No. 819,748. PATENTED MAY 8, 1906.

A. FRIEDEMANN.

HARROW.

APPLICATION FILED JULY 31, 1905.

2 SHEETS—SHEET 1.

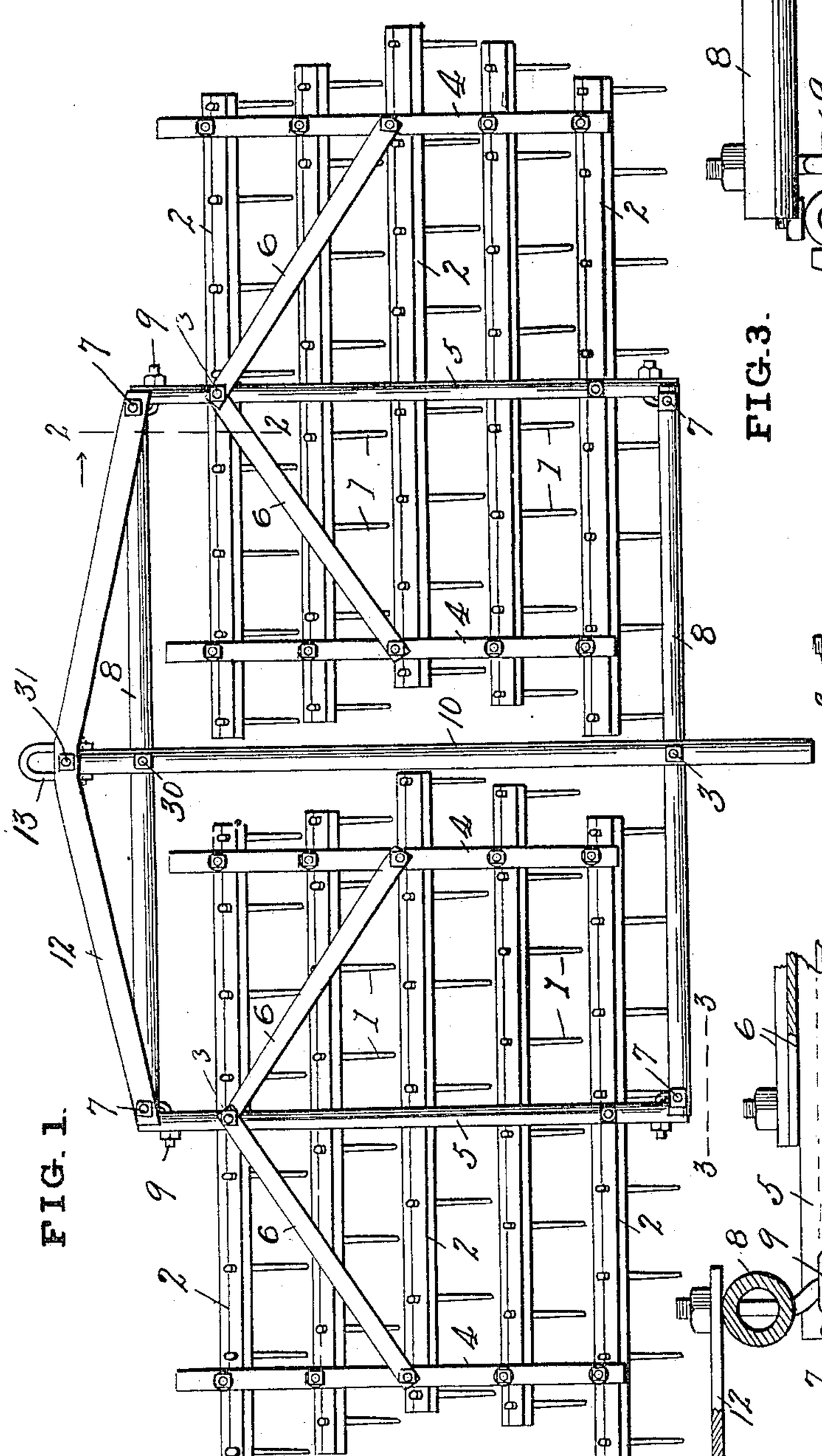

FIG. 1.

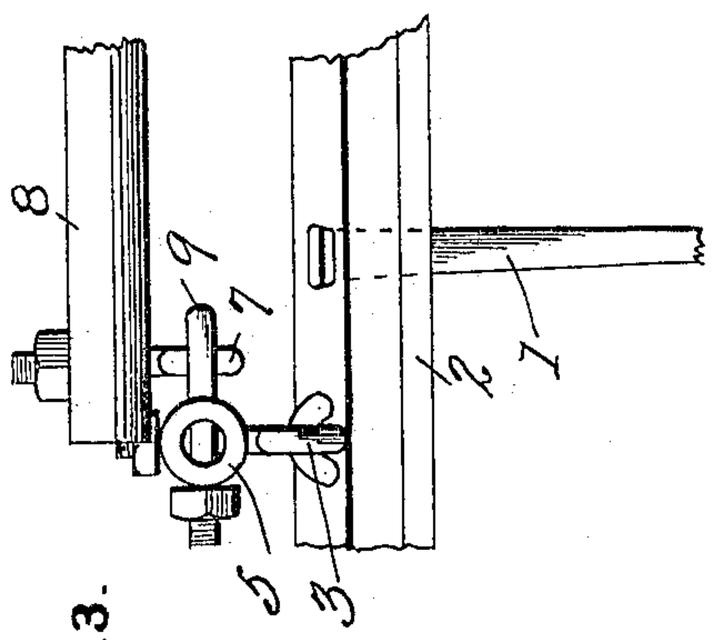

FIG. 3.

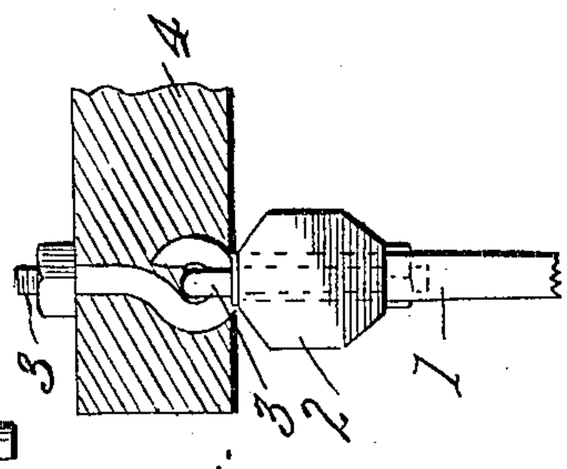

FIG. 4.

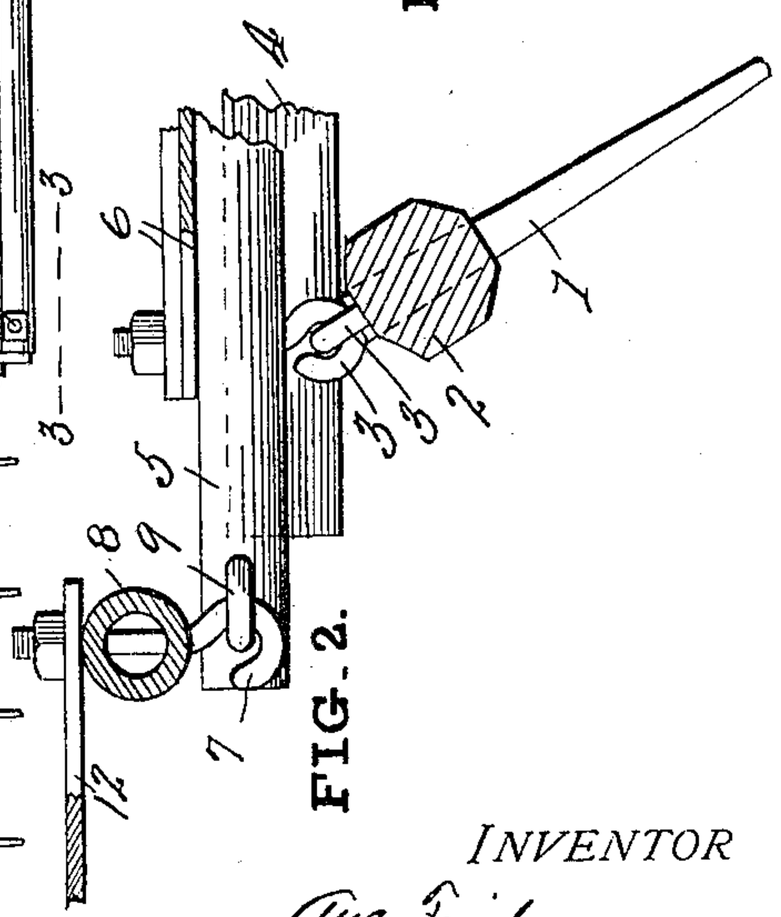

FIG. 2.

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2 SHEETS—SHEET 2.

FIG. 5.

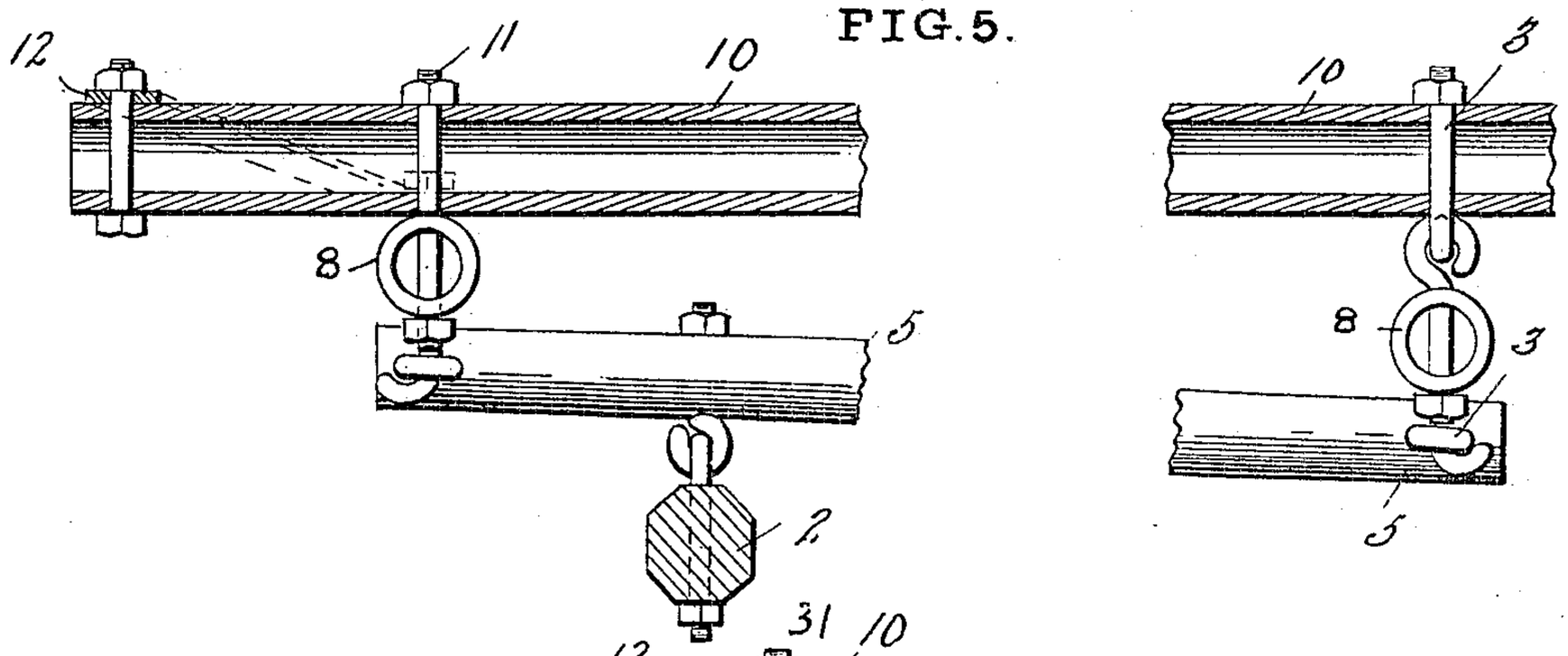

FIG. 6.

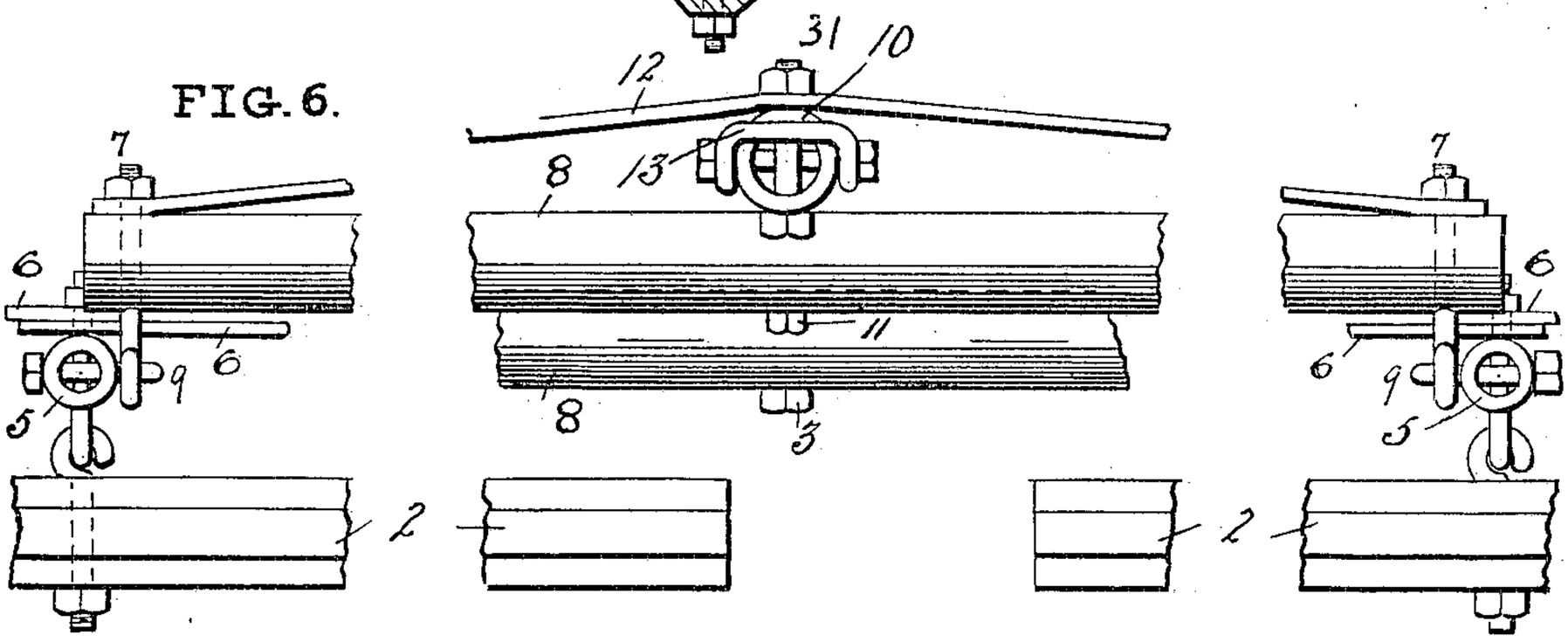

FIG. 7.

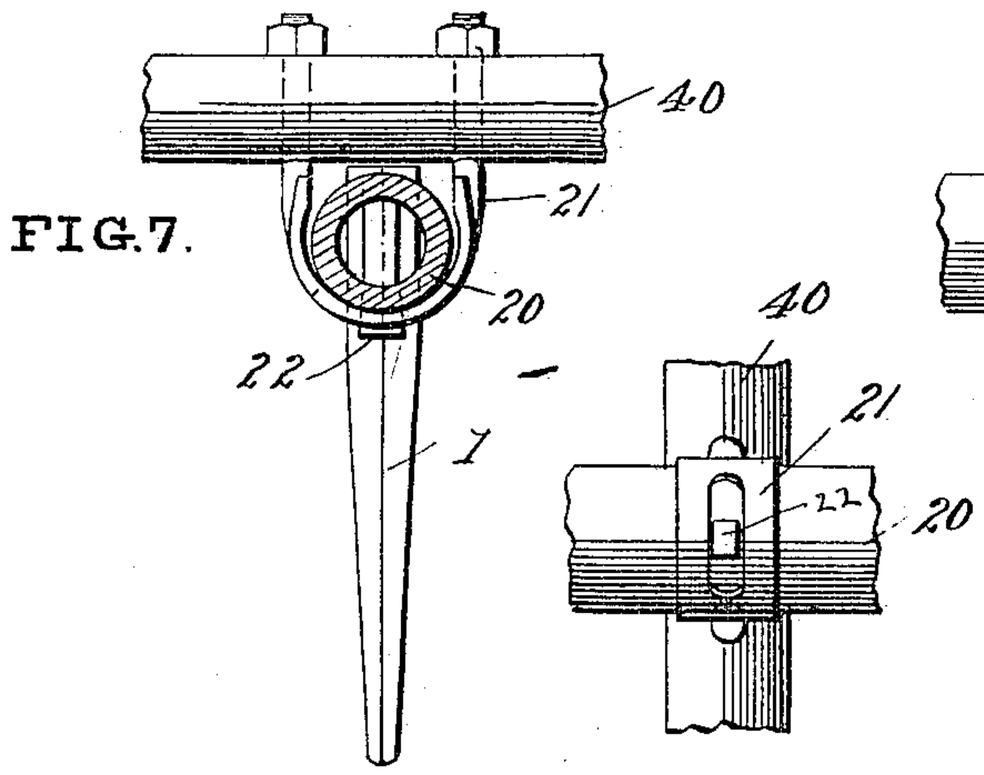

FIG. 8.

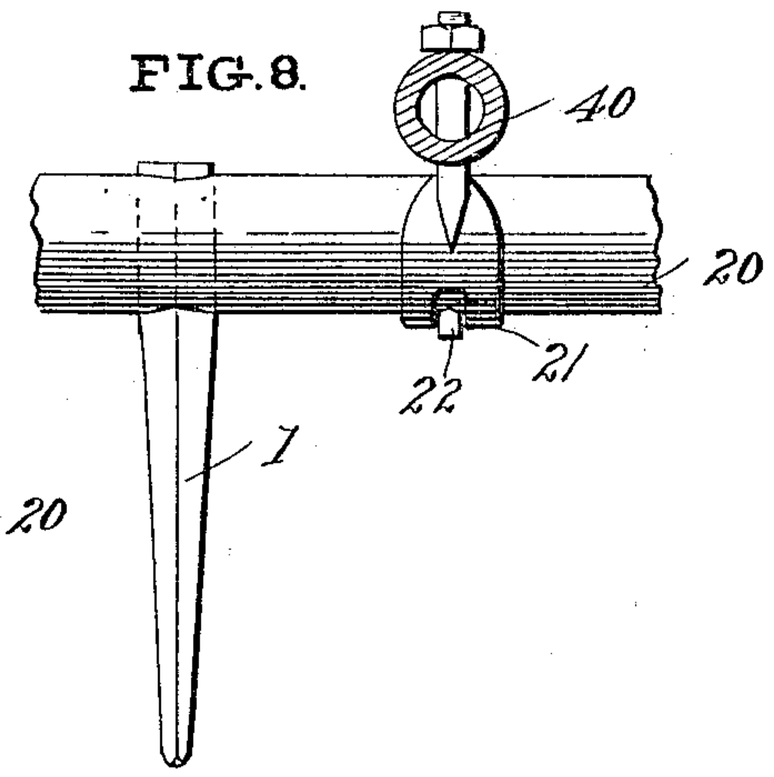

FIG. 9.

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AUGUST FRIEDEMANN, OF WAVERLY, IOWA.

HARROW.

No. 819,748. Specification of Letters Patent. Patented May 8, 1906.

Application filed July 31, 1905. Serial No. 272,013.

To all whom it may concern:

Be it known that I, AUGUST FRIEDEMANN, a citizen of the United States, residing at Waverly, in the county of Bremer and State of Iowa, have invented certain new and useful Improvements in Harrows, of which the following is a specification.

This invention relates to harrows with teeth which may be self-sharpening.

The object of the invention is to produce a drag or harrow which shall be flexible, so as to conform to the character of the ground, and which has teeth secured to bars, so that they may be inclined in either direction, and thus be sharpened by the draft of the harrow along the ground; also, to utilize certain features of construction in the manufacture of harrows.

Figure 1 is a top plan of a complete harrow embodying my invention. Fig. 2 is a broken section on line 2 2, Fig. 1. Fig. 3 is a broken elevation on line 3 3, Fig. 1. Fig. 4 is a broken section of one of the section frame-bars and an end view of a tooth-bar. Fig. 5 is a broken longitudinal section showing connection of draft-bar to frame-bar. Fig. 6 is a broken front elevation showing connection of longitudinal frame-bar to section hinge-bar and tooth-bar. Fig. 7 is a broken section, Fig. 8 a broken elevation, and Fig. 9 a broken plan, of a modification of tooth-bar wherein tubes are employed instead of wooden bars.

The teeth 1 are preferably straight and tapered as desirable. These teeth pass through tooth-bars 2. The tooth-bars 2 are octagonal, or at least have their upper corners beveled or removed to such an extent as to permit the tooth-bars to swing when suitably connected by joint-bolts or double eyebolts 3 3 to the section frame-bars 4.

The joint-bolts consist of two eyebolts with their eyes hooked together. The bodies of the joint-bolts which connect the tooth-bars to the section frame-bars 4 pass through holes in these bars, and are secured by nuts. This gives strength and flexibility to the coupling which would not be attained by an ordinary form of hinge. The eyes of the bolts may be countersunk in the tooth-bars and frame-bars, so as to limit the movement of the tooth-bars by drawing them close to the frame-bars. The eyebolts thus form hinge members.

Section hinge-bars 5 5 extend across each section of the drag and are connected to the front and rear tooth-bars of the section by joint-bolts 3 3 in the same manner that the tooth-bars 2 are connected to the section frame-bars 4. The section hinge-bars 5 are preferably tubular, gas-pipe being preferred. The section-bars 5 extend both to the front and rear of the tooth-bars of their respective sections and are connected to the section frame-bars 4 by braces 6 6, which braces are bolted to the section hinge-bars 5 and to the section frame-bars 4.

The tooth-bars are preferably connected to the frame-bars in staggered relation, so that the drag-teeth do not follow each other, and the teeth are arranged in the tooth-bars in the relation as shown.

The projecting ends of the section hinge-bars 5 5 are connected to the longitudinal frame-bars 8 8 by hook-bolts 7 7 on the bars 8, which hook-bolts engage with loops 9 9 on the sides of hinge-bars 5. The bars 5 5 and 8 8 thus form a flexible rectangular frame. The two hinge-bars 8 8 are connected by a draft-bar 10. A straight bolt 30 passes through the draft-bar 10 and the bar 8 at the front of the harrow when the parts are in the position shown in Fig. 1, and a hinge-bolt 3 passes through these bars at the rear of bar 10.

A brace 12 extends from the ends of front hinge-bar 8, being bowed or bent forward and secured to the draft-bar 10 by straight bolt 31. A clevis 13 serves for the attachment of the draft-animals.

Now if a team be attached to clevis 13 and the drag drawn forward the front longitudinal bar 8 being rigid with the draft-bar must move therewith, and hinge-bars 5 5 being connected to front bar 8 must also move. The tooth-bars will swing on their hinge-bolts 3 3 as far as their coupling permits, and the teeth will incline rearwardly. When the harrow is thus drawn, the teeth will be worn mainly on their front faces.

In Fig. 4 the joint-bolts are shown so far embedded in the tooth-bars and frame-bars that the teeth are held in substantially vertical position.

When it is desired that the wear shall come on the reverse side of the teeth, the draft-bar 10 is released from the rear bar 8 by loosing the joint 3 3. The hook-bolts 7 7 are unhooked from loops 9, and the frame-bars 8 8 are then reversed in position, that one which

was the rear becoming the front bar, and vice versa. The hook-bolts 7 engage with the loops 9, as before, and the draft-bar 10 is simply reversed, as are the bars 8 8. The draft being then in the opposite direction, the tooth-bars will swing on their joint-bolts 3 3 so far as their coupling will permit and will incline in reverse direction to that of their former inclination. The wear now coming on the new front of the teeth will tend to sharpen them.

The bars 10, 8, and 5 described are tubular. The frame-bars 4 and section-bars 2 are polygonal. These bars 2 and 4, however, may be made of tubes in the following manner: Tooth-bar 20 is of gas-pipe with polygonal holes therein for the passage of teeth 1. These teeth are of similar polygonal outline to the holes in the bars and are made without taper at their upper ends, so that they may hold to the tubular bars 20 in whatever position they may be adjusted. The sectional frame-bars 40 are also tubular. The tooth-bars 20 are held to frame-bars 40 by clips 21, which clips pass through the frame-bars and loop around the tooth-bars. Clips 21 are slotted, and a pin or plug 22, attached to bar 20, enters the slot in the clip. Thus the tooth-bars 20 may rock in their holding-clips; but this rocking movement is limited by the plugs 22 engaging the ends of the slot in the clips 21. The rocking of bar 20 determines the inclination of the teeth carried by said bars. The teeth are self-sharpening for the same reason as when carried in the wooden bars 2.

The rear portion of bar 10 affords a convenient handle or lever by which to lift the rear side of the harrow for dropping trash, &c.

The hinge-bars 5, on which the sections may rock, form part of the frame; but being loosely connected the entire harrow becomes flexible, so as to readily adapt itself to rough or uneven land.

What I claim is—

1. In a harrow the combination of a draft-bar, a front and rear hinge-bar extending transversely thereof and loosely connected thereto, a pair of section hinge-bars loosely connecting the ends of these transverse hinge-bars, tooth-bars loosely connected to these section-bars, and frame-bars connected to said tooth-bars and tooth-bars connected to these frame-bars and completing the harrow-sections.

2. In a harrow, the combination of a draft-bar, a pair of hinge-bars loosely connected thereto and extending in direction substantially transversely thereof, a pair of section-bars loosely connecting the ends of said hinge-bars, tooth-bars forming independent sections separately connected to said section-bars so that the teeth may be inclined to the front or rear, and couplings whereby the position of the draft-bar may be reversed, as set forth.

3. In a harrow, the combination with the frame-bars, of tooth-bars of polygonal form, and connecting-hinges adjustably secured to said bars, whereby the tooth-bars are permitted to swing to a greater or less distance, and find a bearing against the frame-bars.

4. In a harrow, the combination with a tooth-bar having teeth, of an eyebolt passing through said bar and having its eye countersunk therein, and a frame-bar having an eyebolt passing therethrough and the eye countersunk, the eyes of the eyebolts being connected and forming a joint-bolt, and the movement of the joint being limited by the "sink" of the eyes in the bars.

5. In a harrow, the combination with a tooth-bar having its upper edges beveled, of a frame-bar, and a flexible connection between the tooth-bar and frame-bar, whereby the beveled edge of the tooth-bar serves as a stop to limit its swing from the frame-bar.

6. In a harrow, the combination of a draft-bar, a front and a rear hinge-bar loosely connected thereto and extending transversely thereto, a pair of section hinge-bars loosely connecting the ends of these transverse hinge-bars, tooth-bars near the front and rear of these section hinge-bars, extending transversely thereof, and loosely connected thereto, frame-bars connected to said tooth-bars, and other tooth-bars connected to the frame-bars, substantially as described.

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

AUGUST FRIEDEMANN.

Witnesses:
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ELMA D. PATTERSON.