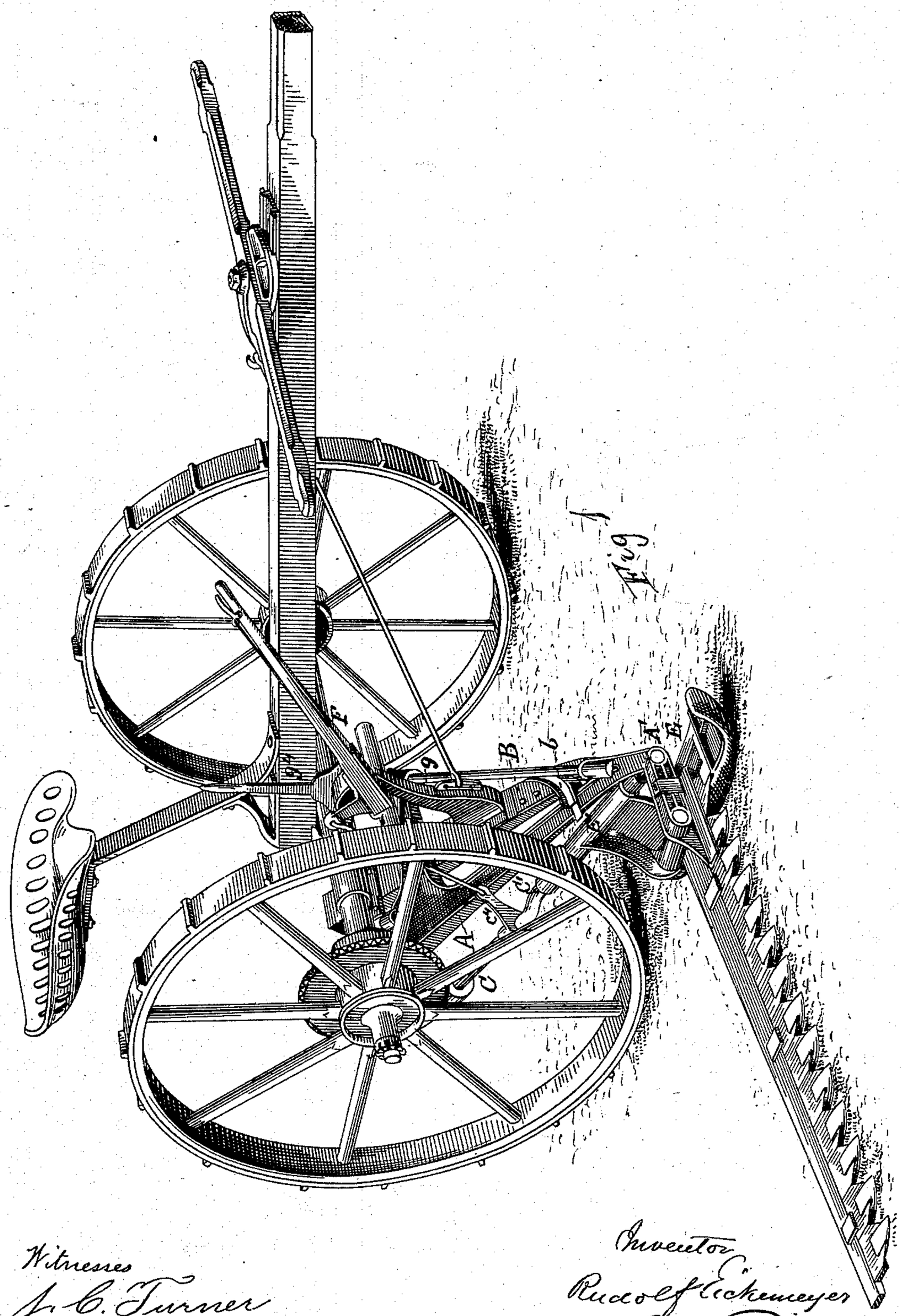
(No Model.)

4 Sheets—Sheet 1.

R. EICKEMEYER.

HARVESTING MACHINE.

No. 249,326. Patented Nov. 8, 1881.



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Aug. L. Jordan

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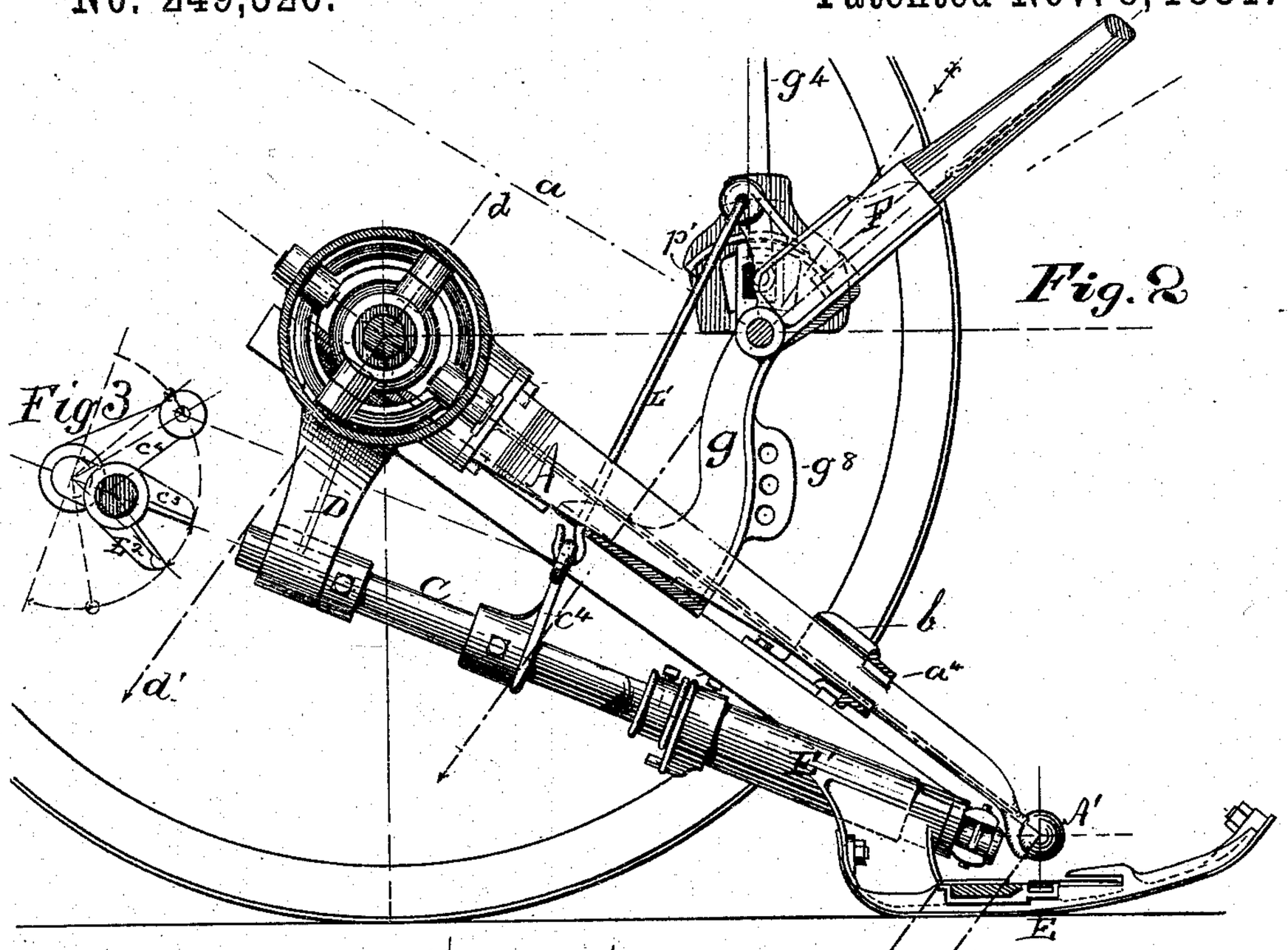
By his Atty
R. D. Smith

(No Model.) 4 Sheets—Sheet 2.

R. EICKEMEYER.

HARVESTING MACHINE.

No. 249,326. Patented Nov. 8, 1881.



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Lee Bacon

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By his attys
R. D. O. Smith

(No Model.) 4 Sheets—Sheet 3.

R. EICKEMEYER.

HARVESTING MACHINE.

No. 249,326. Patented Nov. 8, 1881.

Fig. 5

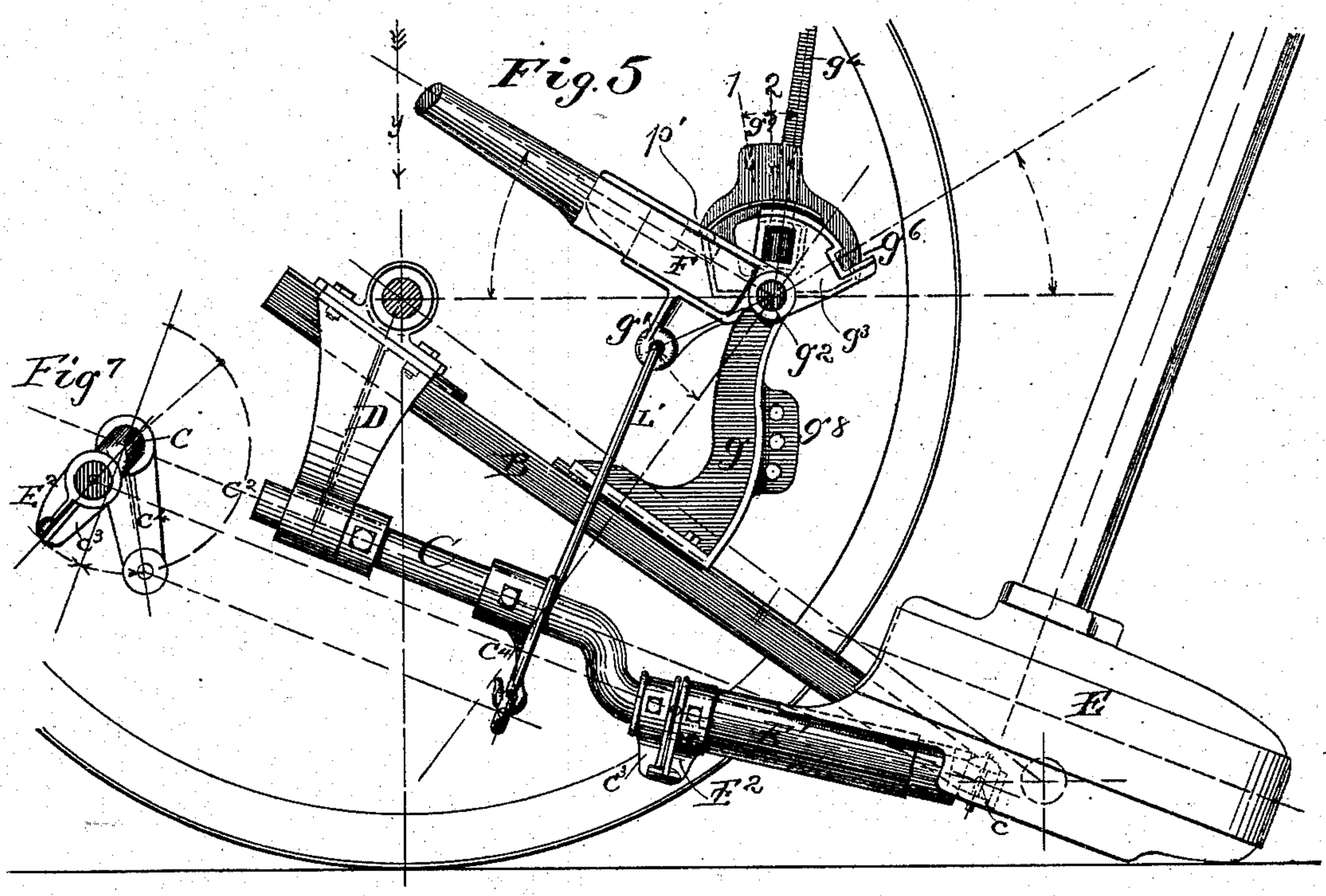
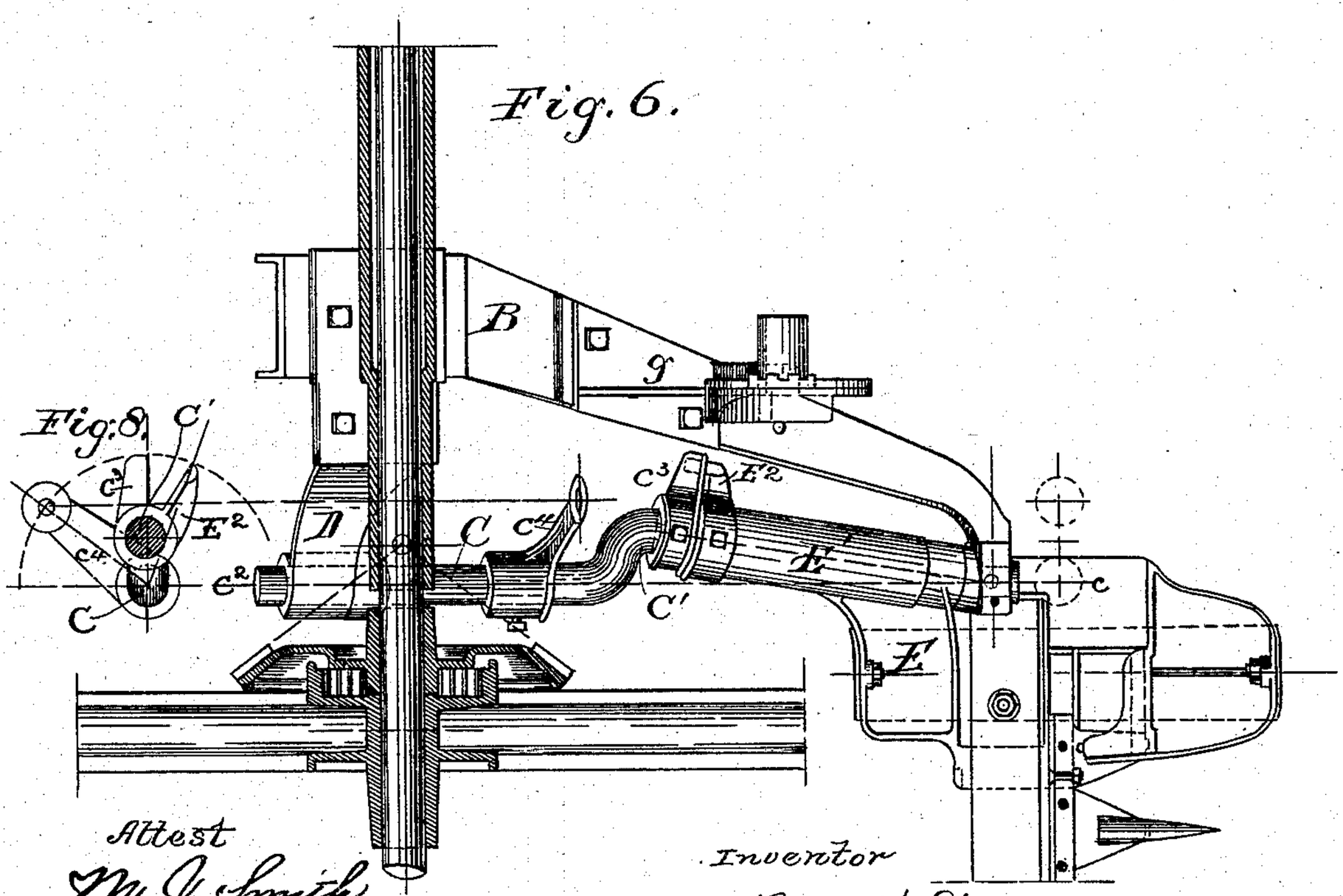


Fig. 6.



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(No Model.) 4 Sheets—Sheet 4.

R. EICKEMEYER.

HARVESTING MACHINE.

No. 249,326. Patented Nov. 8, 1881.

Fig. 9.

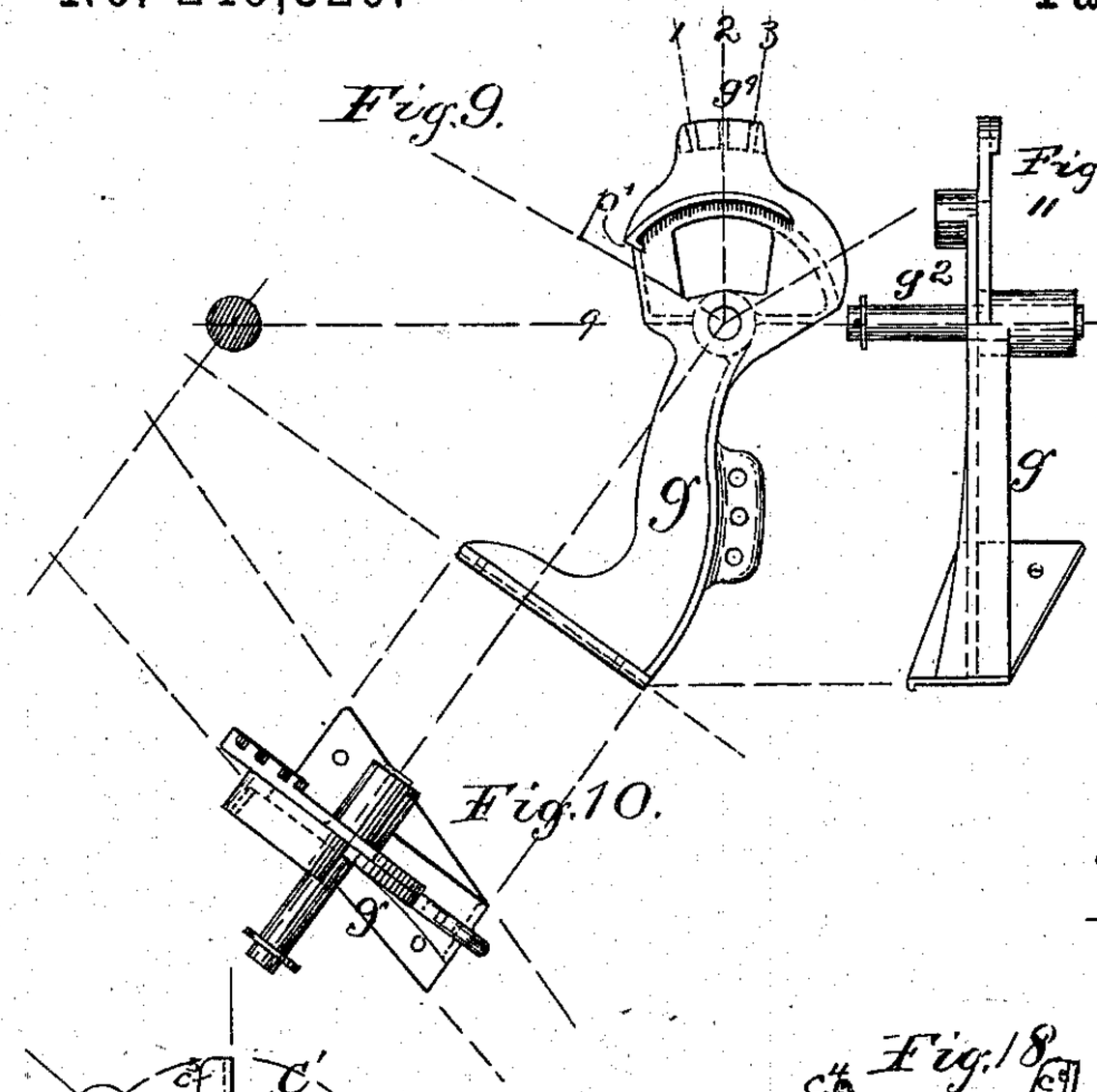


Fig 11

Fig. 10.

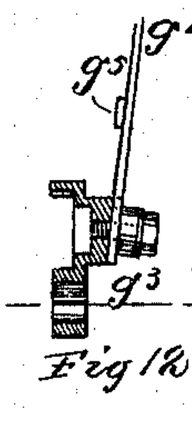


Fig 12

Fig. 13.

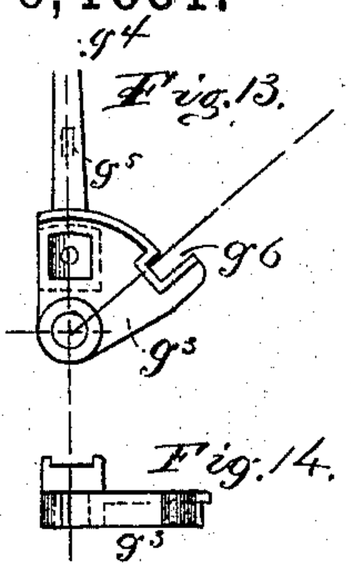


Fig. 14.

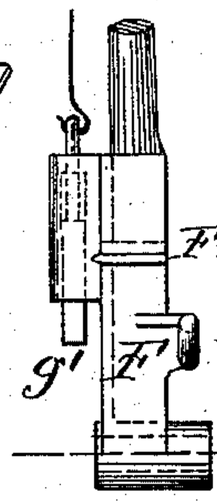


Fig 15

Fig 16

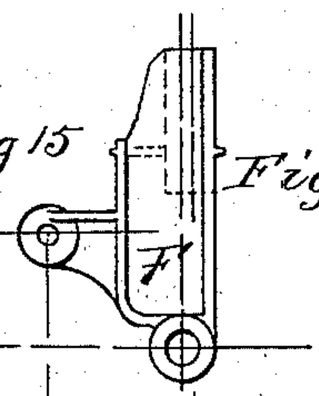


Fig 17

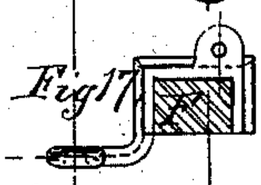


Fig. 18

Fig 19

Fig. 20.

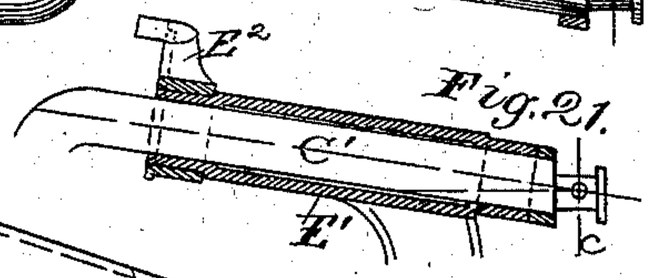
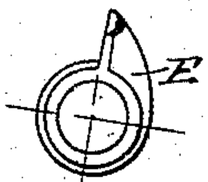


Fig. 21.

Fig. 22.



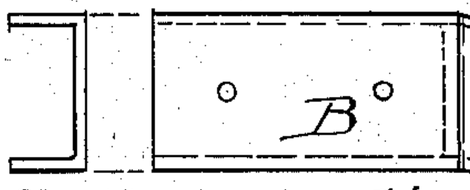


Fig. 23.

Fig. 25.

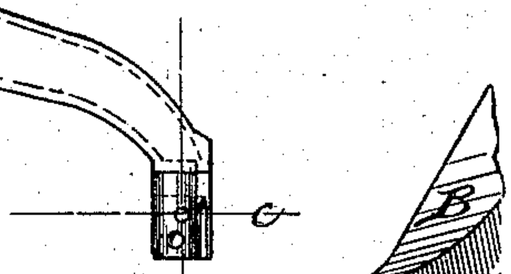


Fig. 26.

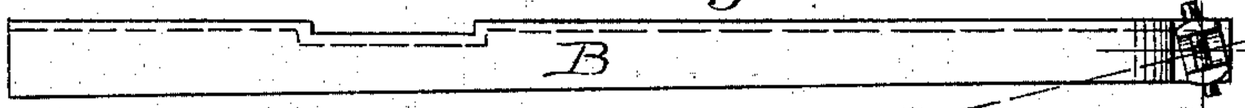


Fig 27

Fig. 24.

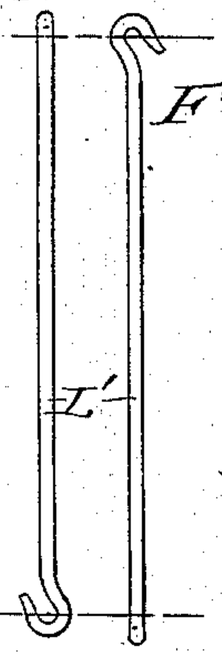


Fig. 28.

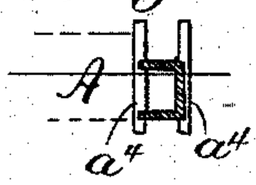


Fig. 29.

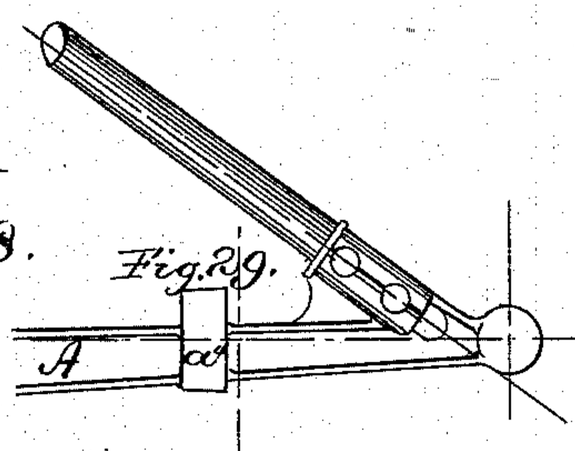


Fig 31

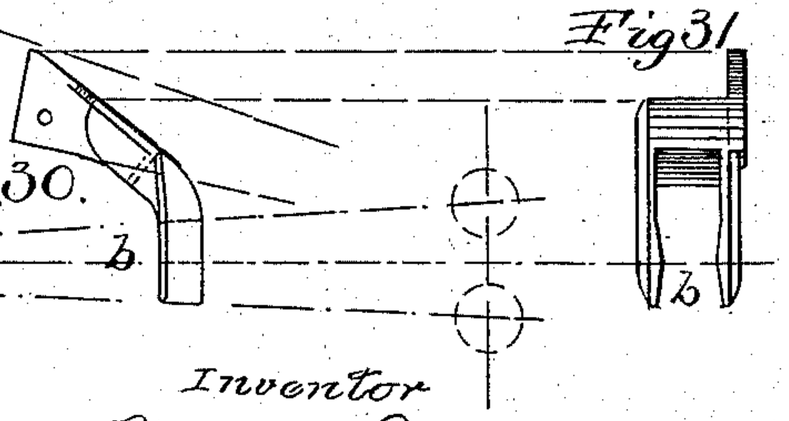


Fig. 30.

Attest.
M. V. Smith
Lew Bacon

Inventor
Rudolf Eickemeyer
By his Atty.
R. D. O. Smith

UNITED STATES PATENT OFFICE.

RUDOLF EICKEMEYER, OF YONKERS, NEW YORK.

HARVESTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 249,326, dated November 8, 1881.

Application filed January 19, 1881. (No model.)

To all whom it may concern:

Be it known that I, RUDOLF EICKEMEYER, of Yonkers, in the county of Westchester and State of New York, have invented new and useful Improvements in Harvesting-Machines; and I do hereby declare that the following is a full and accurate description of the same.

A part of my improvements relate to machines constructed in accordance with my patent of 1870, No. 101,719; and it consists, primarily, in an adjustable universal joint, by means of which the vibrating gear and vibrating arm are hinged to the main frame or sleeve, and a guide or stop which, while allowing a free movement of the vibrating arm in the plane of the cutting apparatus, and a slight rotary motion of the same, supports the vibrating arm, and thus prevents the rotation of the vibrating gear.

Another part of my improvement, although embodied in the present case in a machine as above described and applicable thereto, is also applicable to machines in which the vibrating motion of the cutting apparatus is obtained by other mechanical means; and it relates to the manner in which the tilting and folding of the cutting apparatus is effected. In the machines heretofore constructed and known to me two levers were used to accomplish this object, while in my present machine the folding or raising lever performs both functions, the extent of the tilting motion being determined by an adjustable stop.

Another feature of my present invention is the manner in which the hinge-pin is constructed. In all previous machines known to me the cutter-bar was folded around the hinge-joint nearest the edge of the wheel, which also served as the hinge-pin on which the finger-bar was allowed to turn to conform to the irregularities of the ground. In my present machine the cutter-bar is folded on the hinge-center nearest the inner wheel, but is allowed to conform to the ground on the hinge-center farther from said wheel of the machine.

Another object of the improvement is the construction of the hinging and tilting devices on this side of the frame and of the vibrating arm, instead of under the frame and vibrating arm, as heretofore constructed.

That others may fully understand my invention, I will more particularly describe it, reference being had to the accompanying drawings, wherein—

Figure 1 is a perspective view of a machine constructed in accordance with my invention. Fig. 2 is a side view of a part of the machine, the outer driving-gear being removed, and the driving mechanism shown in section. Fig. 3 is an elevation of the operating-lever of the hinge-pin. Fig. 4 is a plan of the driving, lifting, and tilting apparatus of the machine, partly in section. Fig. 5 is a side view of the tilting and lifting apparatus, other parts of the machine removed. Fig. 6 is a top view of the same, the shoe being turned ninety degrees from position in Fig. 5. Figs. 7 and 8 are transverse sections of the hinge-pin and operating-lever. Figs. 9, 10, 11, 12, and 13 are detail views of the bracket which supports the lifting and tilting lever, and the devices which regulate the tilt. Figs. 14, 15, and 16 are detail views of the lower part of the lifting and tilting lever. Figs. 18, 19, and 20 are detail views of the hinge-pin and the parts attached to the same. Figs. 21 and 22 show the sleeve of the shoe in section, and the lever or locking arm by means of which the shoe and finger-bar are held while it is being folded. Figs. 23 and 24 represent the link which connects the tilting and folding lever with the operating-lever on the hinge-pin. Figs. 25, 26, and 27 are detail views of the main frame to which the cutting apparatus is attached. Figs. 28 and 29 are views of a portion of the vibrating arm; and Figs. 30 and 31 represent the supporting-guide of the vibrating arm detached from the machine.

I will first describe the improvements relating to the vibrating arm.

The vibrating arm A is hinged to the frame by means of a universal-joint construction in the usual manner; but the joint-pins in the line of *d d'*, Fig. 2, are fastened to a tubular piece, d^3, fitted upon the tubular part of the main frame and adjustable around the central axis of the main shaft of the machine.

To the projecting brace bar or arm B of the main frame which supports the cutting apparatus I have fixed a forked support, *b*, (shown detached from the machine in Figs. 30 and 31,) in which the vibrating arm A is confined vertically, but is left free to vibrate horizontally.

The vibrating arm A is provided with wear-

ing-surfaces, as at a^4, Figs. 28 and 29. The motion of the vibrating arm at the point where it is supported by the fork is in a straight line; but while a line drawn from the center of the universal joint to the center of the ball A′ of the pitman-joint which actuates the cutter-bar vibrates in a plane, the arm itself has a slight rotating motion around this line, and to allow for this slight rotary motion I have made the fork *b* with surfaces inclined toward the central position of the vibrating arm, and I have made the wearing-surfaces a^4 on the vibrating arm of sufficient width to remain in contact with the highest part of the fork during its vibrations.

To adjust the vibrating arm it is only necessary to put the lower end into the fork and to fasten the set-screw a^3 in the piece d^3. All the strain caused by the rotation of the driving-gear is thus taken off the universal joint, and the resistance is furnished by the supporting-fork.

To be able to perform both the turning of the fingers and raising of the cutting apparatus with one lever I have made a hinge-pin of a novel construction. In Fig. 18 I have shown the pin detached from the machine. It is bent in the manner shown, and the axial lines *c c′* and *c* c^2 of the two cylindrical portions in C and C′ intersect each other at the point *c*. The brace-bar B is provided at its lower end with a bearing for the lower end of the hinge-pin, and a bracket, D, supports its upper end.

The inner shoe, E, is provided with a sleeve, E′, loosely fitted to the part C′ of the hinge-pin, as shown in Figs. 5 and 6 in side and plan view, and in Fig. 21 in section. To this sleeve I attach a short lever, E^2, which may be cast integral with the sleeve, or otherwise attached. In the drawings it is shown fastened by a set-screw. This lever E^2, co-operating with a similar short lever, c^3, on the hinge-pin C, serves as a stop to prevent rotation of the cutting apparatus upon the hinge-pin beyond a point determined by the relative positions of said levers c^3 and E^2 from their respective supporting parts.

When the hinge-pin C C′ is supported in the brace-bar B and the bracket D the axial line *c* c^2 is parallel, or nearly so, to the line of progression of the machine; but the sleeve E′ of the shoe is fitted to the part C′ of said hinge-pin, the axial line *c c′* whereof is oblique to the line of progression. The rotation of the hinge-pin in said bearings raises the outer end of the cutting apparatus or tilts the cutters, as the case may be.

To operate the hinge-pin I have attached to it a lever, c^4, which is connected by a link, L′, with the hand-lever F, and by these means the hinge-pin is rotated at will. The hand-lever F is pivoted to the bracket *g*, and is provided with a spring-bolt, *g′*, (see Fig. 15,) to engage with proper notches in the bracket *g* to retain it in the desired position. On the hinge-pin g^2, upon which the hand-lever is mounted, I have also mounted a segment-piece, g^3, which is movable on said pin, and is operated by a hand-lever, g^4. This lever is provided with a projection, g^5, which fits into notches g^9 in the brackets *g*, and it can thus be held in any of the positions indicated by dotted lines in Fig. 9, and marked 1, 2, 3, respectively. The piece g^3 has a notch, g^6, which serves to receive and hold in position the spring-bolt *g′* of the hand-lever F, and the position of the hand-lever and its range of motion forward. Its position, when held by the spring-bolt, is thus controlled by the position of the lever g^4, and it, in turn, varies as the projection g^5 is entered into the notch g^9 at 1, 2, or 3 in the bracket *g*. The bracket *g* is also provided with a projection, *p′*, to retain the hand-lever when the cutting apparatus is raised to its highest position. I have not shown in my drawings the foot-lift generally used in machines of this class; but it is desirable to use a device for that purpose in the present machine.

The operation of the devices described is as follows: The cutting apparatus is held in a vertical position by the hand-lever F, as shown in Fig. 5. The levers c^4, c^3, and E^2 are then in the positions shown in Fig. 7, the lever c^3 supporting the lever E^2 on the sleeve E′. When the spring-bolt *g′* is withdrawn from the stop-shoulders *p′* the hand-lever F may be permitted to rise, and the cutting apparatus will turn around the axial line *c* c^2, gradually approaching a horizontal position, the lever E^2 still engaging the lever c^3. When the cutting apparatus has reached the ground the hand-lever has not, however, reached the extreme end of its movement, and its continued motion releases the lever c^3 from the lever E^2, so that the cutting apparatus is free to move on the hinge-pin. At the forward extremity of the movement of the lever F the bolt *g′* falls into the notch g^6. The points of the fingers are tilted either up or down by a more limited movement of the lever F—that is to say, a movement of said lever forward rotates the hinge-pin so as to elevate the cranked portion *c′* of said lever and the sleeve E without changing the elevation of said hinge-pin at the point *c*. This will depress the points of the fingers. A contrary movement of said lever produces the opposite result. The movements of the lever F required to control the elevation of the points of the cutters is conveniently effected by means of the lever g^4, which changes the position of the notch g^6 at will. In Fig. 2 the shoe is represented in the position it occupies when the lever g^4 is held in the central notch at 2, and it is level with the ground, while it would be elevated in front if g^4 were held in the notch 1, and depressed in front if held in notch 3. To raise the cutting apparatus, the spring-bolt *g′* is first withdrawn from the notch g^6 and the hand-lever pulled toward the driver. This causes the cutting apparatus to turn around the point *c* and the fingers to rise until the lever c^3 comes in contact with the lever E^2,

when the cutting apparatus is raised at its outer end until it has reached a vertical position.

The action of this device differs from all others known to me in this particular: When the finger-bar is lowered it touches with the fingers raised, and as the hand-lever is moved forward the fingers are gradually depressed to their desired point, and when the bar is to be raised the fingers are always first raised, while the bar remains on the ground. The cutting apparatus thus always occupies the same position, no matter whether the bar is tilted more or less when at work.

The draft-rod is attached to the bracket *g* at g^8, and is constructed substantially in the manner shown.

It is obvious that the device will work equally well if the hinge-pin is attached to the frame so that the line *c c'* is nearly parallel with the line of progression, while the line *c* c^2 is inclined toward the drive-wheel at its rear end, or when neither of the lines are parallel with the line of progression, and I therefore do not confine myself to the particular construction shown.

Having described my invention, what I claim as new is—

1. A vibrating arm connected at one end to the cutter-bar, and a universal joint whereby the other end of said arm is connected to the main frame, combined with means whereby said joint may be adjusted upon the main frame.

2. A projecting brace bar or arm connected at one end to the main frame, and a finger-bar connected to said arm by means of a joint-pin oblique to the line of progression, said pin being itself capable of partial rotation around an axis about parallel with the line of progression, and said joint-pin being located at the side of said arm, as set forth.

3. An oscillating gear, a vibrating arm driven by said gear, and a universal joint whereon said arm has its motion, in combination with means by which said joint is attached to the frame of the machine in such a manner that it may be adjusted around the center of the main axle to conform with the desired setting of the arm, substantially as described.

4. An oscillating gear, a vibrating arm driven by said gear, and a universal joint whereon said arm has its motion, combined with a support to guide said arm, said support being so constructed that the arm is rigidly guided in a horizontal plane, while a slight rotary motion is permitted as it vibrates.

5. An oscillating gear, a vibrating arm driven by said gear, and a universal joint whereon said arm has its motion, combined with an adjusting-sleeve interposed between said joint and the main frame, so that said joint may be adjusted to the setting of the arm, substantially as set forth.

6. An oscillating gear, a vibrating arm driven by said gear, and a universal joint whereon said arm has its motion, combined with a forked guide to inclose said arm above and below, and provided with bearing-points for said arm at or near the extremities of said fork, so as to permit a slight rotary movement of said arm as it vibrates.

7. The inner shoe of the cutting apparatus mounted upon a joint which is oblique to the line of advance, combined with a hinge-pin for said joint which is itself capable of movement around an axis substantially parallel with the line of progression, whereby the cutting apparatus may be tilted by movements of the hinge-pin around its axis in the line of progression.

8. The inner shoe of the cutting apparatus mounted upon a joint which is oblique to the line of progression, and a hinge-pin for said joint which is itself capable of movement around an axis substantially parallel with the line of progression, combined with stops capable of engagement with each other to interlock said shoe and said pin at a determinate point in the movement of said pin, whereby a movement of said pin past the interlocking-point for said stops will cause the cutting apparatus to be raised from the ground at its outer end.

9. The hinge-pin with the longitudinal and oblique axes of its parts C and C′ intersecting at the point *c*, combined with the supporting brace-bar B and bracket D, and the inner shoe of the cutting apparatus, the joint whereof is upon said oblique part C′.

10. The crank-shaped hinge-pin having the parts C C′, with their axes inclined to each other and intersecting at the point *c*, combined with the shoe jointed to said part C′, and the stops c^3 and E^2, whereby said shoe becomes locked to said hinge-pin, as set forth.

11. The cranked hinge-pin having its parts C and C′ inclined to each other, as set forth, mounted in bearings at the extremities of the arms B and D, so that the axis of part C is substantially parallel with the line of progression, and the inner shoe jointed upon the part C′, combined with the arm c^4, and the hand-lever connected therewith by a link-rod, L′, whereby said cutting apparatus may be tilted or raised from the ground by a single lever, as set forth.

12. The hand-lever F, combined with the movable stop g^3, controlled by a hand-lever, g^4, for the purpose of varying the limit of motion of said lever F, as set forth.

RUDOLF EICKEMEYER.

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