

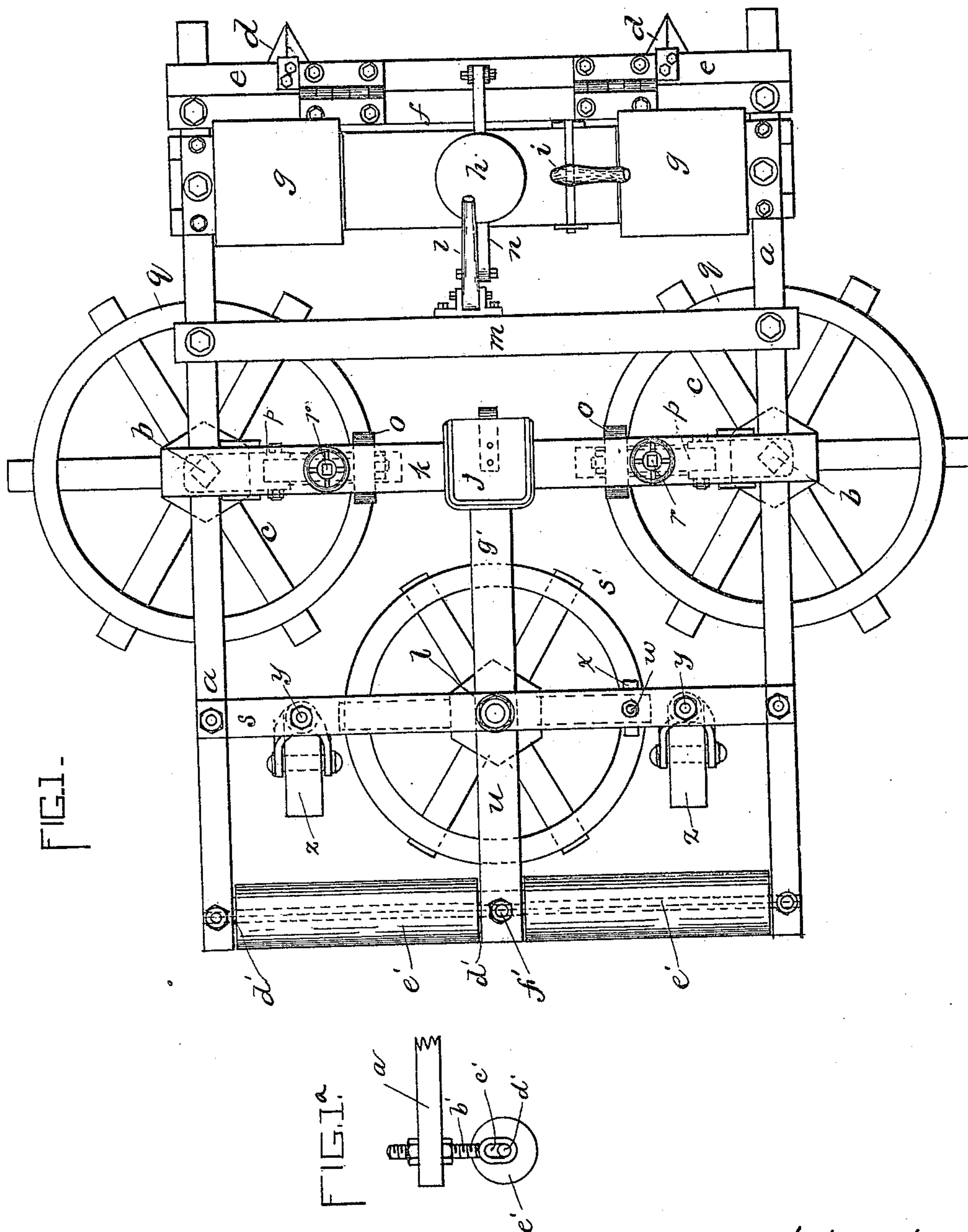
(No Model.)

2 Sheets—Sheet 1.

H. H. MONROE.  
ROTARY HARROW.

No. 440,178.

Patented Nov. 11, 1890.



WITNESSES.

A. F. Macdonald.  
A. D. Harrison.

INVENTOR.

Halsey H. Monroe.

by  
Wm. Brown & Crossley.  
Attys.

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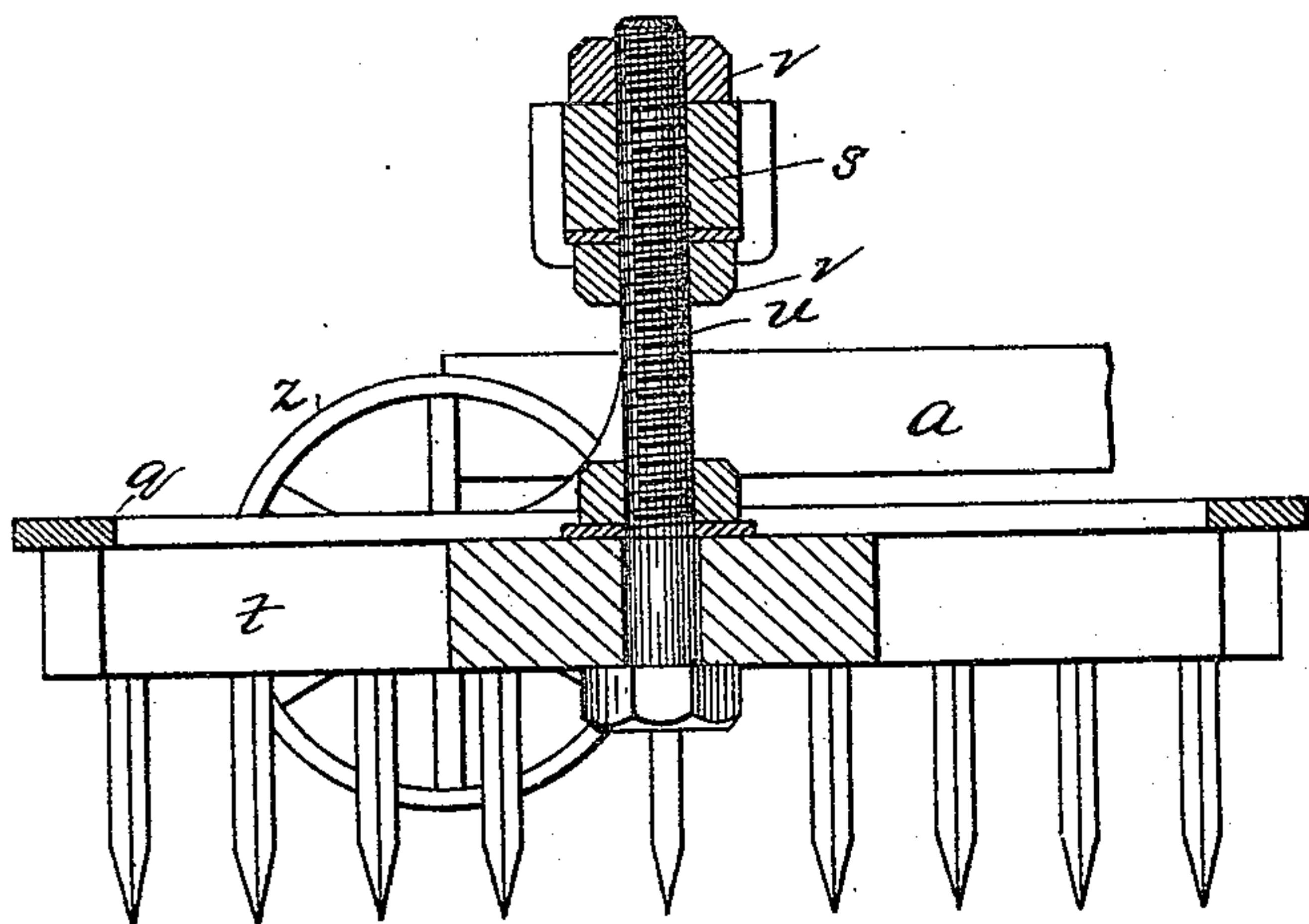
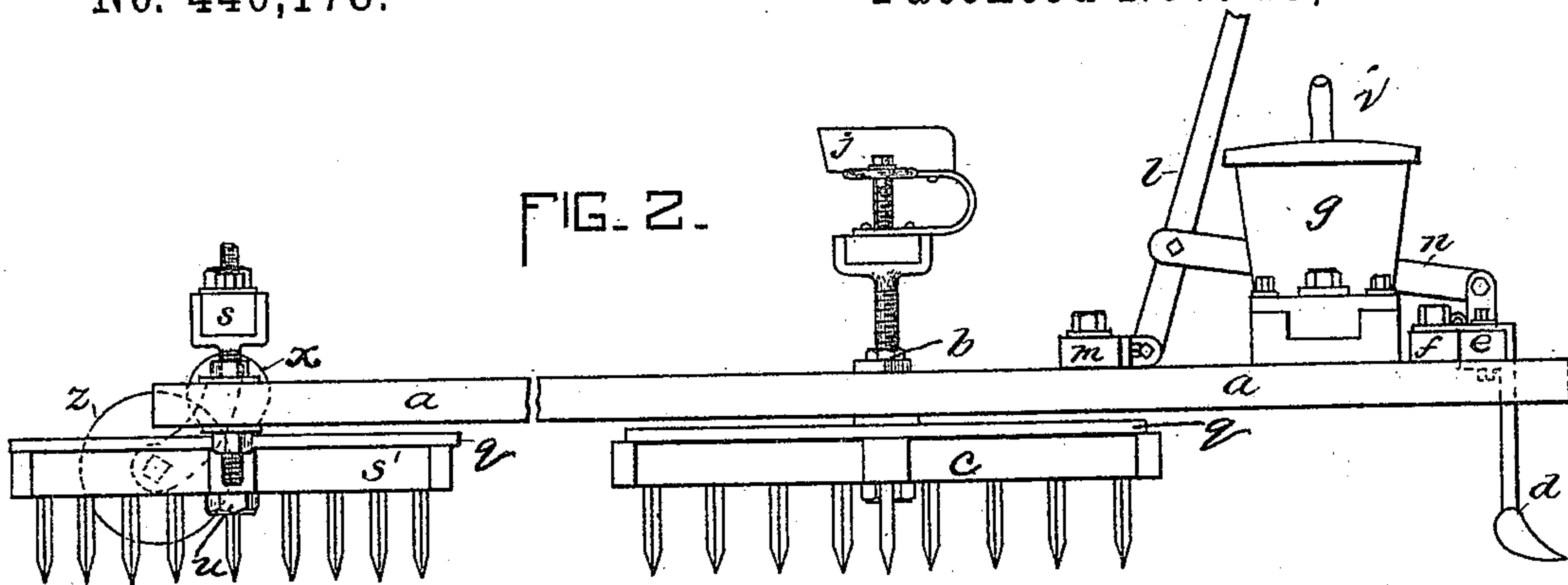


FIG. 3.

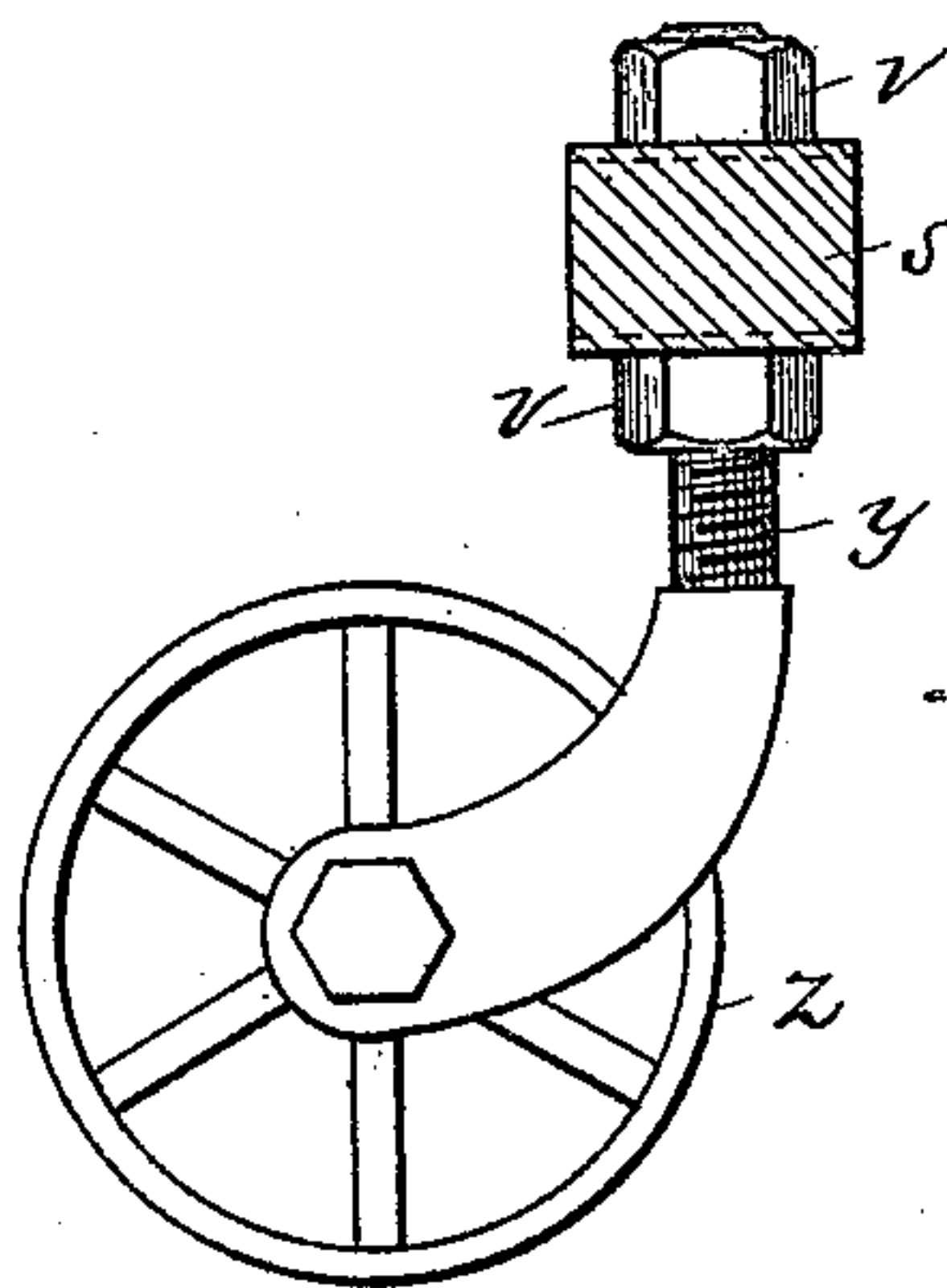


FIG. 4.

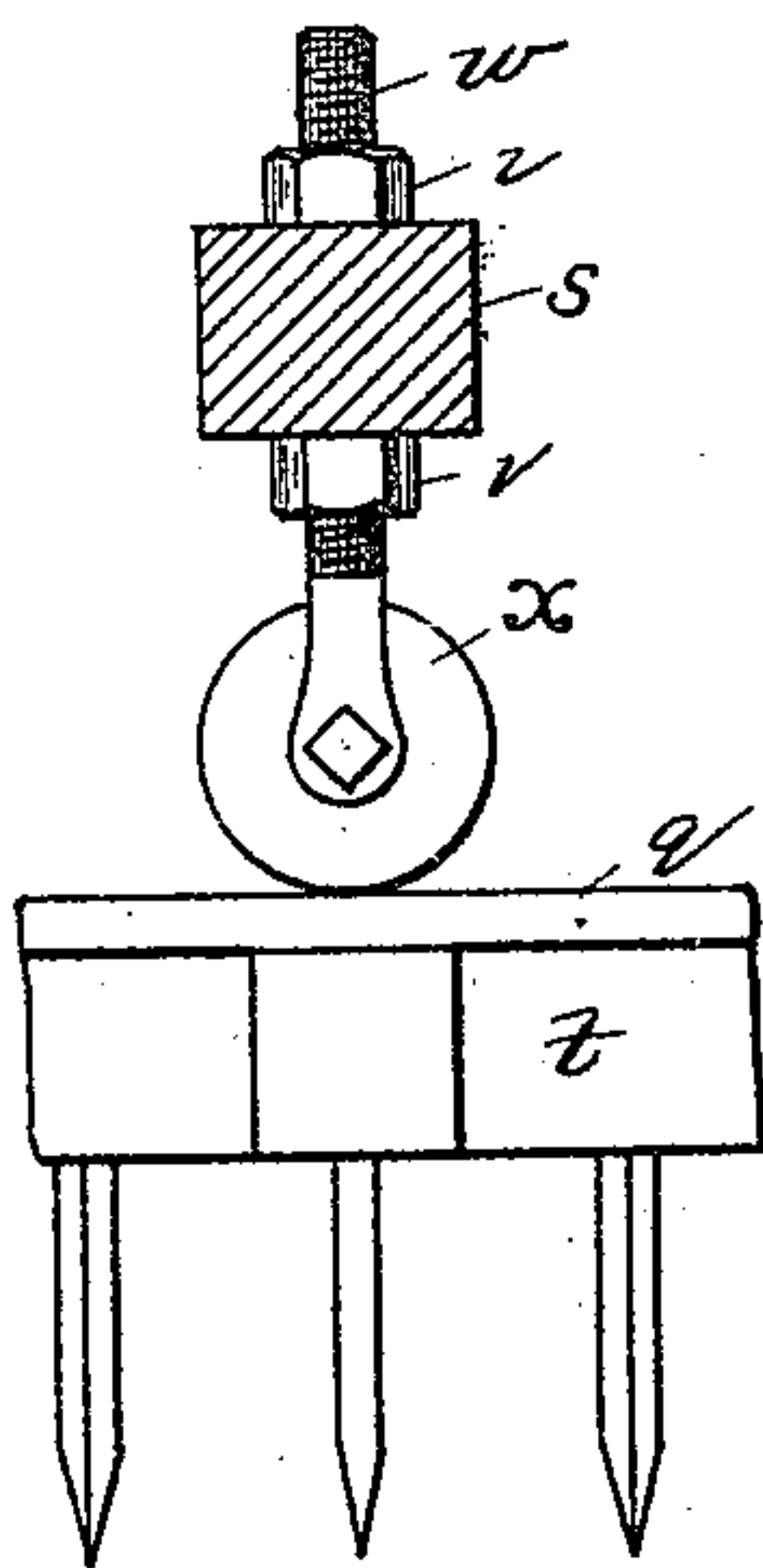


FIG. 5.

WITNESSES.

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By  
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# UNITED STATES PATENT OFFICE.

HALSEY H. MONROE, OF THOMASTON, ASSIGNOR TO THE I. C. WYMAN COMPANY, OF PORTLAND, MAINE.

## ROTARY HARROW.

SPECIFICATION forming part of Letters Patent No. 440,178, dated November 11, 1890.

Application filed November 19, 1889. Serial No. 330,936. (No model.)

### *To all whom it may concern:*

Be it known that I, HALSEY H. MONROE, of Thomaston, in the county of Knox and State of Maine, have invented certain new and  
5 useful Improvements in Rotary Harrows, of which the following is a specification.

It is the object of my invention to provide such improvements in rotary harrows as that by them a thorough pulverization of the  
10 ground over which they pass and upon which they operate may be effected at a minimum expenditure of draft or power.

It is also the object of my invention to provide improvements in rotary harrows which  
15 will better adapt them for use in connection with planters, organizing and constructing them so as that a more thorough "working" of the ground may be effected between the rows than has heretofore been accomplished.

It is also the object of my invention to provide improvements in rotary harrows, whereby the same may be more readily transported  
20 from place to place "off the field" than heretofore.

It is also the object of my invention to utilize the means whereby the depth of work of the harrows is regulated to contribute to the harrowing or pulverization of the ground.

It is also the object of my invention to provide other improvements in rotary harrows  
30 incidental to the foregoing.

My invention will first be described with reference to the annexed drawings, and the letters of reference marked thereon, forming  
35 a part of this specification, and then particularly pointed out in the appended claims.

Of the drawings, Figure 1 is a top plan view of one form of my improved harrow employed in connection with a planter, the draft-pole or tongue not being represented. Fig. 1<sup>a</sup> is an  
40 end view of the rollers *e'* and their adjustable supports. Fig. 2 is a side view of another form of the same. Fig. 3 is a vertical central sectional view of the rear depth-regulating harrow and its adjuncts. Fig. 4 is a sectional  
45 detail view showing a manner of constructing and arranging the wheels or rollers when the same are employed in the harrow. Fig. 5 is a sectional detail view showing a way in which  
50 pressure may be applied to one side of the

rear harrow and be adjusted to circumstances, in order to effect a proper rotation of the harrow.

The same letters designate the same parts or features, as the case may be, wherever they  
55 occur.

In the drawings, (referring to the constructions shown in Figs. 2 to 5, inclusive, on sheet 2,) *a* designates the two side beams upon king-  
60 bolts *b*, passing through which the main or forward harrows *c* are journaled, so that they may rotate for a purpose well known.

*d* are plows or furrow-openers secured to the cross-beam *e*, hinged to a similar beam *f*, which is secured to the side beams *a*. The  
65 furrow-openers *d* are located in front of the seed-hoppers *g*, from which seed may be dropped by a person sitting on the seat *h* and actuating the lever *i*.

*j* designates the driver's seat arranged  
70 above or it may be upon a cross-beam *k* extending between the harrows *c*, preferably from points centrally over the latter. The lever *l*, fulcrumed on the cross-beam *m* and connected by a pitman *n* with the hinged  
75 beam *e*, is so positioned that the driver may readily reach and manipulate it to raise the furrow-openers *d* out of operative position when circumstances may require this to be  
80 done.

*o* are rollers journaled on the ends of pivoted bars *p*, (shown only in dotted lines in Fig. 1,) which rollers bear on the upper surface of the rims *q* of the harrows *c* at a point  
85 preferably beneath the support for the driver's seat *j*, and where said rims *q* most nearly approach each other.

*r* designates screw-bolts passing through the cross-beam *k* and bearing on the pivoted bars *p* to regulate the pressure of the rollers  
90 *o* on the rims *q*.

*s* designates a cross-beam extending between the side beams *a* and connected to the latter at any desired point to the rear of the points at which the harrows *c* are journaled.  
95

*t* is a harrow journaled so as that it may rotate on a bolt *u*, connected with the cross-beam *s* at a point intermediate of the side beams *a*. The upper end of the bolt *u* is screw-threaded and provided with nuts *v*, one  
100



arranged above the cross-beam *s* and the other below it, so that the harrow *t*, which is arranged to rotate on the lower end of said bolt, may be adjusted vertically, as will be readily understood by reference to Fig. 3.

*w* is a screw-threaded bolt vertically adjustable with respect to cross-beam *s* in the same manner and by the same means as king-bolt *u* is made adjustable in the like part, which bolt *w* is provided at its lower end with a roller *x* arranged to bear upon the rim *q* of the harrow *t* for the purpose of effecting the rotation of the latter as it is drawn over the ground.

*y* designates bolts also adjustable by means of nuts in cross-beam *s*, which bolts extend downward and rearward and are provided on their lower ends with wheels *z*, arranged to travel on the ground.

When wheels *z* are employed at all, I equip the harrow with two and arrange them on opposite sides of the harrow *t*, and it may be on a cross-beam separate from and in rear of the said harrow *t*, so that in transporting the harrow off the field the forward end may be raised and attached to a wagon or other vehicle, and the rearward end will be carried upon said wheels *z*.

The screw-threaded bolts and nuts are shown as a means for adjusting the harrow *t* and wheels *x* and *z* vertically, though I may employ any other mechanical expedient for accomplishing the same purpose.

By my improved harrow seed dropped from the hoppers into the furrows made by the plows or furrow-openers *d* will be thoroughly covered by the rotating harrows *c*, which, being comparatively small, will rotate freely, thoroughly pulverizing the earth in their path, and the rear harrow *s'*, also comparatively small, will operate upon the earth in the same manner on a path lying between the harrows *c* and slightly overlapping the same, the rear harrow *s'* also serving to bear up the forward harrows *c* and thus regulate the working depth of the latter, such depth being greater or less, in accordance with the vertical adjustment of the rear harrow.

Under most circumstances the rollers *z* may be dispensed with in the use of the harrow, though in some instances I prefer to employ them in the field, and when so using them they may be adjusted to meet the exigencies of the existing case.

It is to be observed that I may dispense with the furrowing and seed-dropping mechanism and use my improved machine for simple harrowing purposes, for which purpose or end it is most efficient.

The harrows being small in diameter rotate much more freely than they would if they were of the usual large diameter, and at the same time less draft or force is required to operate them than is required in the use of ordinary rotary harrows covering the same width of

ground, and besides this the rapid rotation of the harrows effects a more thorough working of the ground than does the slower rotation of the larger harrows commonly employed.

In some instances (having reference to Fig. 1<sup>a</sup>) I may extend side beams *a* rearward, as shown at *a'*, in the ends of which are arranged vertically-adjustable bolts *b'*, provided with elongated eyes *c'*, adapted to receive the ends of the journal-shafts *d'* of rollers *e'*. The shaft *d'* passes through an adjustable eyebolt *f'*, passing through the end of the center beam *g'*, the eyebolt *f'* having a round bearing sufficiently large only to admit the shaft *d'* and permit it to turn therein. This construction is employed when it is desired to nicely "finish" the ground after harrowing or planting and harrowing, as before explained.

Having thus explained the principle of my improved harrow, as also a mode of applying the said principle, I declare that what I claim is—

1. A rotary harrow consisting of the two side harrows *c*, the intermediate harrow *t*, rearwardly arranged and the vertically-adjustable wheels *z*, arranged on the opposite sides of the latter harrow, as set forth.

2. In a rotary harrow, the furrow-openers and seed-dropping mechanism, combined with the side harrows *c*, arranged to operate as harrows in the path of the furrow-openers, and the intermediate vertically-adjustable harrow *t*, adapted to operate in a path lying on a line between the furrow-openers, as set forth.

3. In a rotary harrow, the side harrows *c*, combined with the rearward harrow *t*, arranged to operate in a path lying on a line between the side harrows, the said rearward harrow being vertically adjustable to regulate the depth of working of the forward harrow, as set forth.

4. In a rotary harrow, the combination, with a harrow *t*, of the cross-beam *s*, the bolt *w*, nuts *v* on said bolt above and below said cross-beam, and the roller or wheel *x*, journaled in the lower end of the said bolt and bearing on the rim of the said harrow, as set forth.

5. In a rotary harrow, the side or forward harrows *c*, combined with a rear harrow *t*, constructed and arranged to carry a portion of the weight of the forward harrows and regulate the depth of working of the latter, as set forth.

6. A rotary harrow consisting of the two side harrows *c*, intermediate harrow *t*, and the vertically-adjustable rollers *e'*, as set forth.

In testimony whereof I have signed my name to this specification, in the presence of two subscribing witnesses, this 28th day of October, A. D. 1889.

HAILEY H. MONROE.

Witnesses:

ARTHUR W. CROSSLEY,  
A. D. HARRISON.