(No Model.) 3 Sheets—Sheet 1.

G. SPALDING & J. S. ROBBINS.

ROTARY PLOW.

No. 587,459. Patented Aug. 3, 1897.

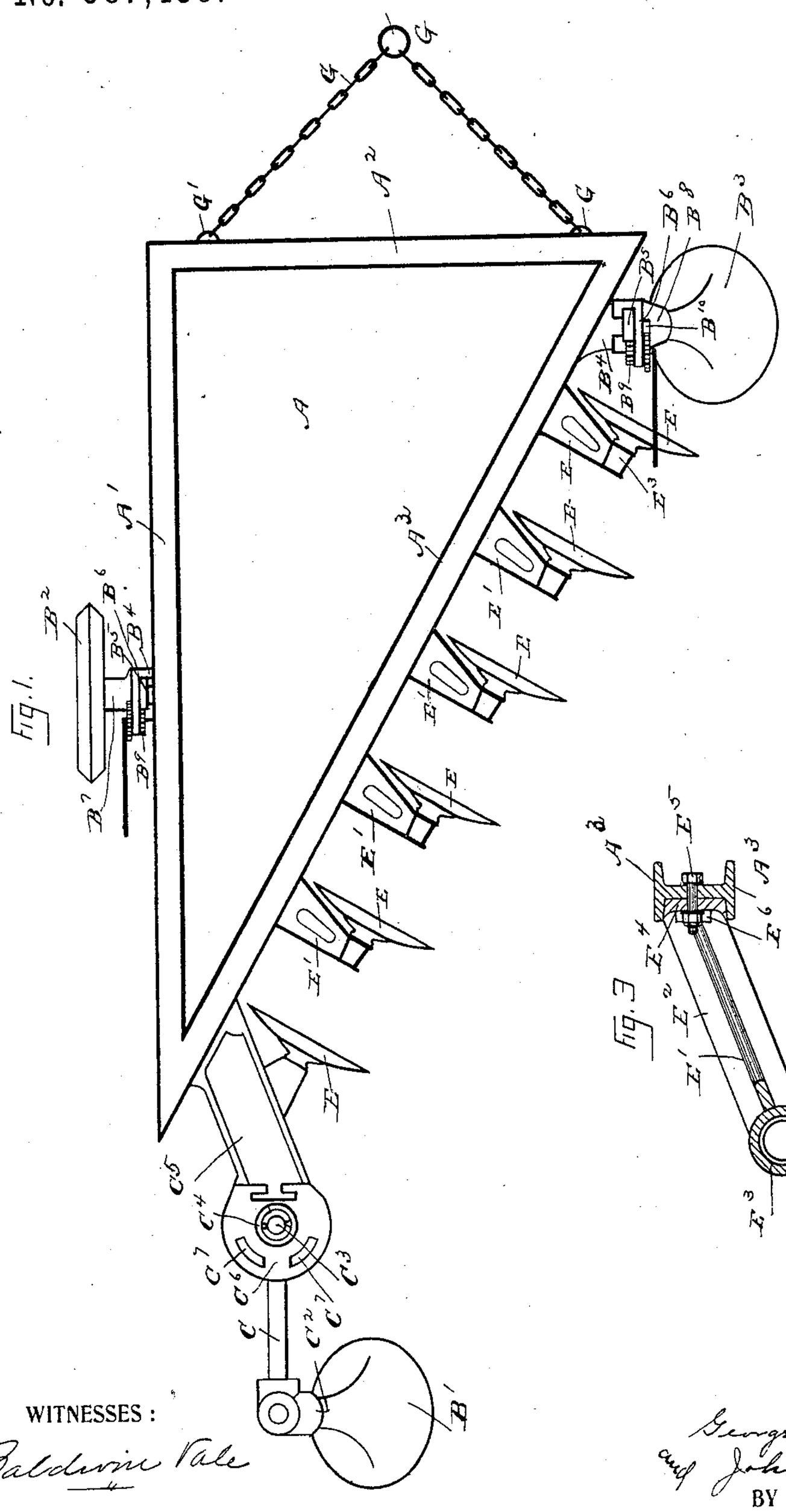

Fig. 1.

Fig. 3

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Fig. 2.

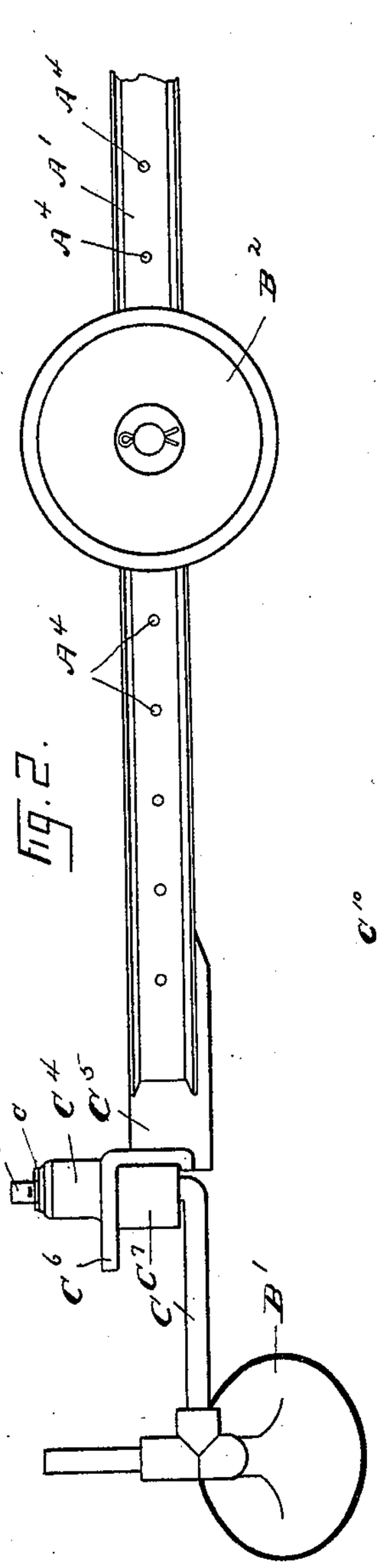


Fig. 4.

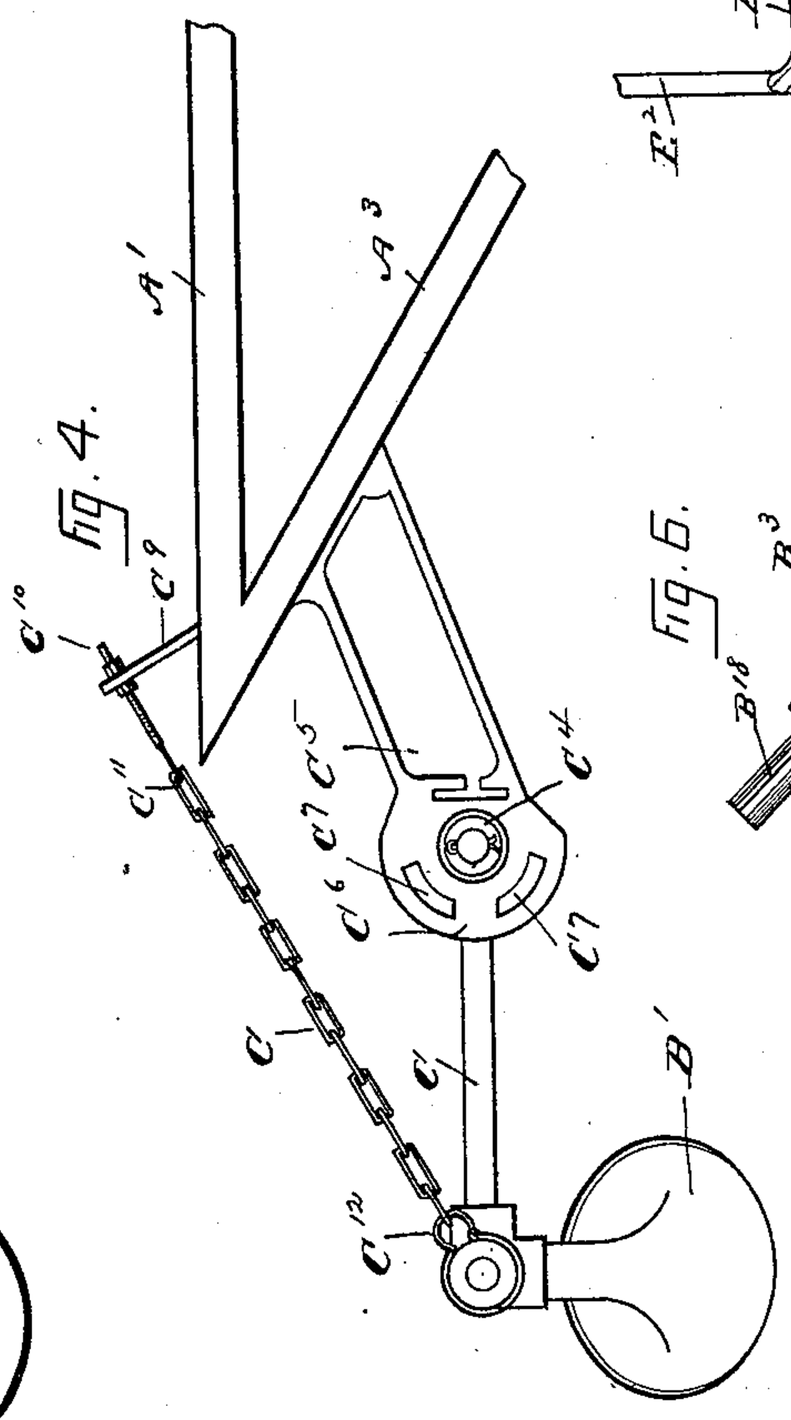


Fig. 5.

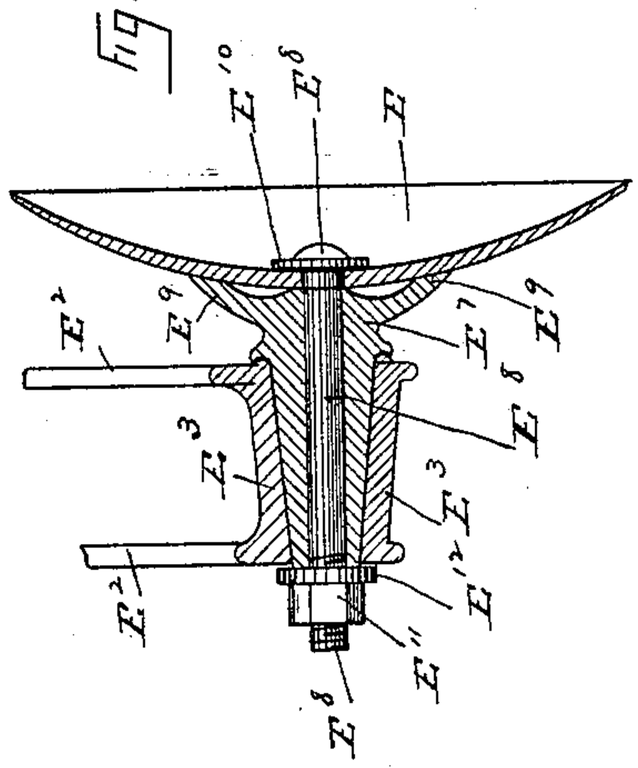
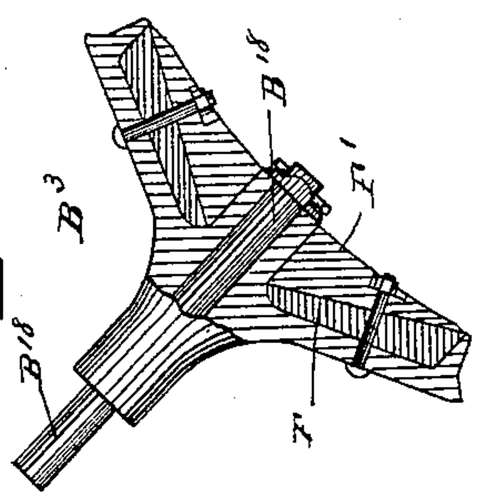


Fig. 6.



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ROTARY PLOW.

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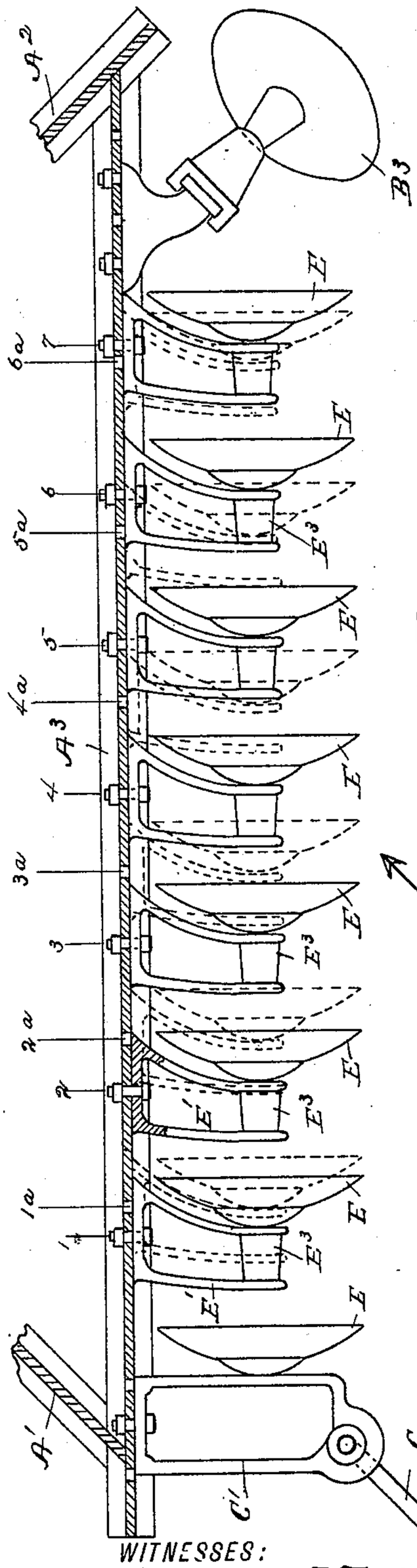

Fig. 7.

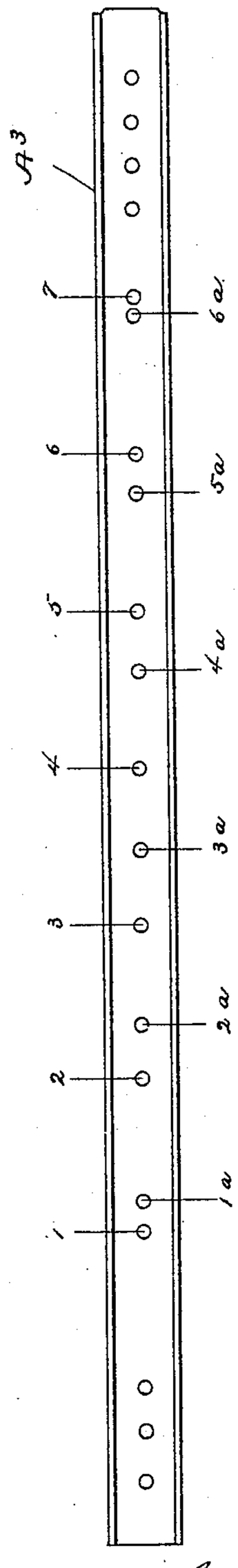

Fig. 8.

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UNITED STATES PATENT OFFICE.

GEORGE SPALDING AND JOHN S. ROBBINS, OF STOCKTON, CALIFORNIA.

ROTARY PLOW.

SPECIFICATION forming part of Letters Patent No. 587,459, dated August 3, 1897.

Application filed November 11, 1895. Serial No. 568,599. (No model.)

To all whom it may concern:

Be it known that we, GEORGE SPALDING and JOHN S. ROBBINS, citizens of the United States, residing at Stockton, in the county of San Joaquin and State of California, have invented certain new and useful Improvements in Rotary Plows; and we do hereby declare the following to be a full, clear, and exact description of said invention, such as will enable others skilled in the art to which it most nearly appertains to make, use, and practice the same.

This invention relates to improvements in rotary plows, and more particularly to the frame thereof.

The objects which this invention has in view are to so construct the frame as to produce solidity of structure, to afford a simple and efficient means for laterally adjusting the rotary cutters or disks, to provide a simple and effective means whereby the said disks may be maintained in position when once set, to provide means for forward and backward adjustment of the land-wheel, and to provide means for the attachment of the hitching whereby the draft may be regulated.

The invention consists in constructing the frame of the plow in a triangular shape, the one side of the triangle being adapted to carry the plow-disks and being set at an angle to the line of draft, in further providing the beam carrying the disks with perforations suitably arranged to permit the brackets on which the disks are carried being moved from one set to another, and in further providing a channel or flange in which or against which the ends of the said brackets rest in line.

In the drawings, Figure 1 is a plan view of a plow constructed in accordance with this invention. Fig. 2 is a side view of the same from the land-wheel side. Fig. 3 is a detail view of the disk-bracket and carrying-beam, showing the manner of connecting and holding the brackets in line. Fig. 4 is a detail view, enlarged, of the bearing and adjusting attachment of the caster-wheel. Fig. 5 is a detail view in section showing the mounting for the rotary disks. Fig. 6 is a detail view in section showing the mounting and construction of the caster and furrow wheels. Fig. 7 is a plan view of the disk-beam, partly in section, showing in full lines the arrangement of the full number of disks with which the beam is supplied and in dotted lines the arrangement of a less number of disks. Fig. 8 is an elevation of the disk-beam, showing the arrangement to the two series of perforations by which the arrangement is changed.

For the purpose of description with reference to the drawings we will let the letter A designate the triangular frame. This in the present construction consists of steel I-beams. It forms the three sides of the triangle, the land side A′, the draft side A^2 at an angle of ninety degrees to the land side and extends the full width of the furrows to be cut, and the disk-beam A^3 set at an angle to the other sides to form the hypotenuse of the triangle. The angle at which the disk-beam is set is governed by the angle at which it is desired to set the disks with reference to the line of draft or the furrow to be cut. The frame may be constructed of one, two, or three pieces, as desired. Where it is constructed of more than one piece the ends of the pieces are secured to angle-irons which fit in the corners and to the flanges of which the webs of the meeting beams are bolted or riveted. By setting the flanges against the webs and snugly in between the flanges all tendency to twist in the frame is guarded against.

When thus constructed, the frame is mounted on the three wheels B′, B^2, and B^3. The wheel B′ is mounted on a caster-arm C, which is pivotally mounted to the rear end of the frame, a bracket C′ being extended to receive it. This wheel is a guide-wheel and serves the double purpose of steadying the machine in swinging around corners and also to prevent side creeping due to the side thrust of the disks. To accomplish this latter purpose, it is necessary to present to the land side of the last furrow a straight flat side. This is provided for by shaping the wheel with the conical back, as shown, and mounting it on an inclined shaft C^3, which throws the cone over to present a perpendicular side to the land side of the furrow. The wheel is mounted in suitable bearings in the far end of the caster-arm C. The caster-arm is bent upward to form the perpendicular bearing-rod C^3, which is extended above the bearing to receive additional or supplemental weights where the ground is of a nature to require it. The bearing C^4 of the caster-rod is formed in

the end of the brackets C^5 or the innermost bracket of the disks. The offset of the disks is equaled in the offset of the inclined bearing of the wheel B′ to cause the said wheel to track in the bottom of the furrow or cut of the innermost disk. To provide for locking the caster-arm C in position, as it is sometimes desired to do, the bearing C^4 is provided with a flange C^6, provided with slots formed therein, into which the stops C^7 may be dropped or from which they may be taken, as desired. Usually, however, it is desired that this wheel be rigid against swinging away from the land side, while free to swing in the opposite direction. This is herein accomplished by removing the stop toward the land side, as shown at Fig. 2 of drawings, and substituting therefor the chain C^8, which is connected to the bracket C^9 on the frame by means of the bolt C^{10} and turnbuckle C^{11} and to a ring C^{12} on the head of the bearing of the caster-wheel. It will be seen that by this arrangement the caster-wheel is prevented from swinging away from the land side by reason of the strain on the chain and at the same time is permitted to swing the full limit in the opposite direction when making the short turn at the end of the furrow.

When the plow is being drawn to and from the field, both the stops C^7 are taken out, so as to allow the wheel B′ to track in either direction in going around the different curves.

The land-wheel B^2 and the furrow-wheel B^3 are both mounted in the same style of bearing in so far as their being capable of being raised and lowered are concerned. In each the bracket B^4 extends out from the frame A and is provided on the end with perpendicular rack-bars B^5. Around these rack-bars are extended the sides of the guide-plates B^6, which carry the bosses B^7 and B^8, on which the wheels B^2 and B^3 are mounted, respectively. To engage the rack-bars, the guide-plates B^6 are provided with small pinions B^9, the teeth of which engage the teeth of the rack-bars, and a pawl B^{10}, suitably arranged on the guide-plate to hold the pinion in position. The pinion may be provided with any suitable lever, either stationary or detachable, by means of which it may be rotated to lift the frame A and the rotary disks. By this construction I obtain greater and constant leverage to lift the weight to any desired height.

While the wheels B^2 and B^3 resemble in the above-described construction of mounting, they differ in other respects. The wheel B^3 resembles in form and construction the caster-wheel B′ above described. It is mounted on the inclined spindle B^{18}, which is set at an angle to the guide-plate B^6, as shown, to throw the conical side of the wheel next the land side of the furrow in which it is run—that is, the innermost furrow previously cut by the plow. The wheel B^2 is the land-wheel and runs inside the furrows on solid ground. The boss B^7, upon which it is mounted, is horizontal. The bracket B^4, by means of which it is attached to the frame, is flanged at both ends and fits snugly between the flanges of the frame and is held against twisting thereby. To provide for adjustment of this bracket forward and backward, the side A′ of the frame is provided with two or more sets of perforations A^4 to receive the bolts of the brackets B^4. By means of this adjustment the wheel B^2 is insured in maintaining its position as the pivot on which the plow turns. In making the turns it is essential that the caster-wheel B′ should track in the same line as followed by the furrow-wheel B^3 in order to distribute the strain, which tends to cause the wheel B^2 to slide, and thus throw the machine out of alinement on the succeeding furrow. The strain in turning is against the conical faces of the wheels B′ and B^3, causing the machine to turn on a point intermediate. Against the strain of the wheel B^3 is set the strain of the disks, and as the number of disks used varies the center of the turn will vary. It is to meet this change of pivotal point that the lateral adjustment of the wheel B^2 is provided, so as to place this wheel on such pivot, and thus overcome the liability to throw it out of line on the succeeding furrows.

A further and more important object in thus mounting the land-wheel so that it is adjustable back and forth along the land-beam is that of regulating the depth of the cut of the last or innermost disk or disks. In this construction of plow the caster-wheel B′ serves the double purpose of supporting the end of the disk-beam and of bearing the same down. That is to say, the disks at this end of the beam are prevented from any sudden sinkage into the ground by reason of the flat tread of the wheel preventing, but in any tendency to rise they are compelled to lift the suspended weight of this wheel. At the same time, as is evident, this wheel tracks in the bottom of the furrow formed by the last or innermost disk and cannot therefore prevent it from gradually getting deeper and deeper in the ground, if soft, as the whole weight of this corner of the plow-frame is carried by the wheel B′ and the innermost disks. By moving the land-wheel B^2 back toward the caster-wheel this is effectually counteracted, as the weight is partially supported by the land-wheel in this position; also, when working in hard ground and added weight is required to sink these disks the land-wheel is shifted forward, in which position it permits a greater proportion of the weight of the frame and caster-wheel to rest on these disks. In this manner the adjustability of the land-wheel permits of that wheel being used for the double purpose mentioned and is of great convenience, especially when the plow is being used in ground of variable hardness or toughness.

The rotary disks E are mounted on the brackets E′, which are cast in the solid form shown at Fig. 3 of drawings. The webs E^2

are spread to support both ends of the bearing E^3 and to form a long brace E^4 to rest against the web of the beam A^3, between the flanges of which it is secured. The fastening for the brackets to the beam is a single bolt E^5, which passes through perforations in the brace E^4 and the beam A^3. To prevent the bolt turning when the nut is being tightened, the lug E^6 is cast on the face of the brace E^4 for the square side of the head to rest against.

At the outer end of the brackets is carried the bearing E^3. This bearing is tapered, as shown in Fig. 5 of drawings. This bearing is constructed as long as possible to give a solid bearing to the disks. By means of the taper form any wear in the bearing may be taken up.

The disks E are constructed of a dish shape, the concavity facing forward. The angle at which these disks stand to the line of draft is determined by the angle of the beam A^3 of the frame, for the reason that the disks are mounted in the brackets parallel thereto and the brackets are preferably set on the beam at an angle of ninety degrees thereto. The disks are mounted in the said bearings E^3 by means of the flanged sleeve E^7, the outer surface of which fits the taper of the bearing E^3, while it is bored with a straight hole to receive the bolt E^8. The sleeve is provided with the concave bell-shaped flange E^9, which conforms to the back of the disks and extends well out toward the cutting edge thereof to brace the same. When the disk is placed in position, the bolt E^8 is provided with a large washer E^{10} and inserted through the disk and sleeve E^7, extending to the outside thereof to receive the nut E^{11} and washer E^{12}.

The sleeve E^7 is extended slightly beyond the bearing E^3 to allow for the disks being clamped tightly without pinching the bearing. The washer E^{12} is formed large enough to extend over the joint between the sleeve E^7 and the bearing E^3 to serve as a dirt and dust protector for the bearing. By means of this construction of the brackets and the disk attachments thereto there is great rigidity of construction obtained, while providing against jamming of the parts.

The beam A^3 is provided with different sets of perforations to receive the bolts E^5 to permit the adjustment of the disks for wide or narrow intervals between them. By reason of the rigid form of the beam A^3 the possibility of its being drawn out of line is provided against, so that the incline of the disks is maintained constant during the changes of adjustment. Thus in the drawings are shown at Figs. 7 and 8 the two sets of perforations, distinguished by the one set being marked 1, 2, 3, 4, 5, 6, and 7 and the other set 1^a, 2^a, 3^a, 4^a, 5^a, and 6^a, the former being an adjustment for eight narrow and shallow furrows and the latter for seven wider and deeper furrows. By means of this construction the adjustment of the disks is quickly and easily made to suit the hardness of ground being plowed. Thus if the weight of the plow is unable to sink the eight disks it will probably sink the seven, and the change can be immediately made while in the field.

The sinking of the disks E into the ground in this style of plow is governed to a large extent by the weight. When we are on exceptionally hard ground or are plowing a field where there is a hard patch, it becomes necessary to increase the weight of the machine to cause the disks to sink into the ground the desired depth. It is principally for this purpose the triangular frame A is floored over. On this floor several persons may stand, or on it may be placed additional weight, such as broken stone or boulders. It also serves as a stand for the driver.

The extension of the bearing-rod C^3 is also provided to carry weights *c*, which are perforated to fit over the rod.

The three essential places for weight in this style of plow are in the furrow-wheel B^3 and caster-wheel B′ and land-wheel. This we have provided for in the supplemental filling-weights F and F′, the latter of which pockets in the former. These weights are secured in the concavity of the wheels by suitable bolts. One or both of these weights may be used, according to the nature of the ground. In case only one is used it should be the outer, F′, to preserve the nearly flush surface of the outside of the wheel and prevent its becoming choked with dirt.

As a simple and better method of getting an equalizing-draft on this plow we provide a flexible hitch G or chain, which we attach to either end of the front beam A^2 of the frame, providing rings G′. The chain is provided with a center ring G^2, to which is attached the tree, either single or double. By taking up a few links on either side of the chain the draft may be corrected at will.

Having thus described this invention, what we claim is—

1. In a rotary plow, a triangular frame having the one side set at an angle to the line of draft to form a disk-carrying beam, and another side set parallel to the line of draft forward of the inner end of the disk-beam, in combination with rotary plowing-disks set along the said disk-beam, three wheels, two of which are mounted on the disk-beam and are adapted to track in the furrows, and the third mounted on the land-beam to track on the solid land, and suitable means for attaching the wheel at different points on the land-beam that it may be adjusted lengthwise the said land-beam without changing the height of the frame from the ground, substantially as described, whereby the depth of the furrows next the land side may be regulated.

2. In a rotary plow the combination with a dish-shaped wheel, of supplemental filling-weights adapted to fit within the hollow of the said wheel, and fastenings to hold the said weights in position, substantially as described.

3. In a rotary plow, cutting-disks mounted in brackets, in combination with a channeled disk-carrying beam set at an angle to the line of draft of the plow, and provided with different sets of perforations at equal distances apart in unequal divisions of the said beam for the adjustment of the disk-brackets, and fastening devices extended through the perforations in the said beam and in the said brackets, adapted to draw the brackets into the channel of the beam between the flanges thereof, substantially as described.

In witness whereof we have hereunto set our hands this 5th day of November, 1895.

GEORGE SPALDING.
JOHN S. ROBBINS.

Witnesses:
BALDWIN VALE,
E. F. MURDOCK.