

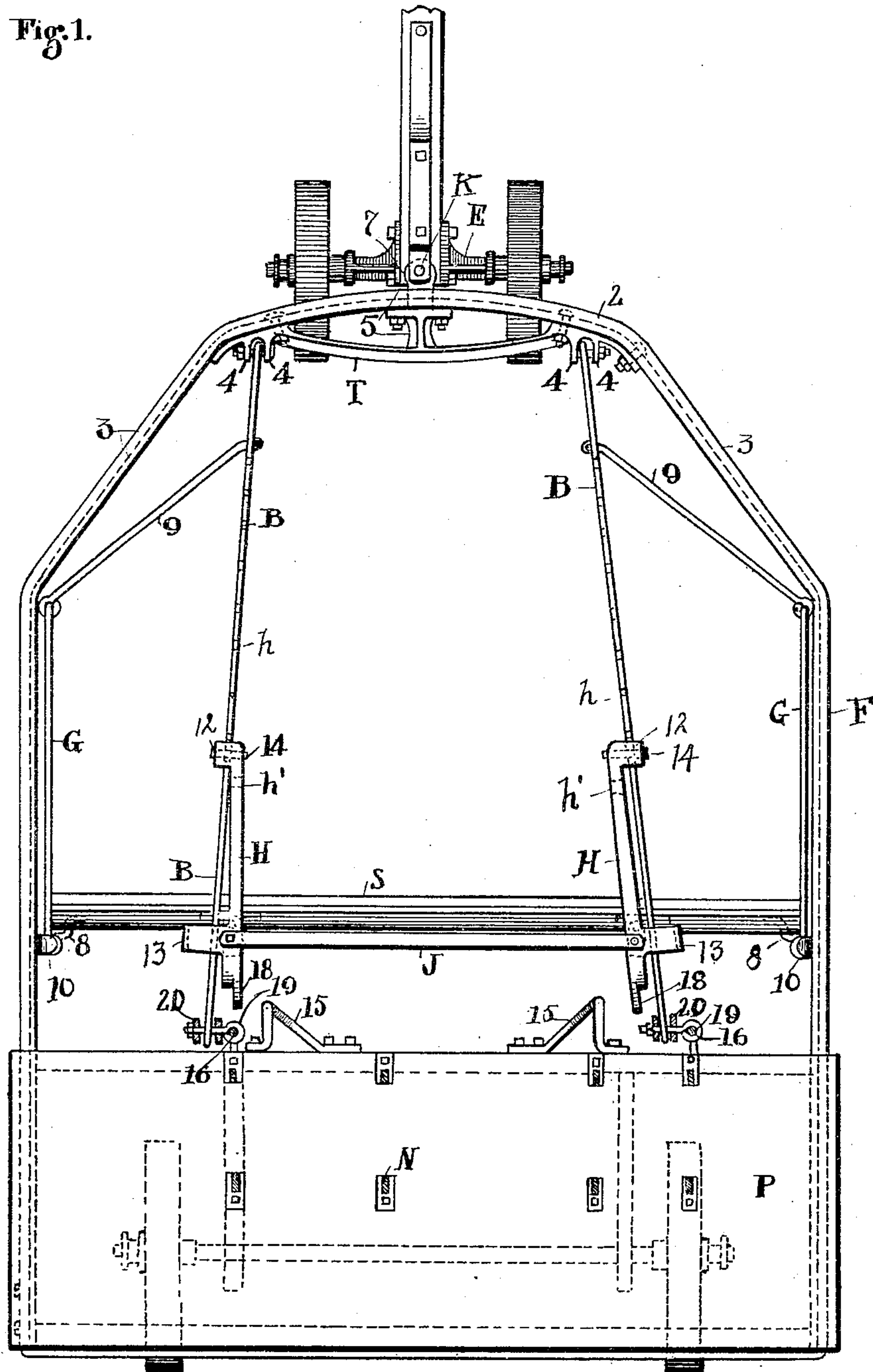
D. E. GRAVES.
 COMBINED GRADING, DIGGING, AND LEVELING MACHINE.
 APPLICATION FILED MAY 20, 1909.

962,756.

Patented June 28, 1910.

4 SHEETS—SHEET 1.

Fig. 1.



ATTEST
E. M. Fisher
F. C. Musson.

INVENTOR.
 DAVID E. GRAVES.
 BY *Fisher & Moser*
 ATTYS.

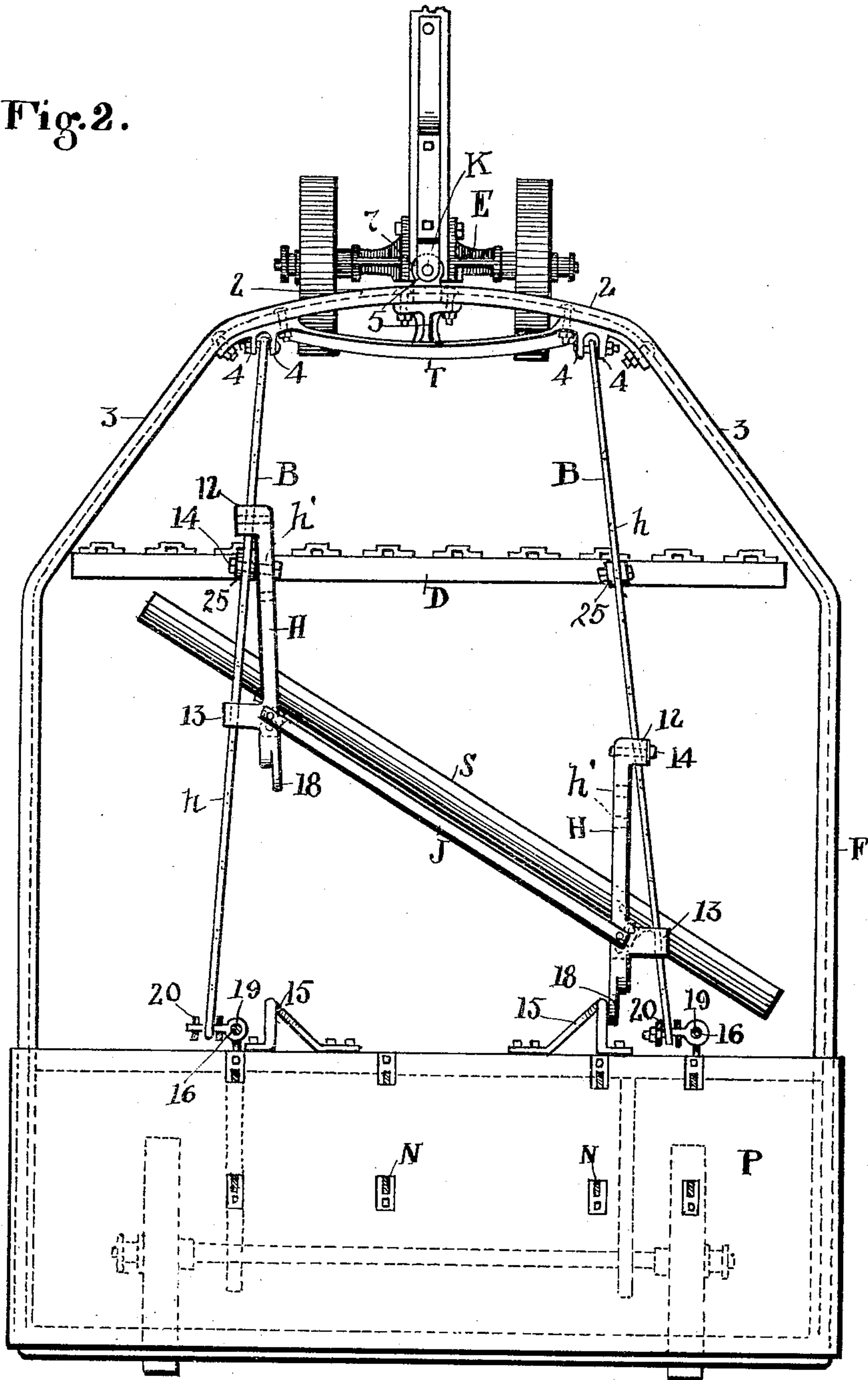
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Fig. 2.



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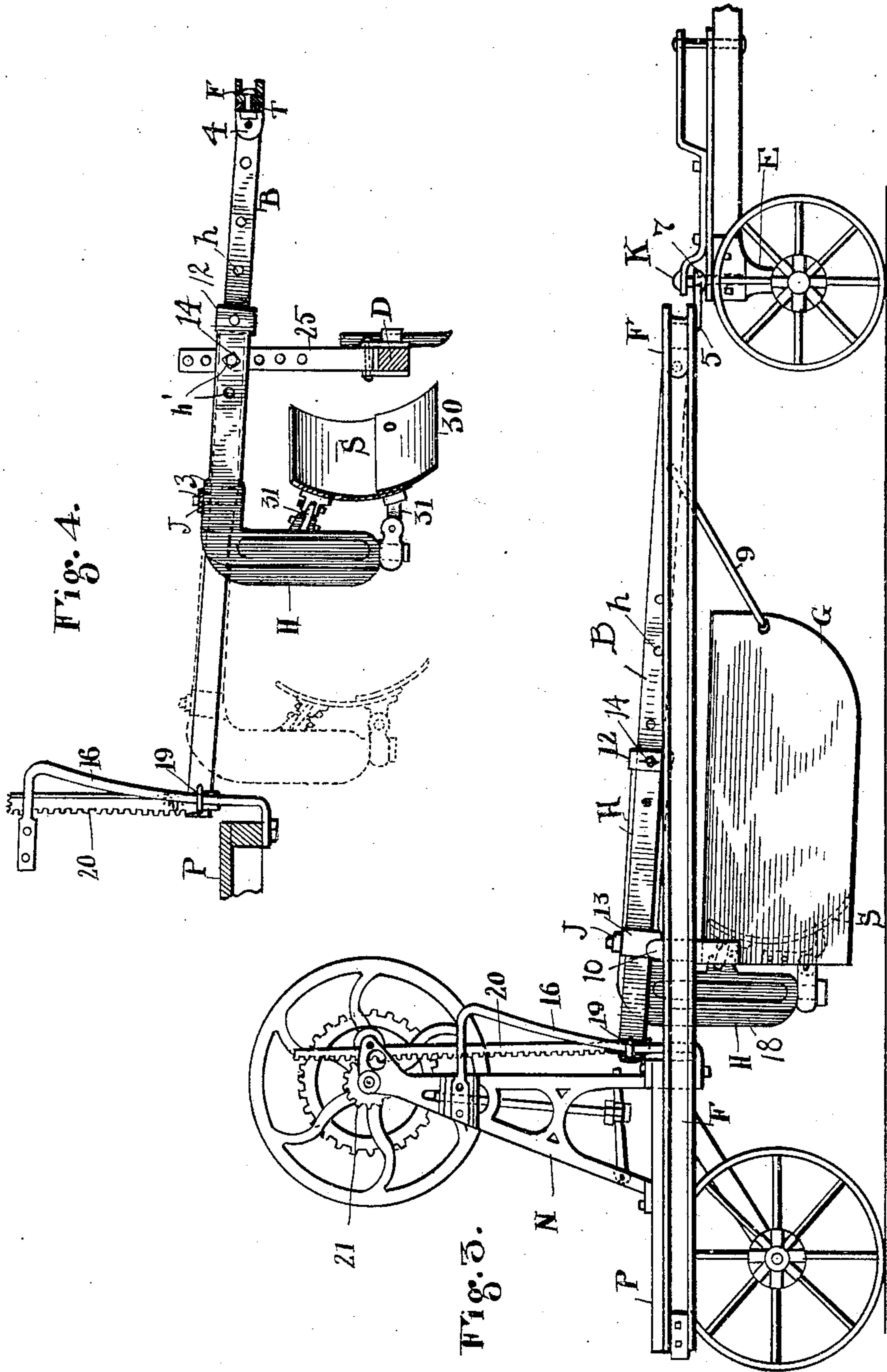
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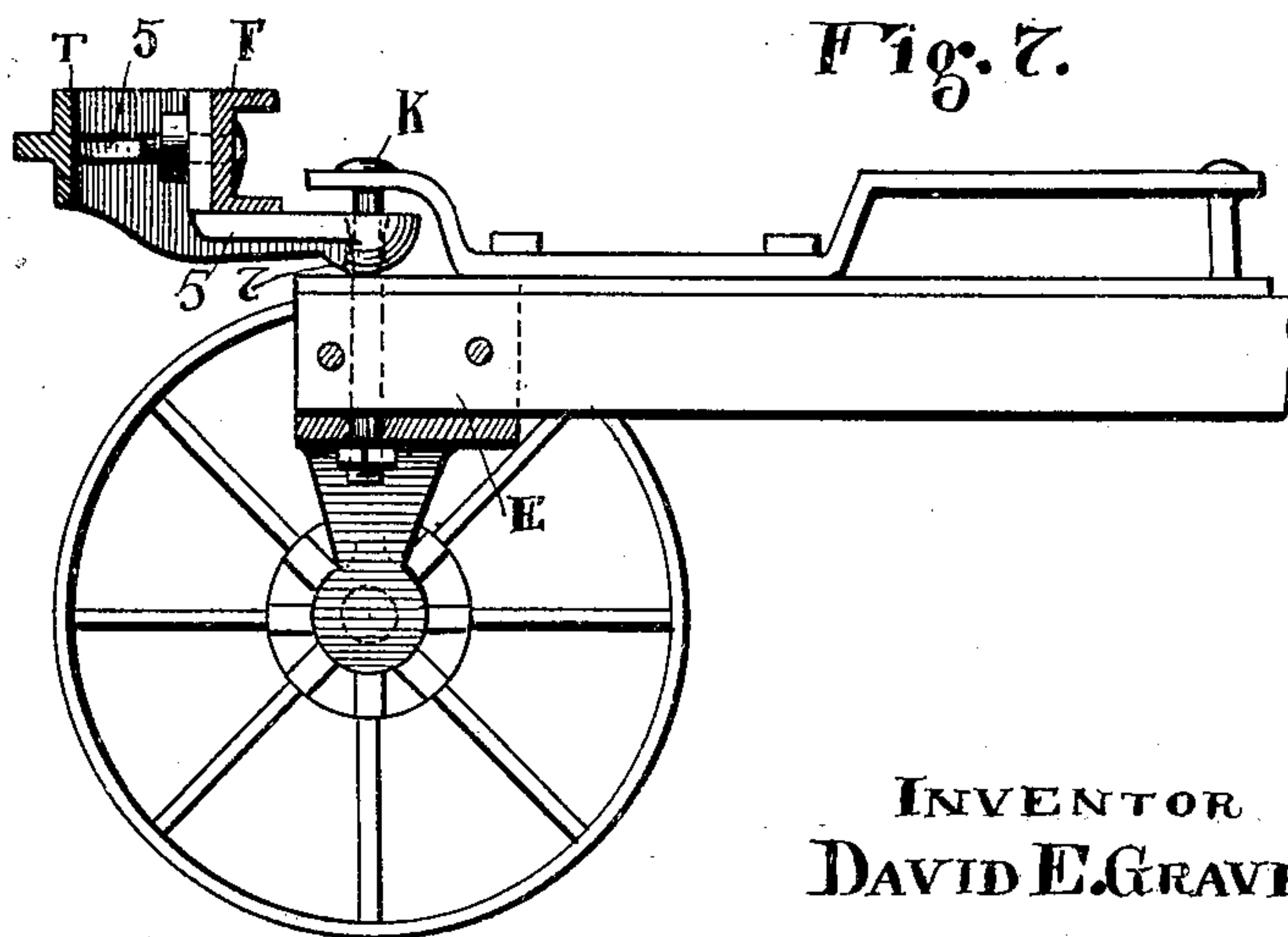
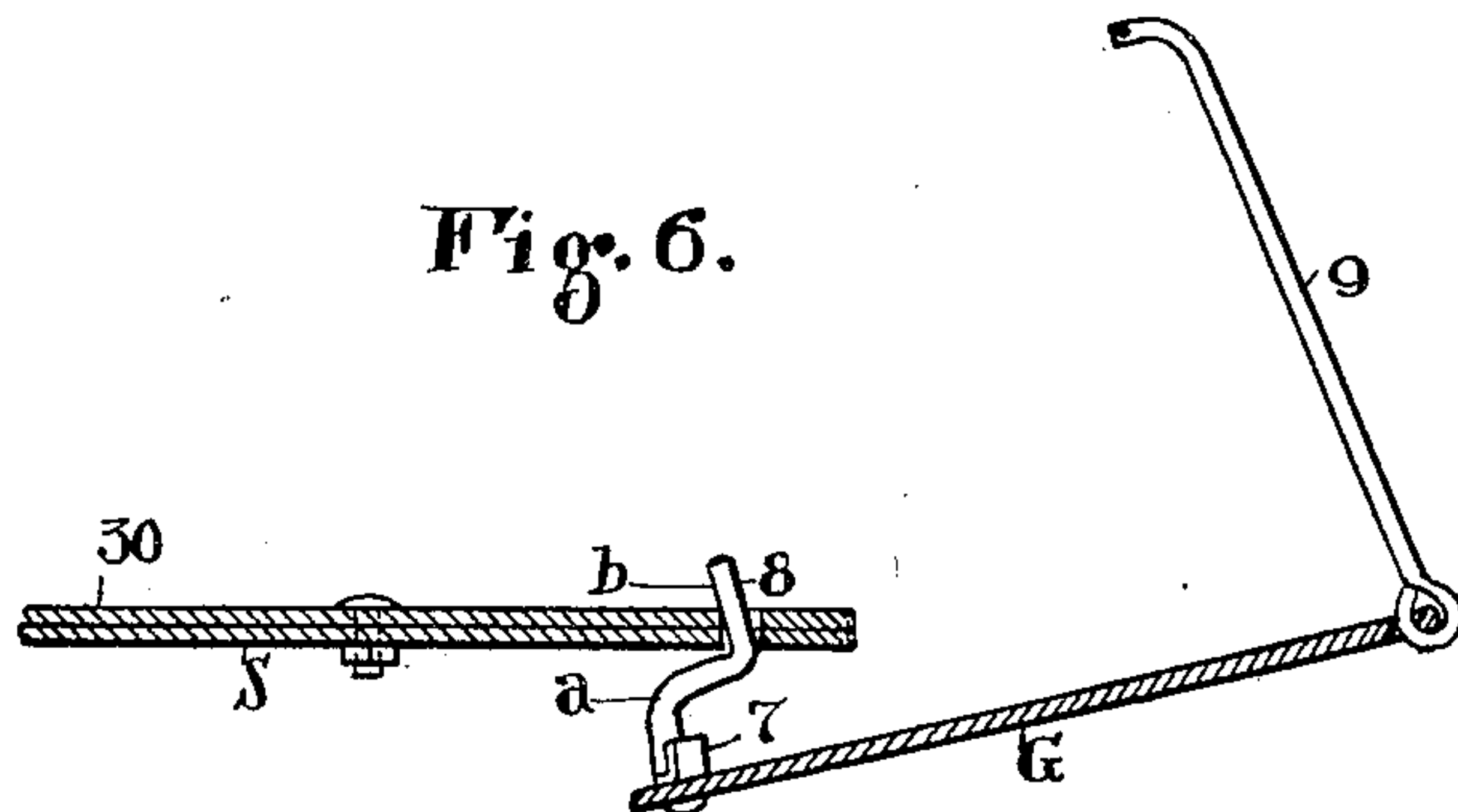
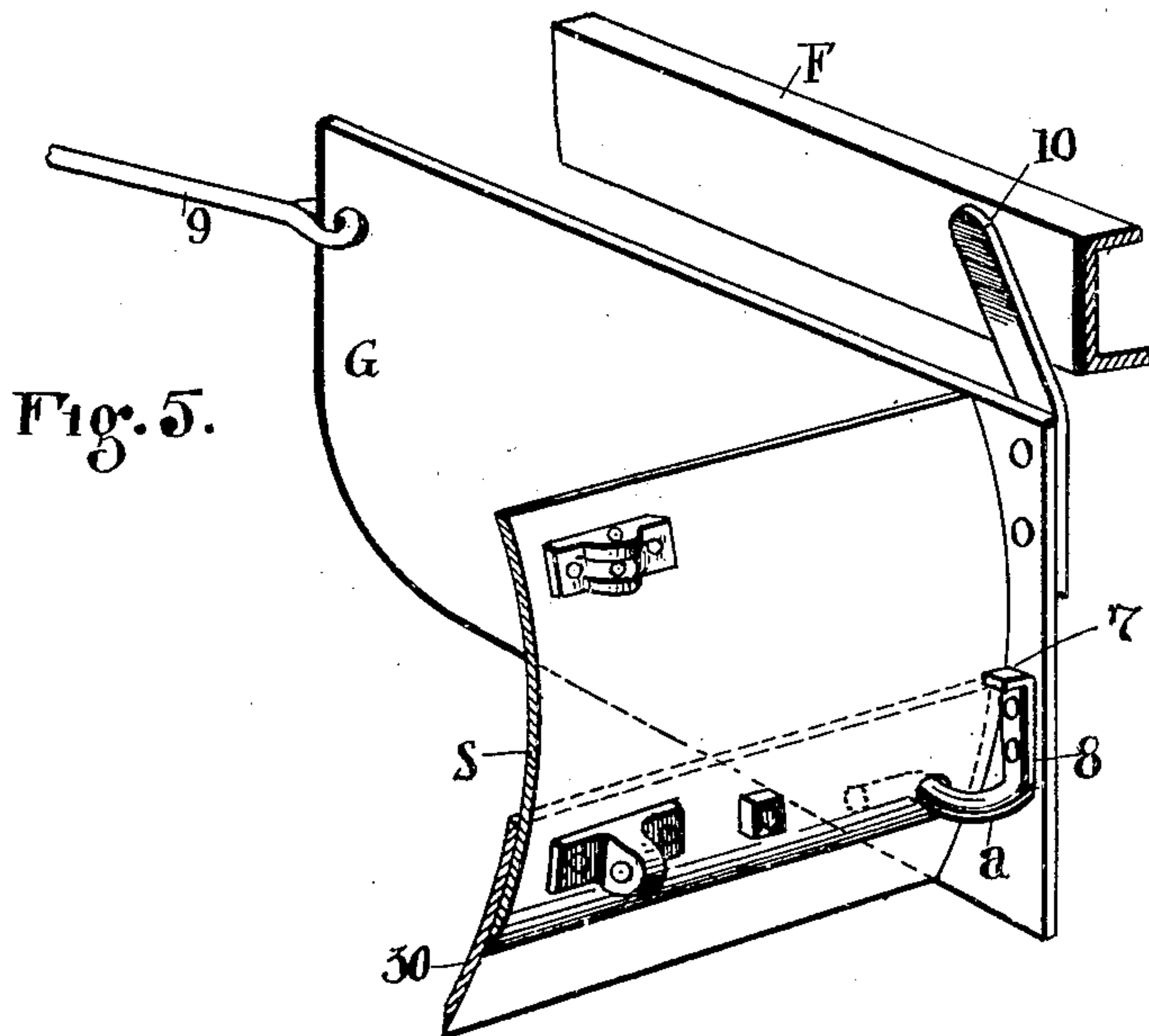
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4 SHEETS—SHEET 4.



ATTEST
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UNITED STATES PATENT OFFICE.

DAVID E. GRAVES, OF OBERLIN, OHIO.

COMBINED GRADING, DIGGING, AND LEVELING MACHINE.

962,756.

Specification of Letters Patent. Patented June 28, 1910.

Application filed May 20, 1909. Serial No. 497,145.

To all whom it may concern:

Be it known that I, DAVID E. GRAVES, a citizen of the United States, residing at Oberlin, in the county of Lorain and State of Ohio, have invented certain new and useful Improvements in a Combined Grading, Digging, and Leveling Machine, of which the following is a specification.

My invention relates to a combined grading, digging and leveling machine, constructed and adapted not only for any kind of road grading and leveling, but also for railroad bed leveling, sub-grade leveling for road paving and for making and cleaning drainage and lateral ditches, for levee building, leveling lands for irrigation and the like, all substantially as shown and described and particularly pointed out in the claims.

In the accompanying drawings, Figures 1 and 2 are plan views of the machine with certain of the parts differently disposed therein as will hereinafter clearly appear. Fig. 3 is a side elevation of the machine as it appears in Fig. 1, and Fig. 4 is a side elevation partly in section of parts of the machine as it appears in Fig. 2. Fig. 5 is a perspective rear view of a portion of the scraper or blade and one of the fenders, showing the means for connecting the same, and Fig. 6 is a plan in section of said parts showing their relation when being separated. Fig. 7 is a vertical sectional view of the main frame and its support upon the front truck.

The invention as thus disclosed is an improvement in a combined machine of this general character patented to Benjamin F. Shuart, of Oberlin, Ohio, on the 13th day of February, 1900, Number 643,240, and which machine and patent are the property of the company which is manufacturing the present invention.

In the course of experience with the Shuart machine it was found that the same was susceptible of material improvement in several important particulars, as will appear in the detailed description herein. Thus, an entirely new and original main frame F for the machine was found essential, and said frame is built of a single bar or rail of channel steel bent to form the entire front and sides thereof. Said bar is slightly bowed at —2— across the immediate front portion of the frame, and from this bowed portion the sides —3— are bent for a short distance to an inclination of ap-

proximately forty-five degrees to the line of draft, giving the front of the frame almost a V shape, while the rear side portions thereof are straight and parallel and the rear ends of said sides are connected by suitable cross pieces to make the frame rigid as a whole and afford a support for the platform P. Then as a means of strengthening the frame at the front as well as for other purposes I build an inwardly bowed malleable iron truss T across the same inside opposite portion 2 and secure the ends thereof to the frame with bolts, while the middle of the truss has a forwardly projecting tongue —5— at its middle with a flange to bolt the same to the main frame and projecting to the front from beneath the frame and serving as a support for the frame on front truck E. The said tongue has an enlargement —7— rounded at its bottom where it rests upon the truck and is loosely secured thereto by king bolt K. Said rounded bottom portion insures a rocking bearing for truck E and the tongue itself affords a direct draft for the main frame. The draw-bars B for scraper or blade S and for digger D are engaged with ears —4— on the ends of said malleable truss T, so that said truss serves several useful purposes.

Again, I have materially improved the means for connecting the fenders G with scraper blade S, by which said parts are inseparably connected when at work and yet can easily be separated when it becomes necessary to do so. To these ends the said fenders are provided at their rear and bottom with rigid inward projections or fingers 8 which have compound bends or curves *a* and *b* and are entered through holes in the ends of blade S to make working connection therewith. These fingers practically lock the blade and fenders operatively together in right working relations and yet provide for their easy separation, as seen in Fig. 6. Each fender is also provided with a rigid guide or standard —10— at its rear and top which bears against the inside of the main frame and sustains the fender against outward pressure and in respect to the scraper blade and thus cooperating with said fingers —8— in holding said parts operatively together. Draft rods —9— connect the front of the fenders with draw-bars B.

The blade S is designed to be variously positioned according to the work to be done, and to this end means are provided for set-

ting the same directly across the path of the machine, as in Fig. 1, or at more or less angle of inclination to said path and at either right or left inclination as the work may require and as suggested in Fig. 2, where the inclination is to the right and whereby the earth caught by the scraper will be drifted to the right of the machine. It is provided, furthermore, that the blade shall be movable back and forth within the machine at either or both ends as the work may require, and also to have the same supported by a more or less flexible connection and yet with such adaptations for sustained downward pressure upon the blade as may be necessary to hold it at its work. To these ends the said blade is provided with its own special standards H, which are slidably mounted upon draw-bars B in or by the loops —12— and —13— on the outside of said bars, and said standards are adapted to be fixed by bolts —14— through any one of the series of holes *h* in the said bars. A cross-piece J unites the rear ends of the said standards H, and steel bumper brackets —15— of angular formation bolted at the front of the platform P or the cross bar thereat take the side or lateral pressure against the blade in certain positions thereof, as seen, for example, in Fig. 2, whence said pressure or strain is delivered to the platform axle and its wheels. In this instance the blade standard H has a projection —18— at its rear and top adapted to engage said bracket and take the pressure referred to.

The elevation of blade S and the fenders affixed thereto is governed by adjusting mechanism mounted on auxiliary frame N and which comprises the usual vertically disposed rack bars —20— engaged by pinions —21— above and bifurcated at their lower ends over the rear ends of draw-bars B. A curved guide standard —16— for each bar and rack is fixed to said frames F and N, and an eye bolt —19— is slidably sleeved on said standard and ties said rack and draw-bar together, but the pulling strain of the draw-bar is taken up by curved guide standard —16— regardless of any adjusted position of the parts. This is possible because the curvature of guide standard 16 corresponds to the arc movement of draw-bars B which have their pivots at ears —4— of truss T. By these means the usual working adjustment of the parts is effected through said pinions and rack-bars.

In Figs. 2 and 4, I show a digger D arranged in advance of blade S and adapted to loosen up the earth for said blade. The relative arrangement of these parts in itself is not new but I have found that there is great advantage in operation in having the digger as near as possible to the blade, and to this end I have provided the front

arm of the blade standard H with holes *h'*, and connect the standards —25— of the digger with said standards and the corresponding draw-bar by means of a single bolt 14 through both, as seen at the left in Fig. 2 and in Fig. 4.

By coupling up the scraper blade and the fenders alike with the draw-bars as in this case I am enabled to make any preferred disposition of said parts with each other according to the many and varied uses to which the machine is adapted and said draw-bars are provided with holes at intervals more or less their entire length and especially in their forward portion or half and by which the digger also is held in coöperating relations with said parts. This also leaves the main frame unimpaired at all points to attach said parts.

The blade S is provided with an attachable cutting knife 30 which can be renewed or sharpened as occasion may require. Suitable links 31 connect the blade with its standards H, see Fig. 4.

The fingers 8 have a base portion with an inturned upper end 7 adapted to form a stop or back rest for blade S about midway its top and bottom.

What I claim is:

1. A grading and like machine having a transversely disposed scraper blade and fenders at the ends thereof, and means separably fixing said fenders and blade rigidly together.

2. A grading and like machine comprising a truck with a tongue, a frame having a bearing portion at its front and center rounded on its bottom and operatively engaged on said truck.

3. A grading and like machine having a front truck, a main frame with a bowed inside truss across its front portion and a tongue upon said truss forming a support for said frame on said truck.

4. A grading machine having a front truck and a main frame provided with a truss brace across its front inside and said truss fixed to said frame at its center and ends and constructed at its ends to support draw bars and at its center to rest said frame on said truck.

5. A grading and like machine having a main frame at its front and sides formed out of a single piece of channel steel and said frame bowed outwardly at its immediate front and provided with diverging front side portions substantially as shown and parallel rear side portions, and an inwardly bowed truss in the front of said frame and fixed thereto at its middle and ends.

6. In a grading and like machine, a scraper blade adapted to extend across the path of the machine and end fenders therefor having rigid angular projections at their rear ends engaged through holes in said

blade and adapted to operatively unite said blade and fenders.

7. The scraper blade having holes in its ends, in combination with fenders having rigid inward projections at their rear ends formed with two substantially right angled bends and removably engaged through said holes.

8. A grading and like machine having a main frame, a scraper blade having holes in its ends and fenders having inward projections with a plurality of bends engaged in said holes and adapted to lock said parts operatively together, and standards on said fenders bearing against the inside of said frame.

9. In a grading and like machine, a main frame, a scraper blade and draw-bars therefor, in combination with fenders removably engaged with the ends of said blade and provided with guide members bearing against the inside of said frame, and rods coupling the front ends of the fenders with said draw-bars.

10. In a grading machine, a main frame having draw-bars pivotally connected at the front thereof and vertically adjustable at the rear, and curved guiding standards upon said main frame with which said draw bars have sliding and pulling engagement.

11. The machine described having a main frame, a scraper blade and standards carrying said blade, and steel bumper brackets of angular formation bolted on said frame and adapted to be engaged by said standards in certain positions of said blade and take the lateral pressure on said blade.

12. The main frame of the machine and a platform thereon, a supplemental frame over said platform, and vertically disposed standards engaged at their ends on said frames, in combination with a scraper blade and draw-bars therefor, vertically disposed rack-bars adapted to raise and lower said blade and fix the working elevation thereof and eye bolts slidably mounted on said standards

and engaging said rack-bars with said draw-bars.

13. In a grading and like machine, a main frame and draw-bars pivotally connected therewith at their front ends, a scraper blade supported by said draw-bars, curved guiding standards for the rear ends of said draw-bars, and pinion and rack mechanism having an eye bolt connection with said grinding standards.

14. In a grading and like machine, a main frame and adjustable draw-bars thereon and a scraper blade adjustably mounted upon said bars to permit the same to be set at different angles and drifting positions, in combination with a digger and means to support the same on said bars relatively near one end of said blade when set at an angle thereto.

15. In a grading and like machine, a main frame and vertically adjustable draw-bars mounted thereon, and a scraper blade having supporting members slidably mounted upon said draw-bars, in combination with a digger and means to secure said digger and one of said supporting members jointly together upon a draw-bar and relatively close to one end of said scraper blade.

16. In a grading machine, a main frame, a scraper blade and draw-bars and standards for said blade slidably mounted upon said draw-bars and a plurality of bolt openings in both said draw-bars and standards, in combination with a digger and bolts to secure the same either to the draw-bar alone or to standards and draw-bars, whereby a relatively close adjustment of the digger and blade is obtained when set in angular positions in respect to each other.

In testimony whereof I affix my signature in presence of two witnesses:

DAVID E. GRAVES.

Witnesses:

E. M. FISHER,
F. C. MUSSUN.