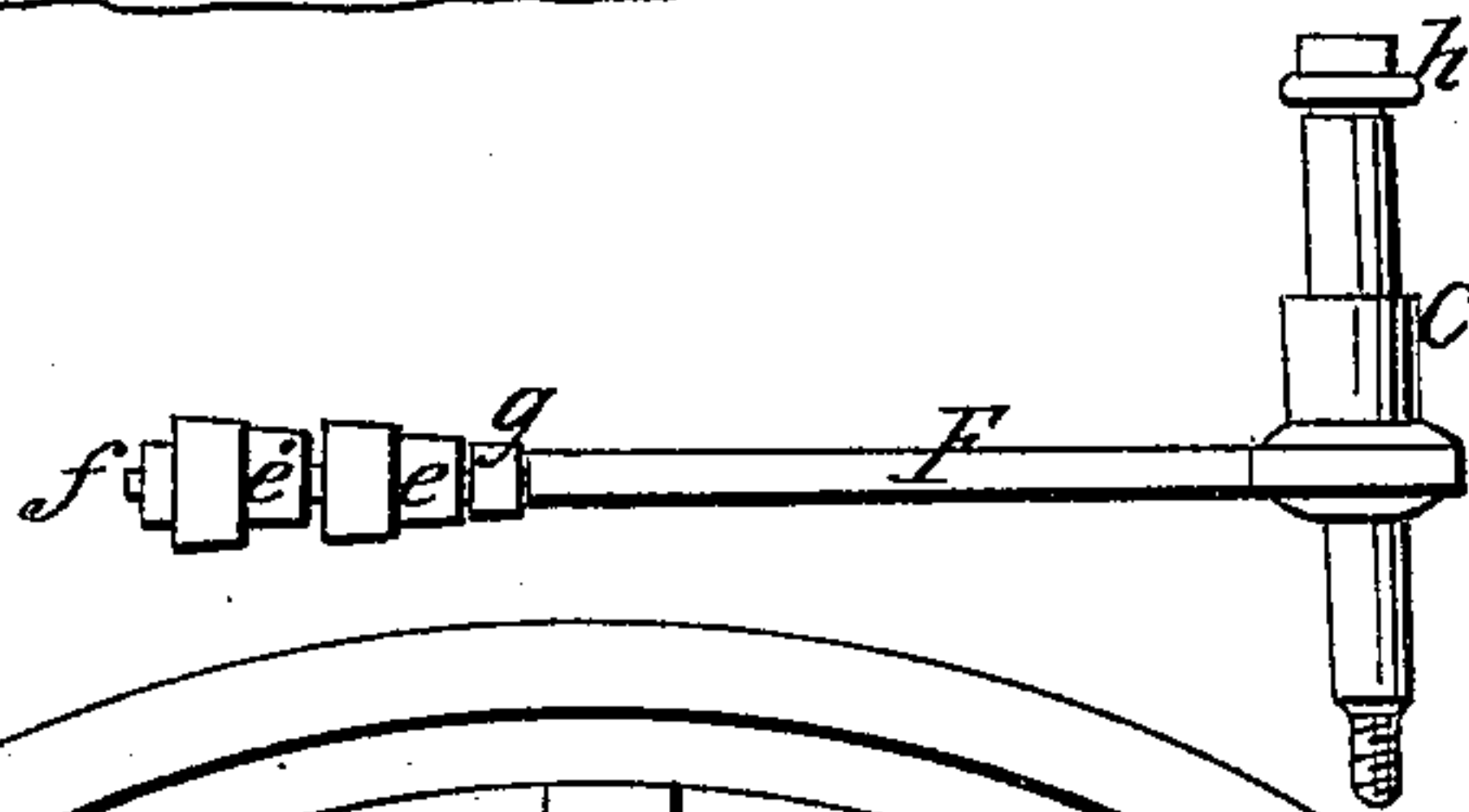
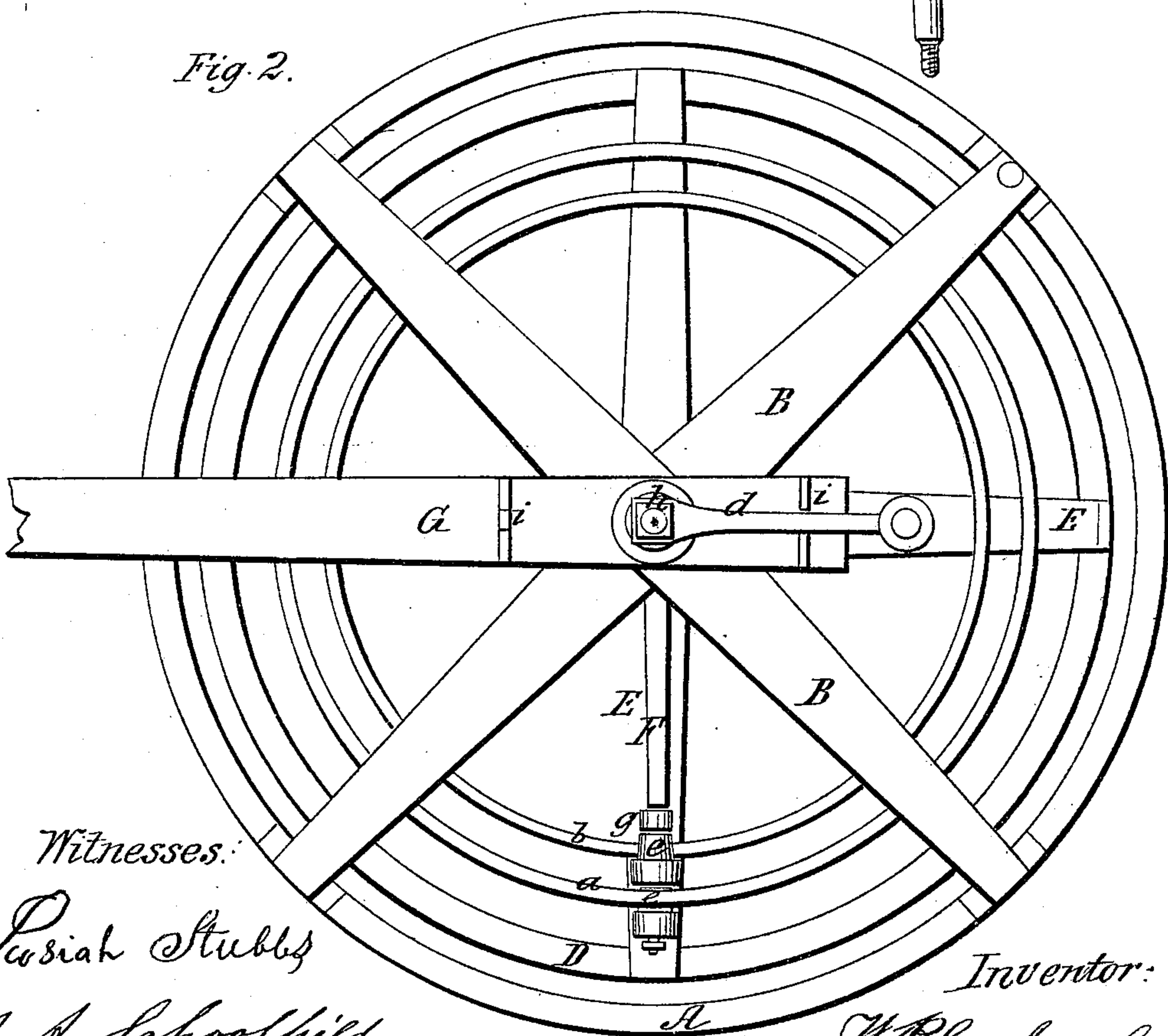


Fig. 2.



Witnesses:

Joshiah Stubbs  
A. A. Schoolfield

Inventor:

W. P. Goolman.



# UNITED STATES PATENT OFFICE.

WILLIAM P. GOOLMAN, OF DUBLIN, INDIANA, ASSIGNOR TO HIMSELF, S. B. MORRIS, AND W. HOLLINGSWORTH, OF SAME PLACE.

## IMPROVEMENT IN ROTARY HARROWS.

Specification forming part of Letters Patent No. 25,301, dated August 30, 1859.

*To all whom it may concern:*

Be it known that I, WILLIAM P. GOOLMAN, of Dublin, Wayne county, Indiana, have invented certain new and useful Improvements in Rotating Harrows; and I hereby declare the following to be a full and exact description thereof, reference being had to the annexed drawings, making part of this specification.

My invention consists, first, in certain devices for depressing opposite sides of two concentric harrows, so as to cause the said harrows to rotate independently and in opposite directions, as hereinafter more fully explained; second, in devices for reversing the direction of rotation of the harrows; third, in a combination and arrangement of friction-rollers and washer for the purpose of regulating the degree of obliquity of the said harrows, as hereinafter explained.

In the accompanying drawings my invention is represented as follows:

Figure 1 is a rear elevation of the harrows. Fig. 2 is a plan of the same. Fig. 3 is a detached elevation of the bent spindle, radial arm, and friction-rollers.

A represents the rim of the larger harrow, attached to and supporting a frame, B, journaled upon the upper part of a bent spindle, C.

Secured to the under side of the frame B is a ring, *a*, of somewhat smaller diameter than the rim of the harrow A.

D is the rim of the smaller harrow, which is journaled to the lower end of the spindle C, and rotates concentrically within the other, but in a plane somewhat oblique thereto. This rim is fastened to the under side of the framing E, to the upper side of which framing is attached a ring, *b*, concentric with but somewhat below the ring *a*.

F is a radial arm projecting from the spindle C, between the frames B E.

*e e'* are friction-rollers fitted to the outer end of the said arm, F, and secured thereon by a nut, *f*, on the end of the arm.

*g* is an adjustable washer on the arm F, which may be placed inside, outside, or between the friction-rollers, as hereinafter explained.

The roller *e* runs on top of the ring *b* of the inner harrow and the roller *e'* beneath the

ring *a* of the outer harrow, the effect of which is to raise one side of the outer harrow and the opposite side of the inner one. By placing the washer *g* between or on the outside of the friction-rollers the larger part of one or both the rollers may be brought into contact with the rings, so as to increase the relative obliquity of the harrows as may be found needful.

The spindle C is bent in the manner represented to correspond with the mean obliquity of the harrows, and both harrows are journaled somewhat loosely on their spindle to permit their adjustment to varying degrees of obliquity, as before explained.

When the harrows are in operation the arm F is set at right angles to the draft-beam G, which is loosely attached above the frame B to the spindle.

Fitted on the top of the spindle is a crank, *d*, secured by a nut, *h*.

*ii* are two segments, mortised into the surface of the draft-beam equidistant from the spindle, with a recess in each, into which the arm of the crank is sprung to hold the arm F at right angles to the draft-beam G, which is the required position while the harrows are in operation.

Operation: As the machine is drawn over the ground the two concentric harrows are depressed on opposite sides by means of the friction-rollers running between the rings *a* and *b* elevating one side of the large harrow and the opposite side of the inner or smaller harrow. The teeth of the harrows taking a deeper hold in the soil on opposite sides, causes them to rotate independently in opposite directions, which effectually prevents any side draft and rapidly pulverizes the soil between the opposing teeth.

The advantages of my improved harrow are as follows: There being no more difference in the diameter of the respective harrows than is necessary to allow one to run within the other, the teeth running in opposite directions catch and crush the lump of dirt between them in a more effectual manner than has been done heretofore. In working over ground that is very rough the teeth of the harrows need to be set so as to take a deeper hold of the soil, which is done in my harrow by changing the washer *g* on the arm F from the inside to the



outside of the friction-rollers. The friction-rollers being conical, and the greatest diameter being farthest from the spindle, changing the washer brings the largest diameter between the rings, and consequently causes the harrows to dip more. One-half this increase of obliquity may be produced by placing the washer between the rollers, so as to bring the larger portion of the roller *e* into contact with the ring, while the position of the outer roller, *e'*, is unchanged. By making a half-turn of the crank *d* the position of the arm *E* is changed to the opposite side, and the direction of rotation of the harrows thereby reversed. This is beneficial, both to enable the teeth to free themselves of trash and to cause large clods, which will be carried before the outer harrow, to be at all times forwarded toward the unharrowed ground.

In the above-described invention no material weight is added to the harrows to produce rotation. Its effect is to level the ground by filling up depressions, and by reason of the teeth engaging at an equal depth on both sides the ground is worked evenly in all parts and side draft effectually avoided.

The following is what I claim as new and of my invention herein, and desire to secure by Letters Patent:

1. The described application of friction-rollers between rotary concentric harrows to elevate opposite sides of the respective harrows, in the manner and for the purposes set forth.

2. The reversible arm *F*, arranged between concentric harrows *A* and *D* to change the direction of the rotation of the said harrows, as explained.

3. The reversible bent spindle *C*, adapted in the manner set forth to correspond with the relative obliquity of two concentric harrows.

4. The described arrangement of the friction-rollers *e e'* and adjustable washer *g* on the arm *F*, operating in the manner set forth to vary the relative obliquity of the harrows.

In testimony of which invention I hereunto set my hand.

W. P. GOOLMAN.

Witnesses:

JOSIAH STUBBS,

H. A. SCHOOLFIELD.