

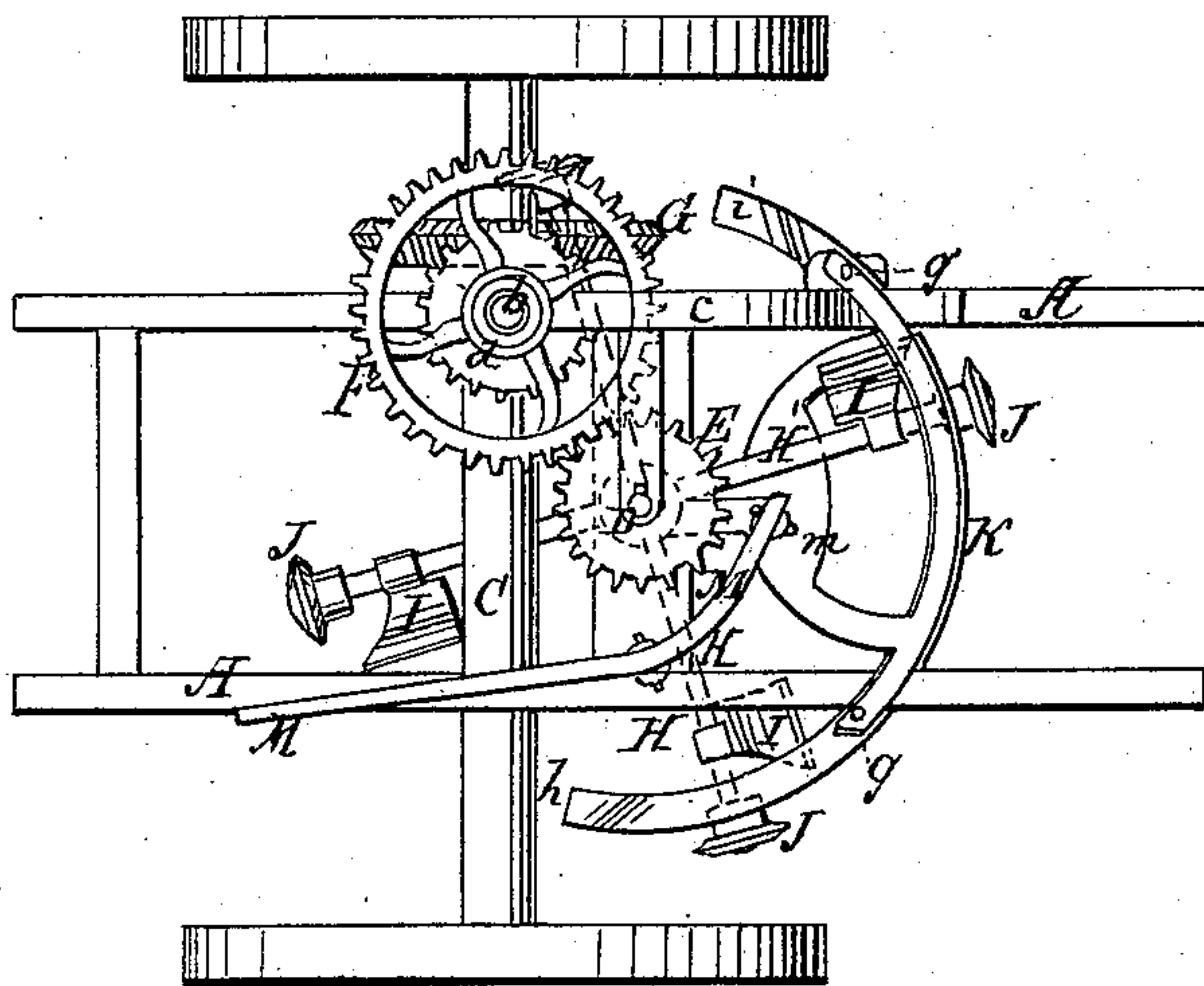
HAGGARD & BULL.

Steam-Plow.

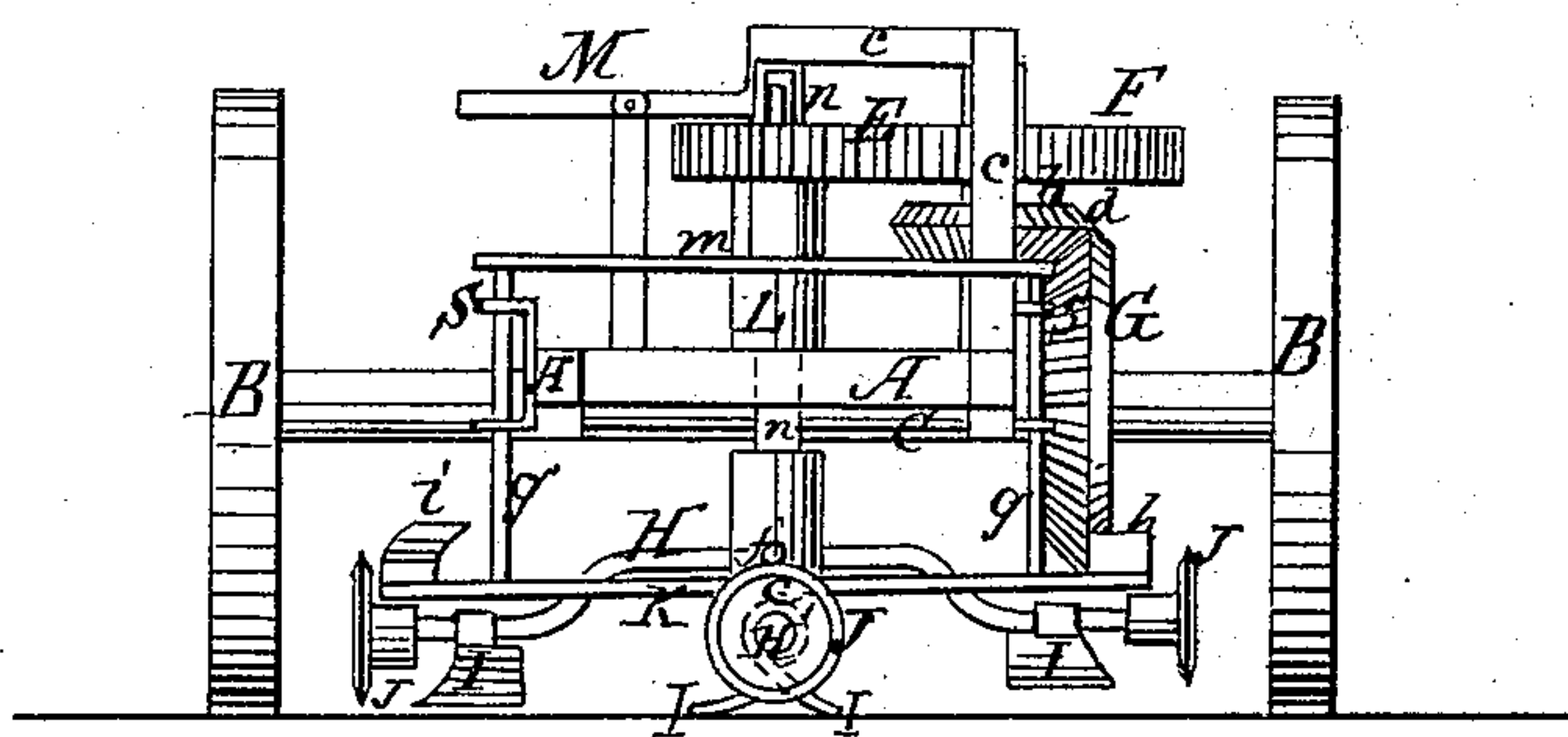
No. 12,387.

Patented Feb 13, 1855.

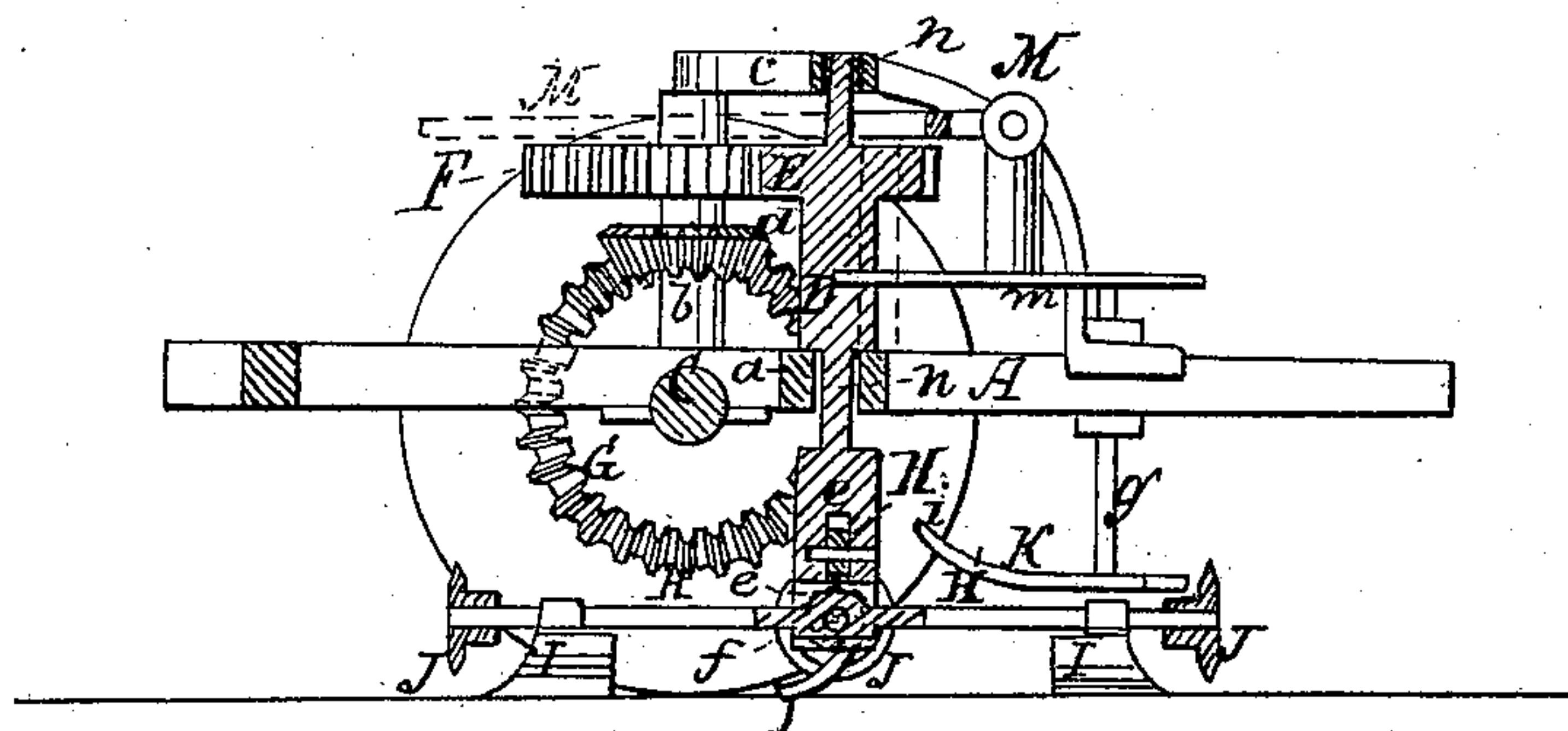
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



# UNITED STATES PATENT OFFICE.

J. W. HAGGARD AND GEO. BULL, OF BLOOMINGTON, ILLINOIS.

## IMPROVEMENT IN ROTARY PLOWS.

Specification forming part of Letters Patent No. 12,387, dated February 13, 1855.

*To all whom it may concern:*

Be it known that we, JOHN W. HAGGARD and GEORGE BULL, of Bloomington, in the county of McLean and State of Illinois, have invented a new and useful Improvement in Rotary Gang-Plows; and we do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is a plan or top view of a rotary plow constructed after our invention. Fig. 2 is a front view of the same. Fig. 3 is a vertical longitudinal section through the center of the plow.

Similar letters of reference in each of the several figures indicate corresponding parts.

This invention relates to a rotary gang-plow, and is designed to render them more utile and also effective in their operation.

The nature of said invention consists, first, in arranging the plows on rods passing horizontally through the lower end of a vertical revolving shaft, so that they shall travel or be caused to revolve in the path of a horizontal circle. By thus arranging the plows the soil can be plowed up very effectually, and also perfectly pulverized, by simply passing over it once, as will be presently shown.

It consists, second, in having each of the rods which support the plows turn slightly on a fulcrum-pin at the center of their length in the path of a vertical circle, and in connection with this arrangement employing an inclined semicircular way for the ends of said rods to move under and to be depressed by as the plows revolve. By means of this arrangement the plows are caused to enter the soil when they come alongside or commence to pass round in front of the vertical revolving shaft, and are thrown out of contact with the same when they commence to pass round to the back of said shaft, and thus all liability of the plowed soil being disturbed by the plows in passing round behind the shaft is avoided.

It consists, third, in employing a gang of circular cutters on the extreme ends of the arms which support the plows, said cutters being capable of revolving in the path of a vertical circle, and also of moving round in the path of a horizontal circle with the plows. By

thus employing the circular cutters all liability of the plows being choked by weeds, &c., will be overcome, as said cutters will effectually cut up or pulverize all such obstructions.

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

A is a strong frame or carriage which rests upon wheels B B, secured fast on a revolving axle, C.

D is the vertical revolving shaft, through which the rods H H' supporting the plows are passed. This shaft passes down through and turns in a box, *a*, set in the center of the frame or carriage A in the manner represented. On its upper end a small pinion, E, is keyed, which gears into a large spur-wheel, F, secured fast on a short vertical shaft, *b*, which has its bearing in the top of the frame or carriage A, and in a small frame, *c*, mounted on top of A, as represented. The upper end of the vertical shaft D also turns in the frame *c*, as will be evident from the drawings. On the shaft *b*, which carries the spur-wheel F, a small bevel-pinion, *d*, is secured, which gears into a larger bevel-wheel, G, secured fast on the axle C. By means of this intermediate gearing motion is transmitted from the propelling-wheels to the plow-shaft D, as will be clearly seen from the drawings.

H H' are the rods which support the plows I I. They are passed through oblong slots *e e*, cut in the lower end of the shaft D, as shown in the drawings, and are secured at the center of their length by fulcrum-pins *f f*. These rods, when thus passed through the shaft D, form four radial arms or supports for the plows I I, which are arranged in them in the manner shown. These arms also serve for supporting the circular cutters J J, which are arranged on their extreme ends, as represented, and revolve freely on the same in the path of a vertical circle. The cutters J J serve for cutting up the weeds, &c., and thus prevent the plows from choking. The rod H is arranged a short distance above H', and consequently requires to be bent, as shown, so that the cutting-edges of the plows and the cutters which are arranged on it shall stand even with the cutting-edges of those which are arranged on H'.



K is the semicircular way for regulating the operation of the plows. This way is arranged in front of the shaft D, as represented, it being suspended in a slightly inclined position by vertical rods *g g*, which play up and down in guides *s s*, fastened tight to the forward part of the frame or carriage A. The ends *h i* of this way are bent or curved upward, so that the hubs of the cutters J J shall freely pass under them as the machine is moved either back or forward. By setting this way a little lower than the axes of the rods H H' and giving it a slight inclination from a horizontal line it will be evident that as the hubs of the revolving cutters endeavor to pass under the lowest end, *h*, of the way they will meet with sufficient resistance to cause one end of the rod to descend and carry the plow and cutter on the same down sufficiently to bring it in contact with the soil and weeds, and simultaneously therewith to elevate the other end and throw the cutter and plow on the same out of contact with the soil, as illustrated in Fig. 2. The way K is connected to the shaft D by the rods *g* and plate *m*, as shown. By thus connecting the way to the shaft D it will be raised and lowered with the same, and thus be out of the way while the machine is not plowing.

It should be observed here that the vertical plow-shaft is made so as to be capable of being elevated when it is desired not to perform the operation of plowing, provision for this movement being made by lengthening the journals *n n* of said shaft, as shown.

M is a lever for raising and lowering the plow-shaft and way. The operation is as follows: As the carriage is impelled forward by a horse or otherwise motion is given to the gearing E F d G by the axle C and a rotary motion communicated to the shaft D, which carries the plows. As this shaft revolves the plows cut up the soil, and, owing to their traveling in a horizontal circle, pulverize it also. As the plows revolve in a horizontal circle the cutters, owing to their hubs coming in contact with the inclined way K, are caused to revolve vertically and cut up all weeds, &c., which may have a tendency to choke the plows. The action of the cutters is also increased by their traveling at the same time as they vertically revolve in the path of a horizontal circle. After the plowing is performed the lever M is depressed and the plows, cutters, and way elevated, so that the machine may be propelled forward or homeward with ease.

What we claim as our invention, and desire to secure by Letters Patent, is—

The arrangement and combined operation of the plows I I I I, cutters J J J J, and semicircular way K, substantially as and for the purposes herein specified.

JOHN W. HAGGARD.  
GEORGE BULL.

Witnesses:

JOHN FOSTER,  
H. H. PAINTER.