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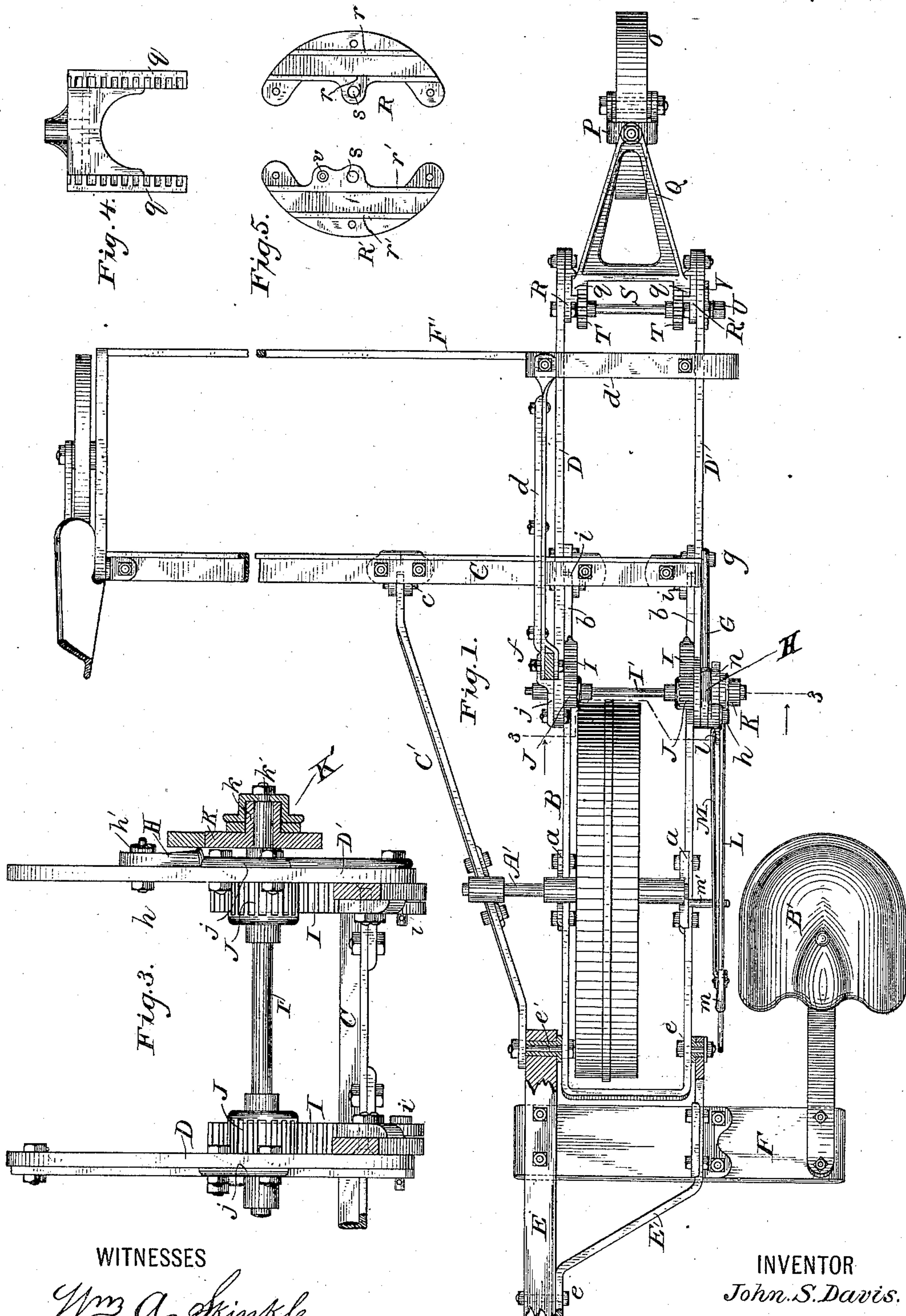
2 Sheets—Sheet 1.

J. S. DAVIS.

GRAIN BINDING HARVESTER.

No. 312,824.

Patented Feb. 24, 1885.



WITNESSES

Wm A. Skink.

H. W. Elmore.

INVENTOR

John S. Davis.

By his Attorneys,

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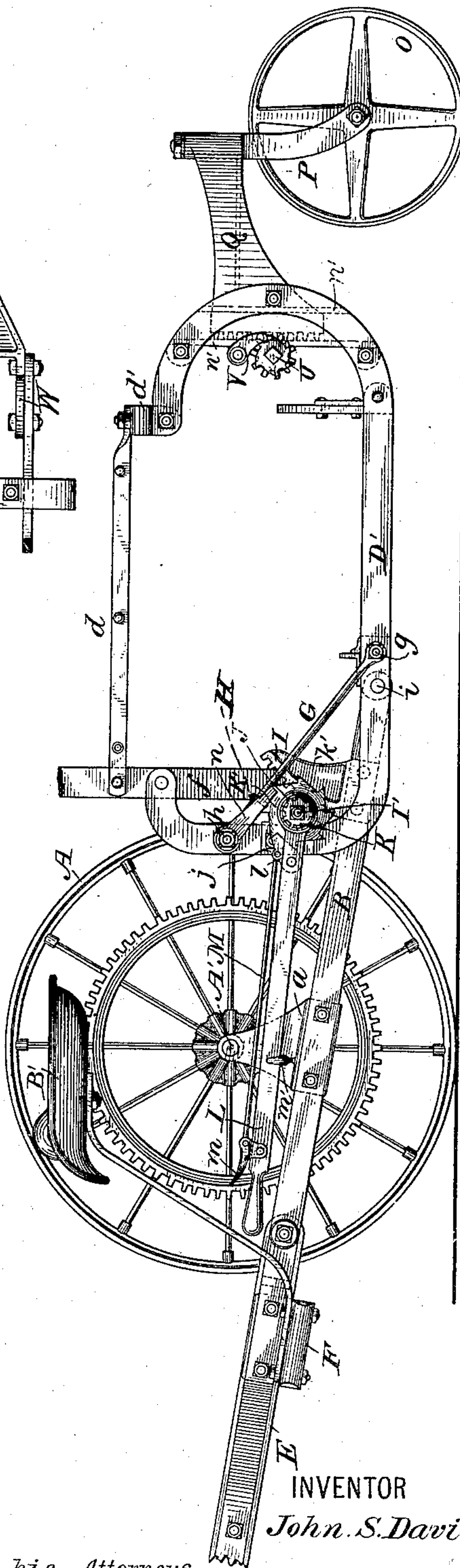
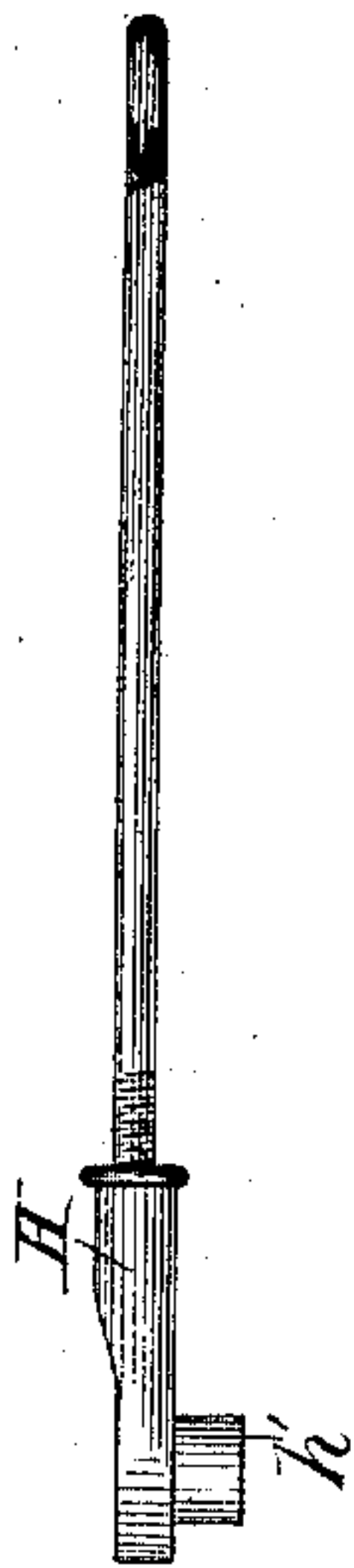
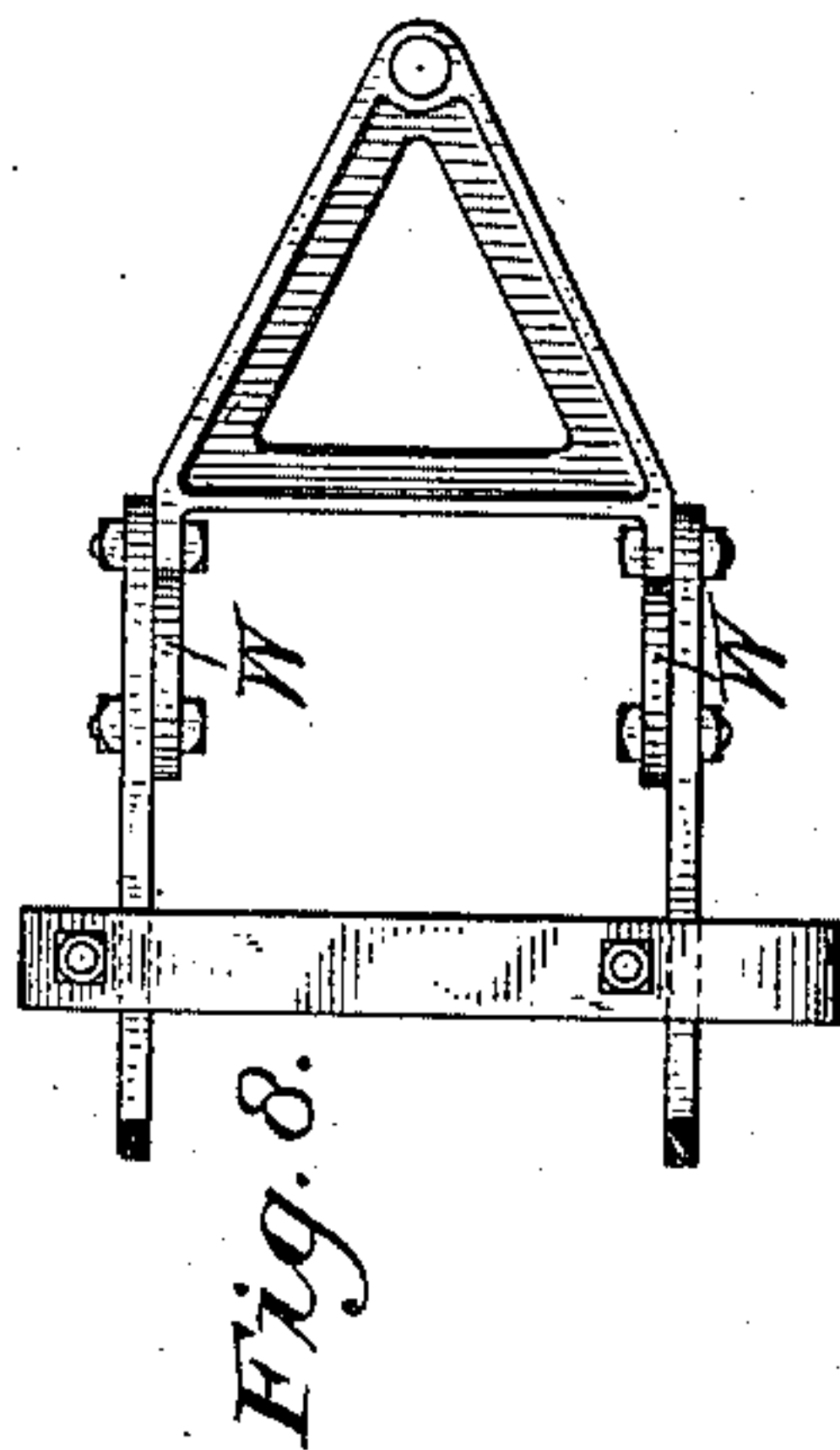
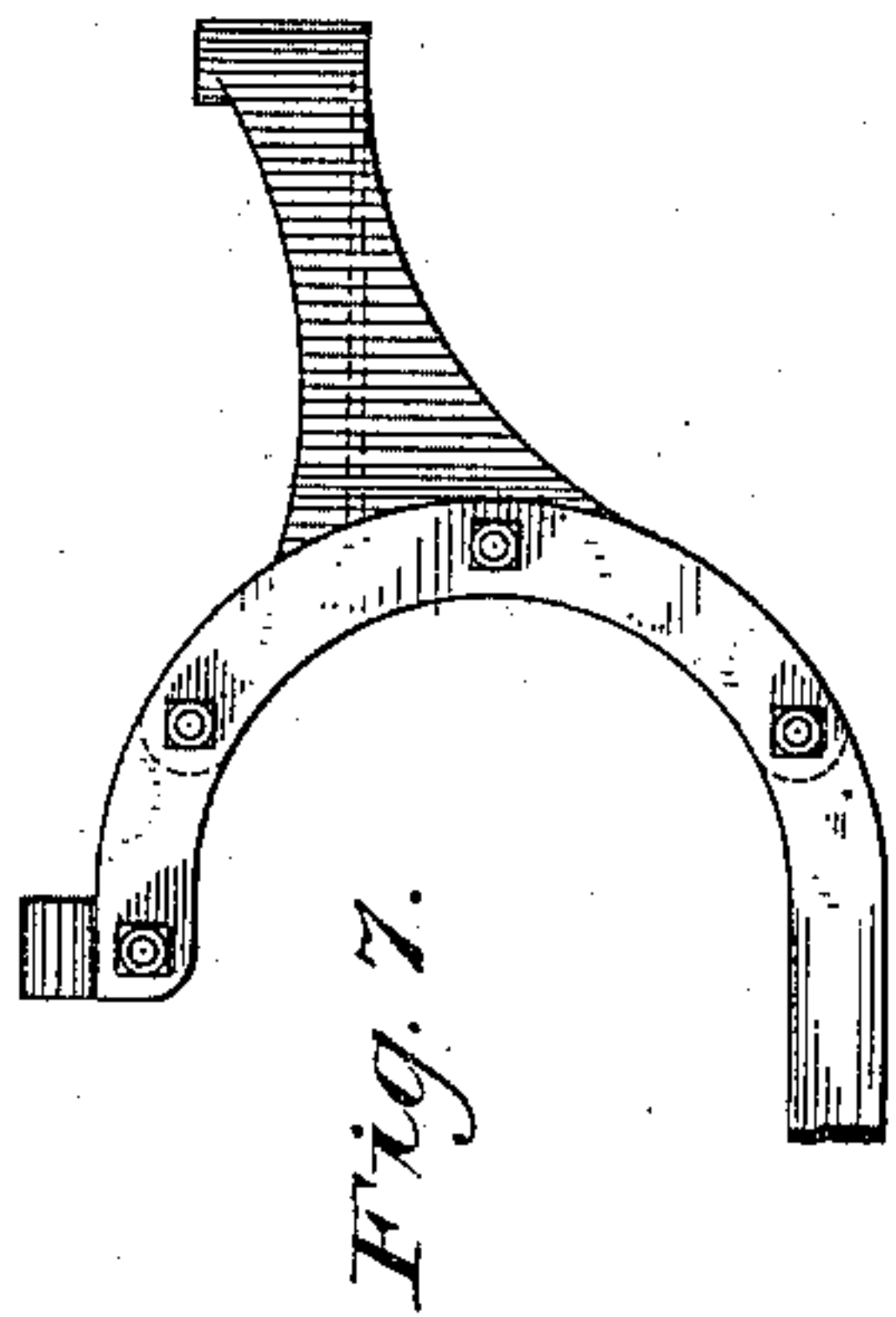
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INVENTOR

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UNITED STATES PATENT OFFICE.

JOHN S. DAVIS, OF TOLEDO, OHIO.

GRAIN-BINDING HARVESTER.

SPECIFICATION forming part of Letters Patent No. 312,824, dated February 24, 1885.

Application filed November 9, 1883. (No model.)

To all whom it may concern:

Be it known that I, JOHN S. DAVIS, of Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Grain-Binding Harvesters, of which the following is a specification.

My invention relates to improvements applicable to grain-binding harvesters of the class commonly designated "platform-binders," particularly that type of this class of machines in which the grain is bound in rear of the driving-wheels. A machine of this type is shown in United States Letters Patent No. 275,330, granted for my invention dated April 3, 1883.

My objects, mainly, are to provide a machine which shall be so constructed as to relieve the necks of the team by which it is drawn of unnecessary and injurious weight, and to insure a substantially uniform pressure upon the necks of the team by the tongue at all times during the operation of the machine; to prevent or greatly lessen the violence of the blows to which the inside animal of a team is usually subjected when the grain-wheel of the machine encounters obstacles to its free forward movement; to provide for vertically adjusting the platform and binder frame, and simultaneously rocking and raising or lowering the cutting apparatus, thus at the same time either elevating the cutting apparatus and tilting up the points of the guards or lowering the cutting apparatus and depressing the points of the guards; to so make adjustable jointed connection between the grain-platform, finger-beam, and binder-frame and the main frame at its rear that the platform finger-beam and binder-frame may be held against downward movement independently of the main frame by way of their jointed connection therewith, while left free to rise by flexure of said jointed connection; to readily pass over obstructions, and prevent breakage of parts, and to provide independent means for raising and lowering the platform and binder-frame of the machine at front and rear.

My improvements are shown in the accompanying drawings as engrafted upon a machine resembling in many respects that shown in the before-mentioned Patent No. 275,330,

only those parts being represented illustration of which is required to show a suitable application of my improvements.

Figure 1 is a plan view, parts being broken away and many features omitted. Fig. 2 is an elevation, as seen from the outer or stubble side of the machine, parts being omitted as in Fig. 1. Fig. 3 is a view, partly in front elevation and partly in section, as indicated by the line 3 3 of Fig. 1. Fig. 4 is a front elevation of a vertically-adjustable support for a caster-wheel which sustains the binder-frame and platform at rear. Fig. 5 shows in elevation two plates which, when in position, constitute a guideway for the support of the rear caster-wheel, and also carry the adjusting mechanism acting thereon. Fig. 6 shows an adjustable brace for the upturned end of one of the binder-frame sills. Figs. 7 and 8 are respectively a side elevation and a plan view, showing a modification of the way of supporting the caster-wheel at the rear of the binder-frame.

As in this instance shown, the driving-wheel A is surrounded by a main frame, B, terminating at its rear end in arms *b b*, which are pivotally connected with the finger-beam C and the sills D D' of a binder-frame, as in the above-named patent, and as also shown in said patent, the main frame is suspended from the axle A' by down-hanging bearing-brackets *a a*, and is capable of rocking about the axle. The tongue E is jointed at its heel to the main frame at *e*, and has jointed connection at *e'* with the main frame by means of the bent brace-bar E'. A drag-bar, C', has jointed connection at its opposite ends with the main frame and the finger-beam, and a driver's seat, B', is mounted on a support secured to a cross-piece, F, which is firmly united with the tongue and the brace-bar E' in advance of the main frame. The driver's seat is not located so far forward as before. The pivots which connect the drag-bar with the finger-beam and the main-frame arms with the finger-beam and binder-frame are in line with each other, as before. The sills D D' are rigidly united with the finger-beam and grain-platform, and curve upwardly at their ends, and these sills, together with the heel end or prolongation of

the finger-beam, and the corresponding prolongation of the back beam, *F'*, of the platform, are the main parts of the binder-frame, all as in the Patent No. 275,330.

- 5 In addition to the bracing of the binder-frame by the binder-arm rock-shaft, (see said patent,) this frame is further stiffened by a brace-bar, *d*, and the springing or sagging of the frame is thus effectually prevented.
- 10 This compound (part wood and part iron) brace-bar *d* is shown as firmly secured at its rear end to the cross bar or piece *d'*, by which the rear upturned ends of the sills are connected, and as fastened at its front end to the upright
- 15 trussing or stiffening bar *f* of the binder-frame. This bar *f* constitutes the inner reel-support, and is firmly secured to the sill *D*, as before. The added brace-bar *d* is mainly intended to stiffen the inner sill, *D*, the outer sill being
- 20 stiffened by the binder-arm rock-shaft, as before. The upturned front end of the outer sill, *D'*, of the binder-frame is strongly braced by means of an inclined rod, *G*, connecting it with the straight or horizontal portion of the
- 25 sill. A bolt, *g*, passing through an eye in the lower end of this inclined brace and through the sill *D'*, and a bolt, *h*, passing through the upturned end of the sill and through the upper end of the brace, serve to firmly secure it
- 30 in place. The brace is made in sections to render it adjustable and facilitate fitting it in place. The short or upper section, *H*, is connected with the longer or main section by means of a screw, as will readily be under-
- 35 stood from inspection of Fig. 6. A laterally-projecting short tubular stud or boss, *h'*, is provided at the upper end of the brace for a purpose in turn to be explained. The bolt *h* passes through this round boss.
- 40 In order that the binder-frame, platform-frame, and finger-beam, which are supported in rear by a caster-wheel, as further on to be described, may be raised or lowered and simultaneously rocked to elevate or depress the
- 45 points of the guards, adjusting mechanism, such as next to be described, is provided, by which the binder-frame, &c., may be rocked about the pivots *i i c*, by which these parts have jointed connection with the main frame,
- 50 and their connection with the main frame be then rendered rigid against downward flexure to secure the parts as adjusted during the working of the machine under ordinary circumstances.
- 55 As shown, this adjusting mechanism is as follows: Each of the main-frame arms *b* has a curved or segmental rack, *I*, firmly secured at its base to it in advance of the pivotal connection of the arm with the finger-beam, &c.
- 60 An adjusting-shaft, *I'*, is mounted in advance of the segment-racks, so as to turn in bearings formed in brackets *j j*, secured to the upturned front ends of the binder-frame sills. Pinions *J J*, fast on this shaft, engage the segment-racks. These pinions are toothed only
- 65 part way across their peripheries, (see Fig. 3,) and their untoothed inner sides constitute

guides for the rack and insure proper engagement of the parts. Besides, by this construction the teeth of the pinions are strengthened. 70

A ratchet-wheel, *K*, is fastened upon the outer end of the pinion-shaft *I'*. The ratchet is formed with a long hub or sleeve-bearing, *k*, constituting a pivotal support for the rear end of a lever, *L*. A cup-shaped washer, *K'*, and 75 a nut, *k'*, upon the reduced threaded end of the shaft serve to secure the lever in place without binding or interfering with its rocking motion, as will readily be understood from inspection of Fig. 3. This lever is provided 80 with a pawl, *l*, for engaging the ratchet. The pawl projects upwardly and rearwardly from its pivotal connection with the lever, and is connected by a link-rod, *M*, with a crank or thumb-lever, *m*, pivoted to the lever *L* near 85 its handle. A hook, *m'*, projecting from one of the bearing-brackets *a* of the main frame supports the lever in position convenient to the hand of the driver when in his seat. A ratchet-dogging pawl, *n*, is pivotally sup- 90 ported upon the boss *h'* of the before-described inclined brace, and is secured against displacement by means of the bolt *h* and its nut and washer, so as to be free to vibrate to engage and release the ratchet. When engag- 95 ing a ratchet-tooth, the dogging-pawl is parallel, or nearly so, to the brace-rod, and thus the upturned end of the binder-sill is relieved of the strain which might otherwise prove injurious, owing to the forcible end- 100 thrust upon the pawl resulting from sustaining the weight of the front part of the binder-frame, &c.

From the above description it will readily be seen that the binder-frame, &c., which have 105 jointed connection directly with the main frame at its rear, instead of being connected with the main frame by way of a supplemental or coupling frame, such as usually employed, may be raised and lowered, and the 110 guards of the cutting apparatus tilted, by manipulating the ratchet-actuating lever and the dogging-pawl, and that while held against downward movement at front the binder-frame, &c., is left free to flex upward, if nec- 115 essary, to prevent breakage of parts.

The caster-wheel *O* at the rear of the binder-frame, in line with and following directly in the path of the driving-wheel, is mounted to rotate between the arms of a swiveling yoke- 120 spindle, *P*, which is mounted in a carrier or support, *Q*, projecting rearwardly from the binder-frame. This support is sustained and the binder-frame, &c., rendered vertically ad- justable by means of the caster-wheel in the 125 following way, as in this instance shown: Two bracket-plates or castings, *R R'*, bolted, respectively, to the inner sides of the upturned rear ends of the sills *D D'*, are provided with vertical guideways formed between the ribs *r* 130 *r' r'* of the respective plates. Guide-ribs *q q* are provided at the opposite sides of the

front end of the support Q. The ribs project both laterally and forwardly from the support. Their laterally-projecting portions fit without binding in the grooves formed between the ribs of the bracket-plates R R', and at front the ribs *q q* are toothed for a portion of their width, constituting vertical racks. The teeth of these ribs are extended only part way across them, in order that smooth surfaces may be left on those portions of the ribs which enter the guideways of the bracket-plates. A cross-shaft, S, is supported so that it may be turned freely in bearing-openings *s s* in the bracket-plates, and pinions T T, fast on this shaft, engage the toothed racks of the caster-wheel support Q. A ratchet-wheel, U, is fastened to the shaft S at its outer end, and has a squared hub or sleeve to be engaged by a crank or wrench for turning the shaft. A pawl, V, pivoted on a stud, *v*, of the bracket-plate R', engages the ratchet and dogs the shaft S against turning when the parts have been adjusted to the desired positions.

From the above description it will be seen that the rear of the binder-frame may be raised or lowered, and this frame, together with the grain-platform frame and finger-beam and the main frame, be rocked about the axle of the machine, to properly level the parts. It will further be seen that the location of a supporting-wheel in rear of the binder-frame and considerably behind the driving or main supporting wheel very greatly lessens the sudden backward movement of the grain-wheel, and consequent violent sidewise sway of the tongue against the inner horse of the team when the grain-wheel encounters an obstruction or is ascending a furrow, and that as the caster-wheel follows in the line of tread of the driving-wheel a pathway is formed for it, and it is made to most effectually counteract lateral vibration of the tongue. It will also be seen that as the tongue is never rigid with the main frame, but is always free to vibrate about its pivotal connection therewith, there is no undesirable weight upon the necks of the team. The team is relieved of a portion of the weight of the tongue by the counterbalancing weight of the driver when on his seat.

Instead of having a vertically-adjustable connection between the caster-wheel and the binder-frame, the caster-wheel support might be rigidly attached to the binder-frame, as shown in Figs. 7 and 8, in which the support is provided at front with curved arms W W, bolted directly to the sills of the binder-frame.

I do not wish to be understood as confining my invention to the details of construction and arrangement of parts hereinbefore particularly described, nor to the application of my improvements to a machine such as that in this instance selected to illustrate a suitable and preferable embodiment of them, as my invention may be considerably modified and my improvements be applied in whole or in part to various machines.

I claim as of my own invention—

1. The combination of the binder-frame sills having upturned ends, and the brace-bar by which the inner sill is stiffened, substantially as and for the purpose hereinbefore set forth. 70

2. The combination of the binder-frame sills having upturned ends, and the inclined brace connecting the upturned front end and horizontal portion of the outer sill, substantially as and for the purpose hereinbefore set forth. 75

3. The combination of the main frame, the rigidly-united grain-platform frame, finger-beam, and binder-frame having jointed connection with the main frame directly and at its rear and the caster-wheel at the rear of the binder-frame, substantially as and for the purpose hereinbefore set forth. 80

4. The combination of the driving-wheel, the main frame, the rigidly-united grain-platform frame, finger-beam, and binder-frame having jointed connection with the main frame at its rear, and the caster-wheel at the rear of the binder-frame following directly in the path of the driving-wheel, substantially as and for the purpose set forth. 85 90

5. The combination, substantially as hereinbefore set forth, of the main frame, the freely-pivoted tongue, the rigidly-united binder-frame, grain-platform frame, and finger-beam having jointed connection with the main frame at its rear, the caster-wheel supporting the binder-frame at rear, and means for vertically adjusting the grain-platform frame, binder-frame, and finger-beam by rocking them about their jointed connection with the main frame and rendering them rigid therewith against downward flexure while admitting of their upward flexure, for the purpose described. 95 100

6. The combination of the main frame, its rearwardly-projecting arms, the racks secured to said arms, the binder-frame having jointed connection with the main-frame arms in rear of the racks, the pinions engaging the racks, their shaft supported by the binder-frame, and means for turning and dogging the shaft, substantially as and for the purpose hereinbefore set forth. 105 110

7. The combination of the main frame, the rearwardly-projecting arms, the racks secured to said arms, the rigidly-united binder-frame and finger-beam having jointed connection with the main-frame arms, the pinions engaging the racks of the main-frame arms, their shaft supported by the binder-frame, the ratchet on the shaft, the dogging-pawl, and the lever and its pawl for actuating the ratchet, substantially as and for the purpose hereinbefore set forth. 115 120

8. The combination of the binder-frame sills upturned at their front ends, the main frame with the rearwardly-projecting arms with which the sills have pivotal connection, the adjusting-shaft, its ratchet, the dogging-pawl, and the inclined brace by which the end of the outer sill is relieved of strain by the thrust of the dogging-pawl, substantially as and for the purpose hereinbefore set forth. 125 130

9. The combination, substantially as here-

inbefore set forth, of the driving-wheel, the axle, the rocking main frame, the freely-pivoted tongue, the binder-frame having jointed connection at its front directly with the main frame at its rear, the caster-wheel supporting the rear end of the binder-frame, and adjusting mechanism by which to rock the binder-frame about its jointed connection with the main frame and render it rigid therewith against downward flexure while leaving it free to flex upward, for the purpose described.

10. The combination, substantially as hereinbefore set forth, of the rocking main frame, the binder-frame having jointed connection at front with the rear of the main frame, adjusting mechanism for raising and lowering the binder-frame at front and rendering it rigid with the main frame against downward flexure, the caster-wheel at the rear of the binder-frame, and means for vertically adjusting the binder-frame at rear, for the purpose described.

11. The combination, substantially as hereinbefore set forth, of the main frame, the rig-

idly-united finger-beam, platform-frame, and binder-frame, having jointed connection with the main frame at its rear, adjusting mechanism for rocking the finger-beam, platform-frame, and binder-frame about their jointed connection with the main frame and rendering them rigid therewith against downward flexure, and means for supporting and vertically adjusting the binder-frame at rear, for the purpose described.

12. The combination of the binder-frame sills having upturned rear ends, the guideway bracket-plates, the caster-wheel support having guide-ribs and racks, the pinions engaging the racks, their shaft, the ratchet thereon, and its dogging-pawl, substantially as and for the purpose hereinbefore set forth.

In testimony whereof I have hereunto subscribed my name this 2d day of November, A. D. 1883.

JOHN S. DAVIS.

Witnesses:

J. H. SOUTHARD,
IDA M. DAVIS.