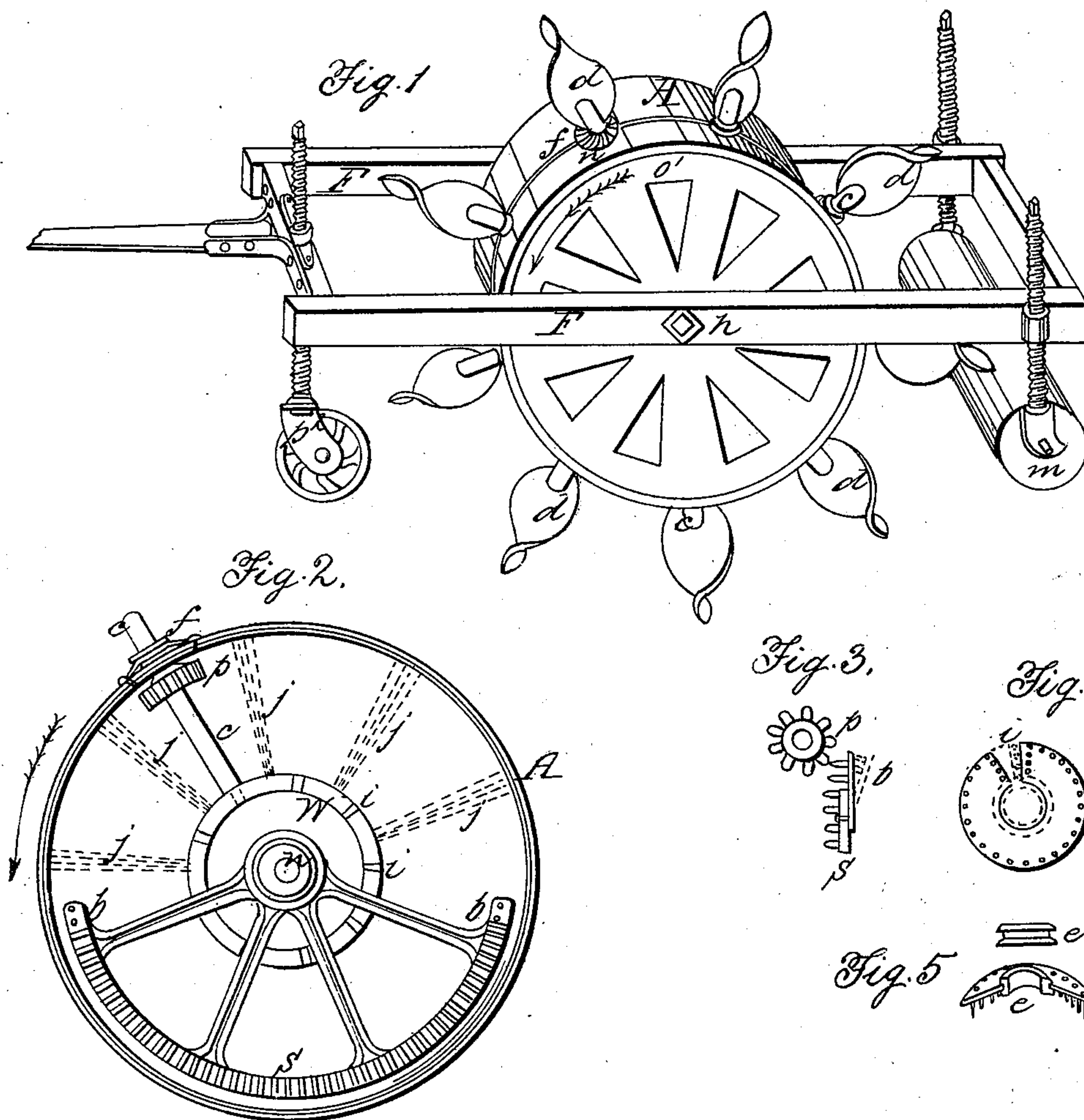


E. T. BUSSELL.
Rotary Cultivator.

No. 68,410.

Patented Sept. 3, 1867.



Witnesses:
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ERASTUS T. BUSSELL, OF INDIANAPOLIS, INDIANA, ASSIGNOR TO HIMSELF, W. A. CANDEE, AND JACOB ELDREDGE.

Letters Patent No. 68,410, dated September 3, 1867.

IMPROVEMENT IN ROTARY PLOUGH.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, ERASTUS T. BUSSELL, of the city of Indianapolis, in the county of Marion, and State of Indiana, have invented a new and useful Improvement in Rotary Ploughs; and I do hereby declare that the following is a full and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference thereon, like letters referring to like parts in the several figures.

The nature of my invention consists in the use of segmental driving cog-wheels, with supplementary yielding cogs (attached to springs) at their ends; the segment-wheels revolving the earth-augers only where it is necessary for them to revolve, viz, while in contact with the earth, thus avoiding the useless friction of a continuous and complete driving-wheel, and the yielding cogs always insure the true and proper meshing of the auger pinions with the rigid cogs of these segment-wheels, preventing the locking or riding of cogs.

Also, in the use of a peculiarly constructed dirt-shield around the auger-shafts, just outside the drum, perfectly preventing the ingress of dust or dirt to the "bearings" of said shaft, and likewise preventing fine dirt from reaching any of the cog-gearing inside the drum.

Also, in the use of a broad-tread "caster-wheel" under the front end of the plough-frame, and a roller under the rear end of the same. These being elevated or depressed by large screws, enable the operator to graduate the depth of his ploughing.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

I construct my plough (designed for two-horse power) as follows, viz: Segment-wheel S must be made to describe a little more than one-third of the entire circle, must be cast with strong arms and bevel cogs, and about sixteen and a half inches diameter from the centre of its hub to the periphery of the cogs. One of these segment-wheels is used to drive each row of augers in a plough, four rows being the usual number for a two-horse plough, and are keyed fast on the under side of the axle, about eight inches apart. The drum A and poise-wheel W may be cast in separate pieces, but the better way is to connect them by light arms, as seen in the dotted lines *j* in Figure 2. The outside auger bearing is in the drum, while the inner bearing is in W. It will be observed that this poise-wheel W, carrying the inside ends of the auger-shafts, serves the purpose of balancing the strain on the shaft when the auger is doing its work. When W is connected with the drum A by cast arms, (as represented in fig. 2 by dotted lines *j j*;) the drum must be cast in transverse sections, each section containing one-half of the external auger bearing, and all of the inner bearing. These sections can be keyed together by cast lugs and eyelets for the same made on the inside of the drum periphery. When they are made separate, the drum may be made of longitudinal staves, and bolted to the end piece; material may be iron or wood. Each auger-shaft, *e*, is provided with a pinion, *p*, keyed on it just inside the drum, so that all these pinions, belonging to one row of augers will mesh in the segment driving-wheel S that belongs to that particular row. The external end of auger-shaft is slotted for the reception of the auger-blade *d d*. This blade may be bolted, riveted, or otherwise securely fastened in this slot. A dirt-shield is made to surround the auger-shaft, just outside the drum, as seen in Figures 1 and 2 at *f*. Only one of these shields is shown, as seen at *n* in fig. 1. Its construction is clearly shown, Figures 4 and 5. A grooved washer, *e*, is shrunk on the auger-shaft at the proper place, so that it is secure and fixed to the shaft. A sheet-iron disk, *f*, fig. 4, is cut out, with the inner circular opening a little larger than the groove in *e*. It is then slit open at one side, and slipped on *e*, and its ends brought to a lap, as shown in the dotted lines *i* in fig. 4, which brings it up snugly in the groove of *e*, where it is to be riveted or otherwise secured to the drum by its outer edge. This prevents dirt from getting into the journal-box of the auger-shaft. The segment driving-wheel S is provided with two supplementary cogs at each end *b b*. These cogs are secured to springs riveted fast to the ends of S. Figure 3 shows the function these cogs perform, viz, always to throw the pinions *p* in mesh before they reach the rigid part of S. If a cog of one of these pinions should strike "a lock" on one of these supplemental cogs, the flat spring will yield, as in fig. 3, until the spring-cog falls into the next space in pinion, and thus bring the pinion into proper relation to the rigid cogs. These flat cog-springs should be stiff enough to always rotate the pinion, even if the auger is somewhat loaded with dirt. (I have left an open space in the drum, to show more clearly

the inside of the machine; it is represented at o' in fig. 1.) The axle h must be about one and three-fourths of an inch diameter, and its ends must be securely fastened to the wooden frame $F F$, so that it cannot rotate. The segment driving-wheels S , being keyed fast on the lower side of this axle, and the drum A carrying all the augers as it revolves on the axle, it is clear that the augers must rotate, each on its own axis, when they are in the ground. In a two-horse plough I would use about four rows of augers, each row eight inches apart, the augers twisted and about six inches in width, and from ten to twelve inches long. The augers should be made of good steel, and about three-twelfths of an inch thick. Their shape at the point may be made to suit the fancy of the builder; they should be somewhat pointed at the outer end, and both edges sharp. The caster-wheel p^2 in the front end of the plough-frame, and roller m at the rear end, are raised and lowered by screws, so as to graduate the depth of the ploughing. p^2 should have a broad tread, and the roller m should be about as long as the width of the plough. This latter may be made of wooden staves, similar to a barrel, and very light in consequence. These may be run down so as to lift the plough-points entirely off the ground, and in this way the machine may be transported from one field to another. A seat for the driver may be erected over the drum, clear of the auger-points, or it may be placed on the land-side of the plough, and sustained by iron brackets. When duplicate rows of augers are used in one plough, the cogs on segment driving-wheels S should all face one way, so that each and every auger will rotate in the same direction, and thus act in concert in breaking up and disintegrating the earth. The drum A should be about three feet in diameter, and long enough to accommodate as many rows of augers as are used in the same machine. The cast ends of the drum may be a solid web, with an opening in each provided with a sliding or hinged cover, through which a long-necked oil-pot may be thrust for the purpose of oiling the inside machinery.

Having thus fully described my invention, what I claim, is—

1. Segment driving-wheels S , compassing less than half a circle, when used in combination with pinions p , for the purpose of rotating each auger upon its own axis at the proper point for most effectually breaking and pulverizing the earth, substantially as shown.

2. Supplementary yielding cogs $b b$, when the same are attached to flat springs, as shown, and these, in connection with the segments S , as and for the purpose stated.

3. Dirt-shield f and its adjunct e , when these are made and used substantially as shown, and for the purpose specified; and

4. Caster-wheel p^2 and roller m , or their equivalents, when the same are used for graduating the depth of this "rotary plough," and for transporting the same from place to place.

E. T. BUSSELL.

Witnesses:

JNO. T. WOOD,
WM. ROE.