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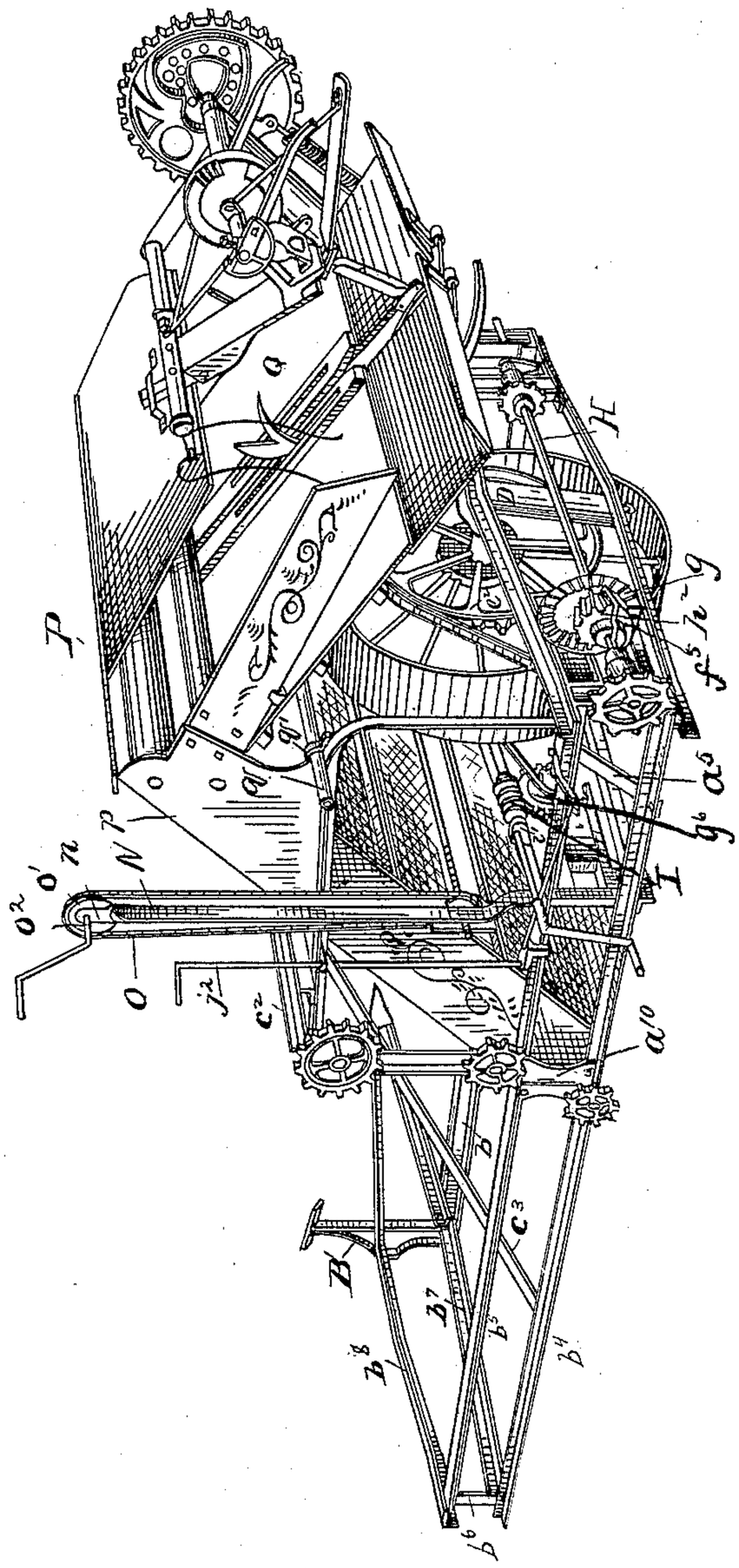
G. G. HUNT.

HARVESTER.

No. 413,065. Patented Oct. 15, 1889.

Fig. 1



Witnesses.
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(No Model.)

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No. 413,065. Patented Oct. 15, 1889.

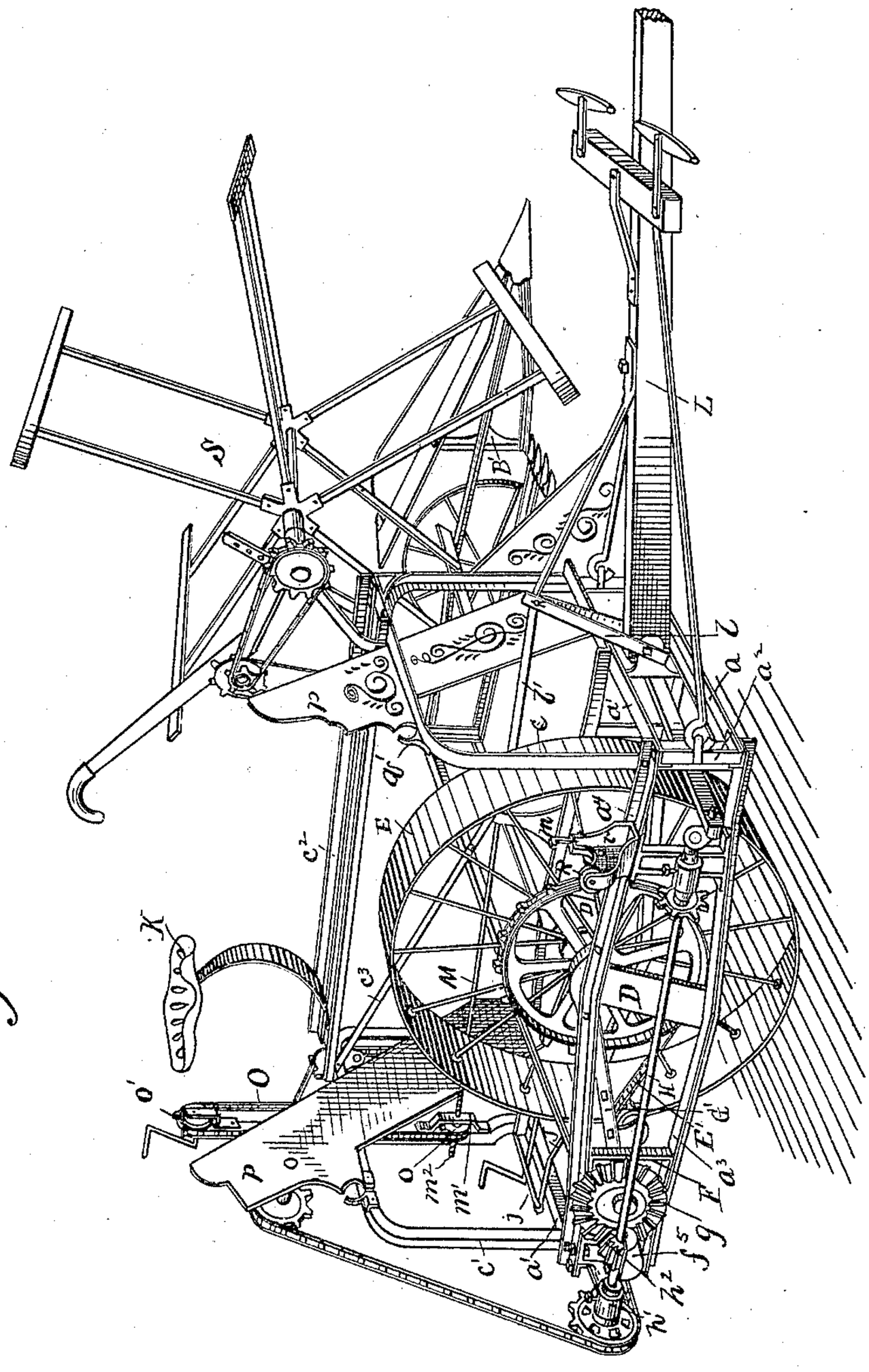

Fig. 2.

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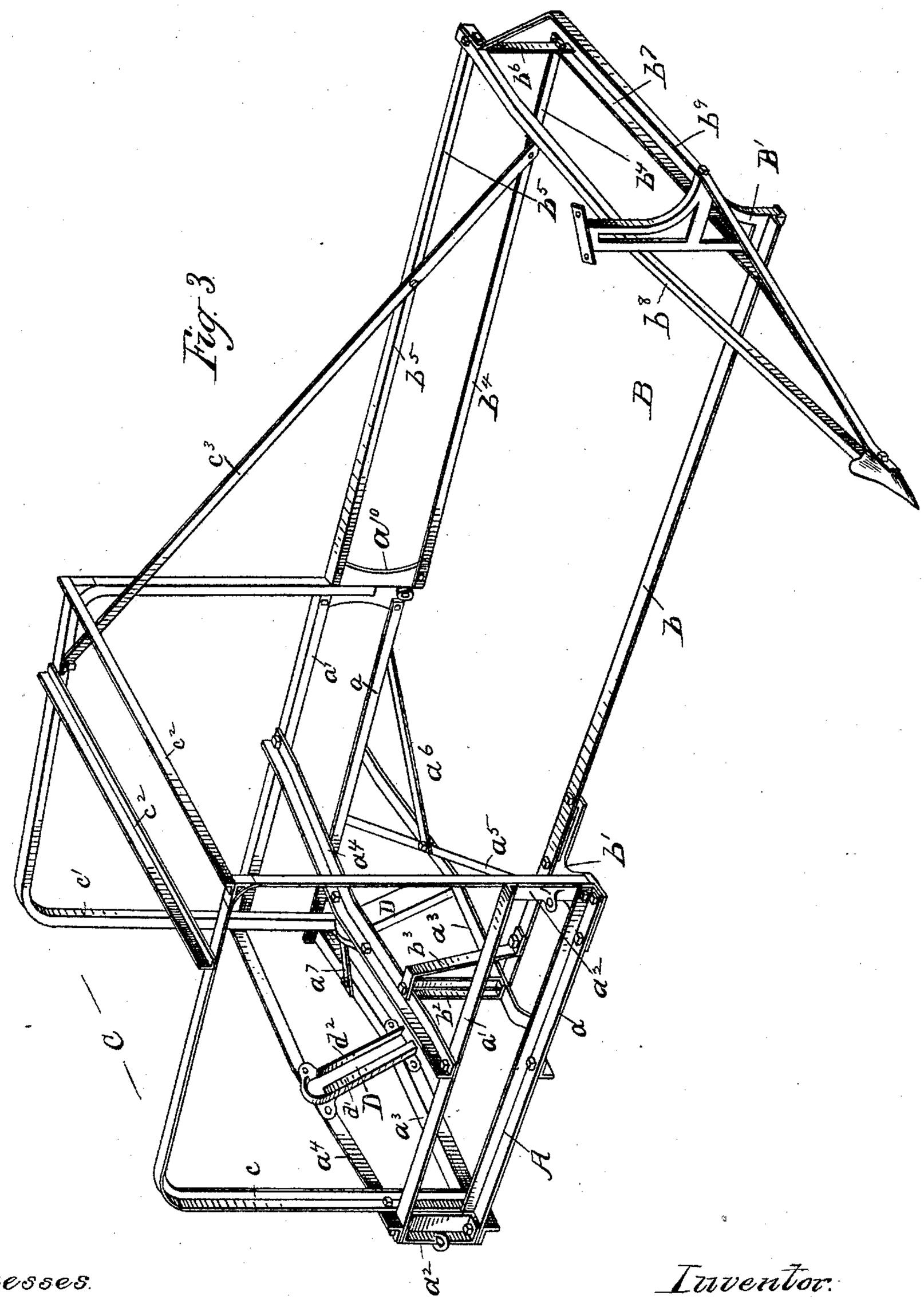
No. 413,065. Patented Oct. 15, 1889.

Fig. 3.



Witnesses.
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No. 413,065. Patented Oct. 15, 1889.

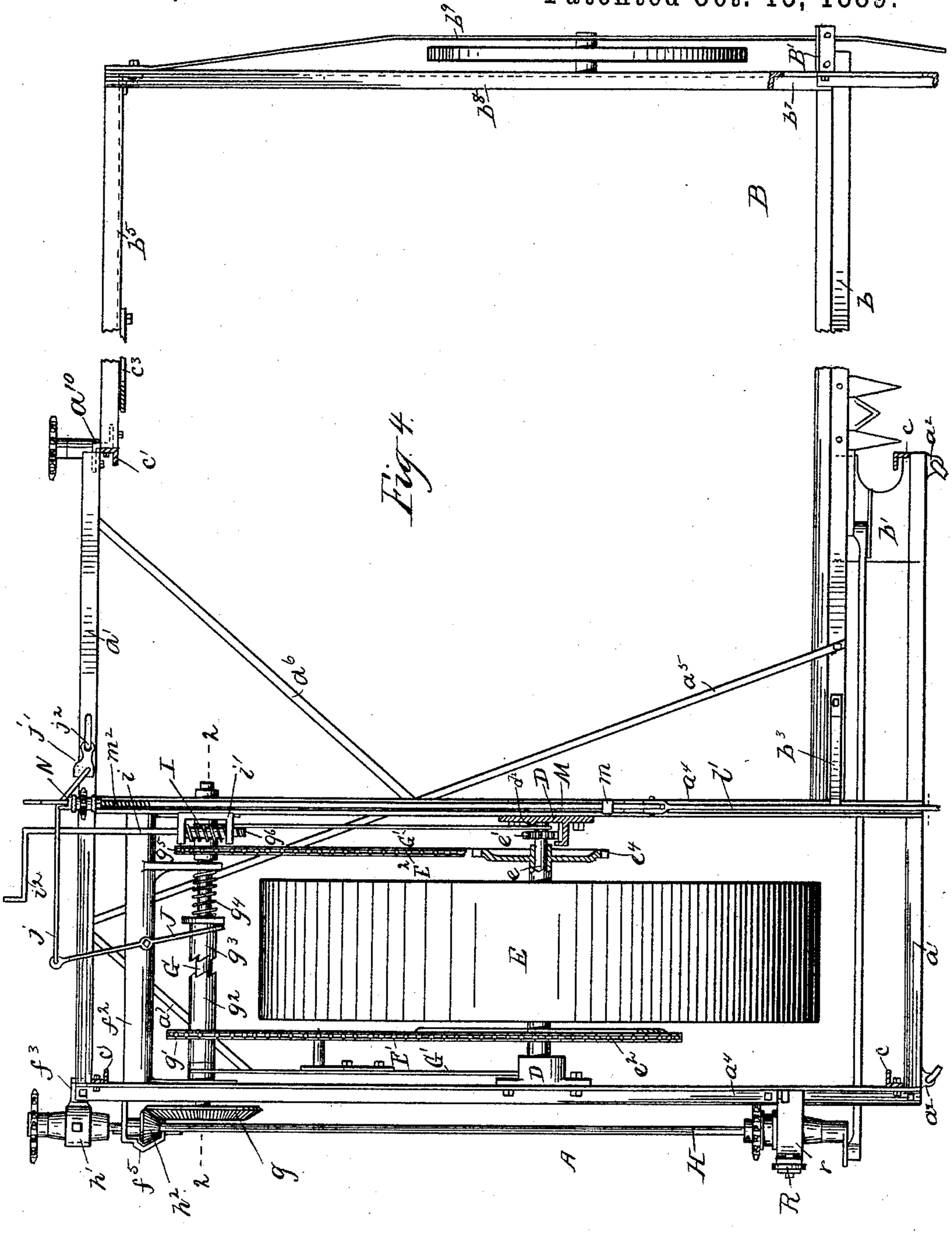

Fig. 4.

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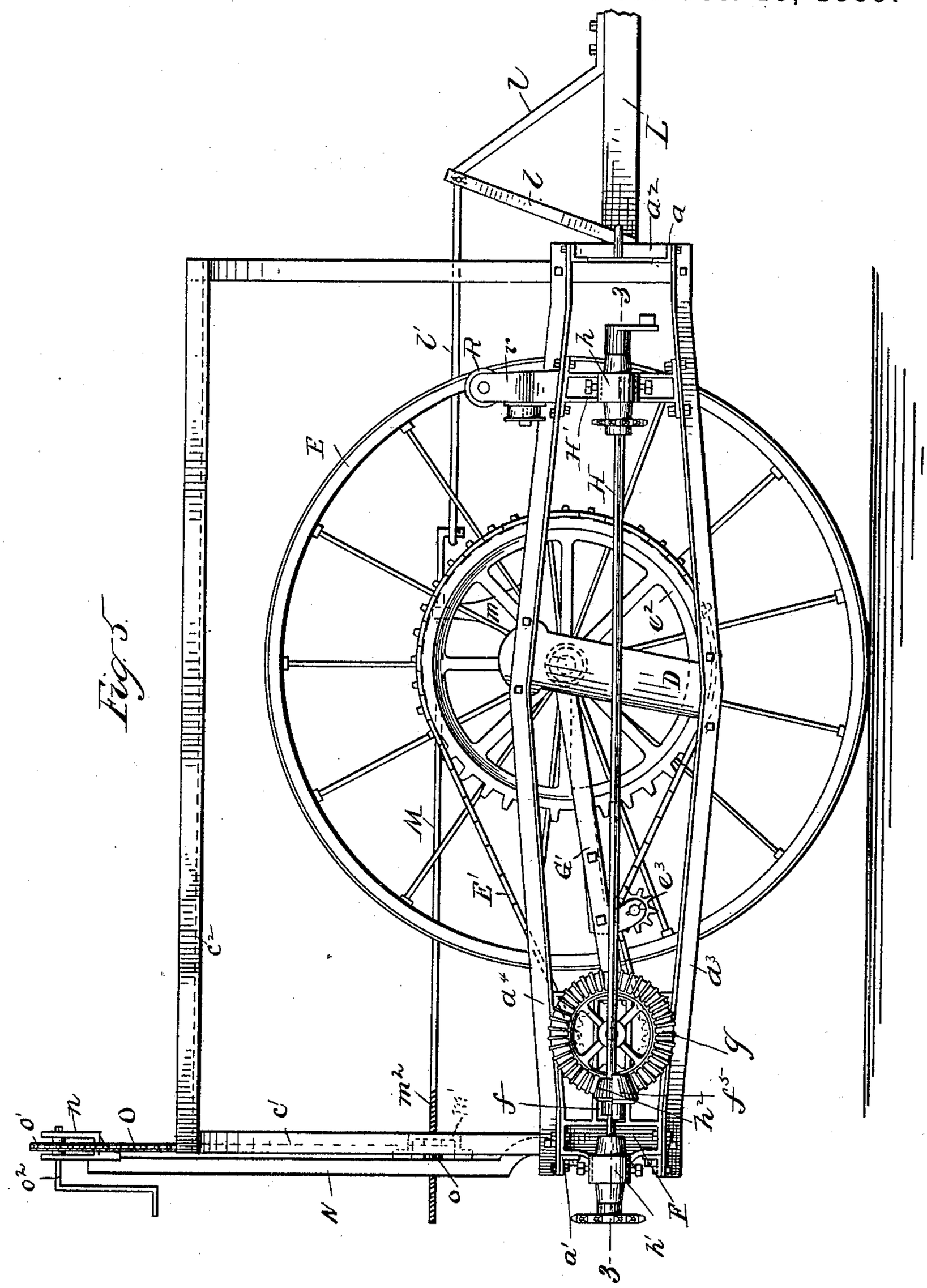

Fig. 2.

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7 Sheets—Sheet 6.

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Fig. 6.

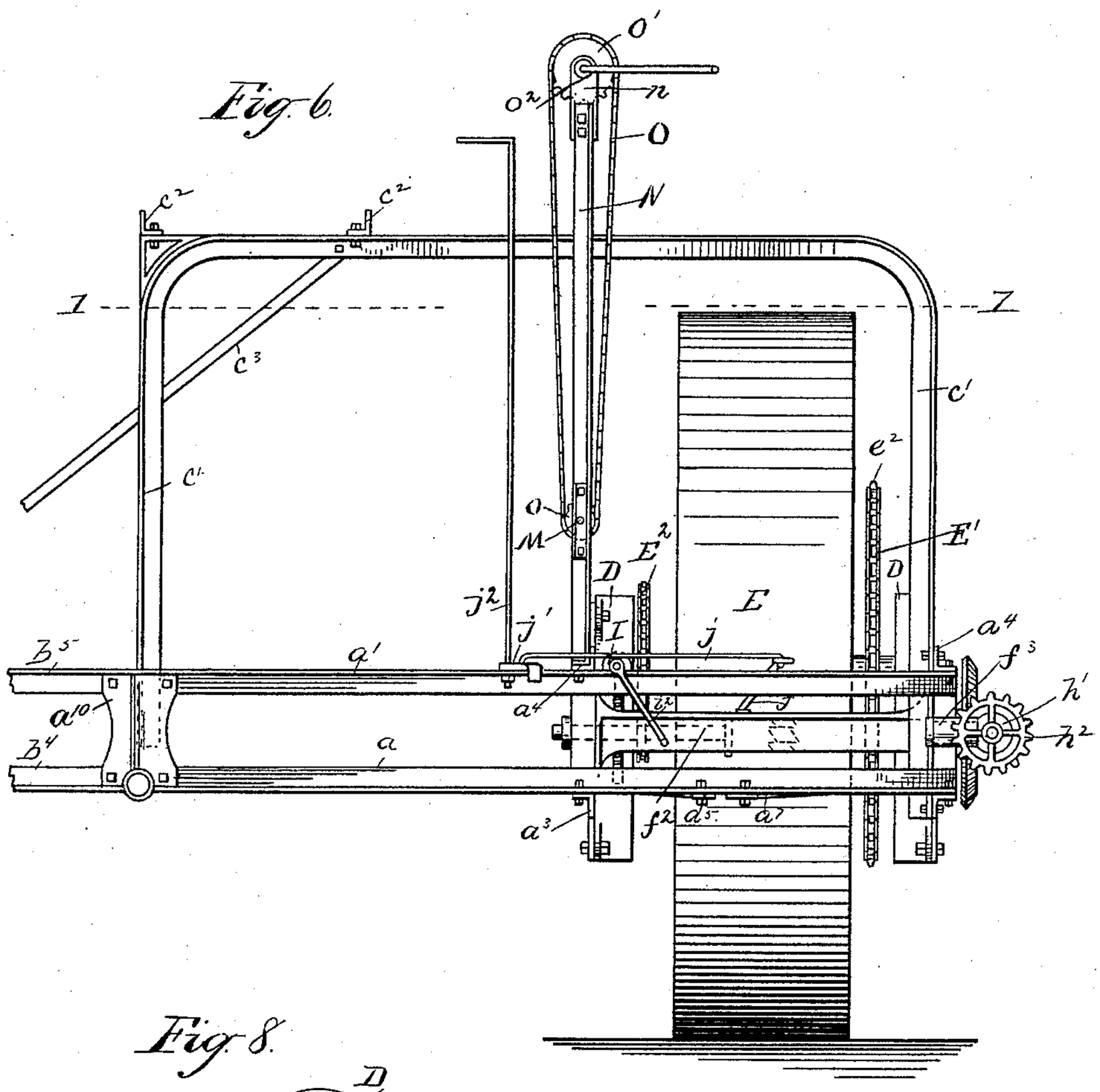


Fig. 8.

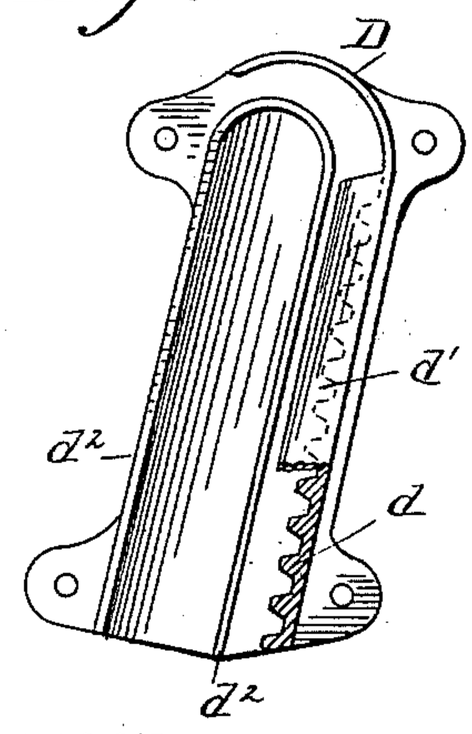
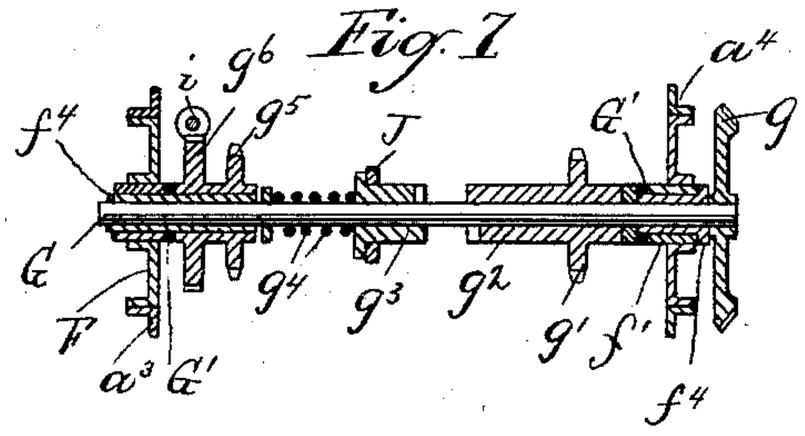


Fig. 7.



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(No Model.) 7 Sheets—Sheet 7.

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No. 413,065. Patented Oct. 15, 1889.

Fig. 9.

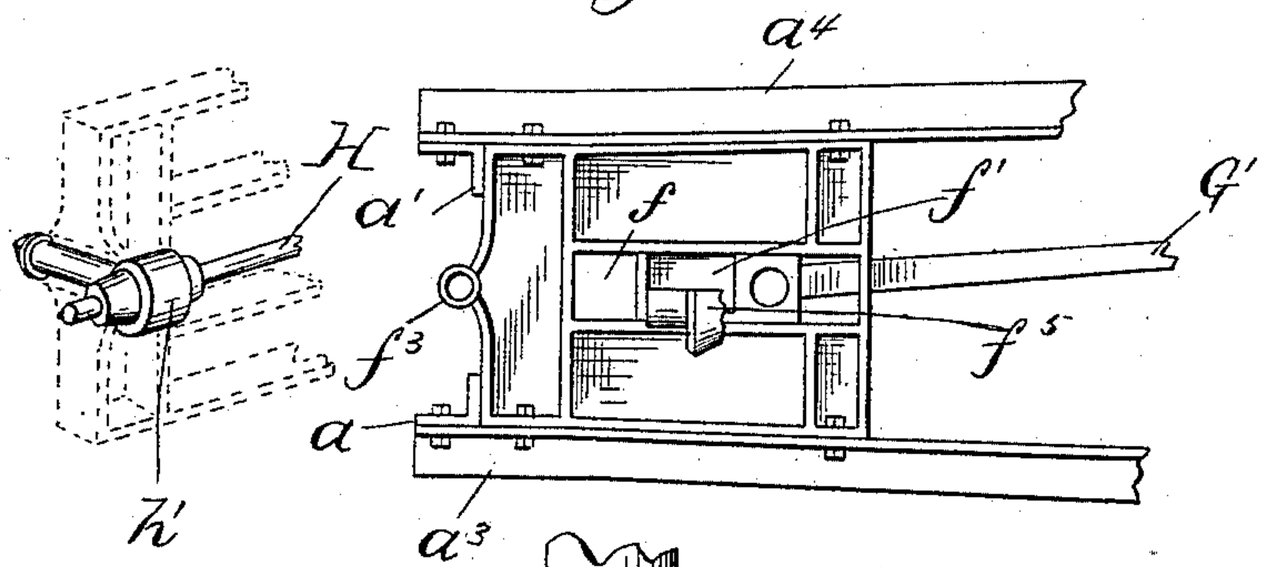


Fig. 10.

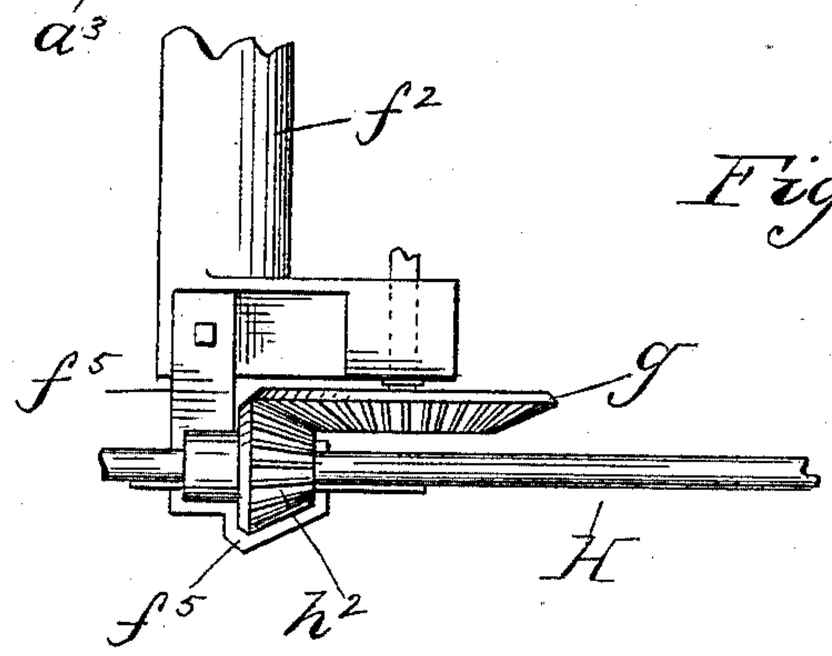
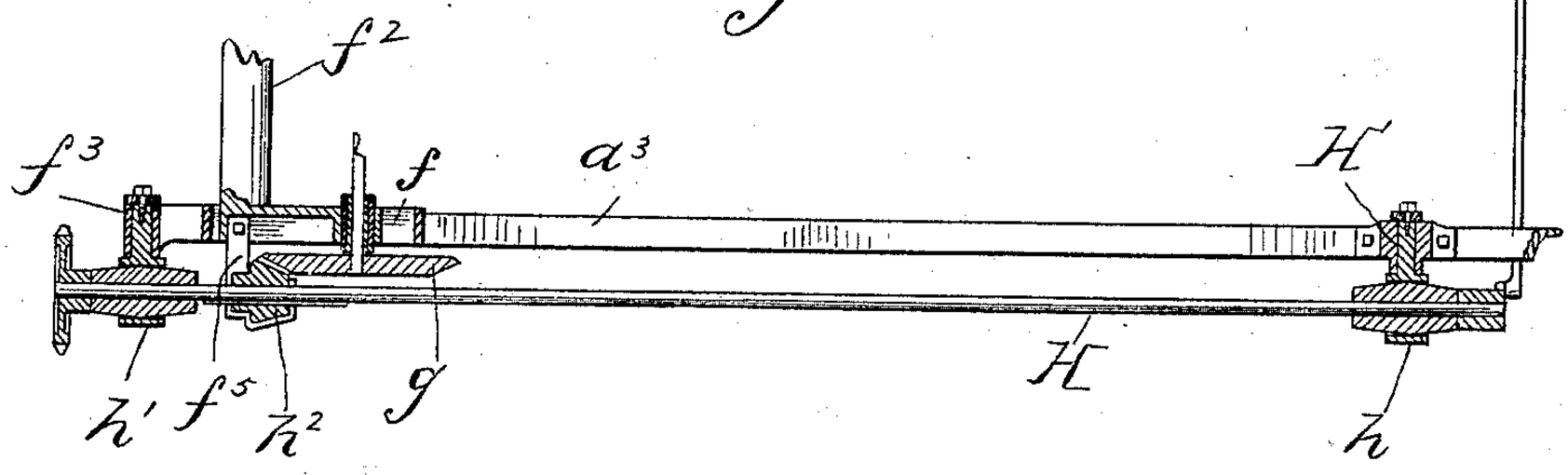


Fig. 11.



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UNITED STATES PATENT OFFICE.

GEORGE G. HUNT, OF BRISTOL, ASSIGNOR TO THE PLANO MANUFACTURING COMPANY, OF CHICAGO, ILLINOIS.

HARVESTER.

SPECIFICATION forming part of Letters Patent No. 413,065, dated October 15, 1889.

Application filed April 2, 1888. Serial No. 269,361. (No model.)

To all whom it may concern:

Be it known that I, GEORGE G. HUNT, a citizen of the United States, residing at Bristol, in the county of Kendall and State of Illinois, have invented a certain new and useful Improvement in Harvesters, which is fully set forth in the following specification, reference being had to the accompanying drawings, in which—

Figure 1 represents a perspective view of a complete machine embodying my invention, looking from the rear stubble corner of the machine; Fig. 2, a similar view looking from the front stubble corner of the machine and with the binder and elevator removed; Fig. 3, a similar view of the frame of the machine, looking from the front grainward corner; Fig. 4, a plan section of the machine with the elevator and binder removed, taken on the line 1 1 of Fig. 6, with the platform partly broken away; Fig. 5, a side elevation of the stubble side of the machine; Fig. 6, a rear elevation of the same with the platform broken away; Fig. 7, a detail section of the counter-shaft and parts mounted thereon, taken on the line 2 2 of Fig. 4; Fig. 8, an inside elevation of the guide-rack for the main axle; and Fig. 9, a detail elevation of the rear stubbleward corner of the frame and connections, looking from the stubble side; Fig. 10, a detail plan showing the shaft H and sliding pinion h^2 with its connections, and Fig. 11 a detail plan section taken on the line 3 3 of Fig. 5.

Fig. 2 is upon a scale somewhat larger than Fig. 1, and the scale of Fig. 3 is still further enlarged. Figs. 4, 5, 6, and 7 are on the same scale and still more enlarged than that of Fig. 3, and the scale of Figs. 8 and 9 is still further enlarged.

My present invention relates to the frame of the machine, its mounting upon the main wheel, and means for adjusting it thereon both vertically and horizontally.

I will proceed to describe the construction and operation of a machine in which I have practically embodied my invention in one way, and will then point out definitely in claims the improvements which I believe to be new and wish to protect by Letters Patent.

The main frame-work of the machine is entirely of metal, preferably steel, though it may be of iron, wholly or in part, and composed of plates and bars bolted together so as to make a very strong light frame for the support of all the working parts of the machine. This frame, stripped of all other parts of the machine, is shown in Fig. 3 of the drawings, and may be divided into three parts—the gearing-frame A, in which the main wheel is mounted, the platform-frame B, and the upright frame C.

The gearing-frame A is composed of two sills or beams a a', at both front and rear, and arranged one above the other, being connected together in front by short posts or ties a^2, to which they are respectively bolted. At the rear outer corner of the frame the sills are connected by a block or bracket, in which is the bearing of the counter-shaft, and which will be hereinafter described. Two pairs of cross sills or beams a^3 a^4 extend from front to rear, and are bolted, respectively, to the upper and lower sills or beams a a'. These cross-sills are also arranged one above the other in each pair, and are set at the usual distance apart for supporting the ends of the drive-wheel axle, the outer pair being secured to the outer ends of the first sills and the other pair some distance farther inward, but only about midway of the length of the main sills. These cross-sills are preferably bent or sprung slightly up and down, respectively, at their central portion, so as to be somewhat arching, as plainly seen in the drawings.

The platform-frame B is composed of a main front sill b, which is bolted at its inner end to the lower member of the inside pair of cross-sills, and is also supported by a bracket b', extending rearward from the lower member of the front sills of the gearing-frame, to which it is also bolted. A post or tie b^2 and brace b^3 at the inner end of this sill are connected also with the upper member of the cross-sills, thereby giving strength and a rigid support. At the rear of this frame there is a lower or main sill b^4, and another b^5 arranged imme-

diately over the latter. These sills are fastened together by posts or ties b^6 a^{10}, and at the inner end are secured to the inner end of the rear sills of the gearing-frame. At the outer end of this frame is a lower end sill b^7, and the beams b^8 b^9, of the usual shape and arrangement, to constitute the divider framework, the last-named being on the outside of the end sill for the support of the grain-wheel. A post or bracket B′ is secured to the lower portion of the frame at the outer front corner, to which the last-named beams or bars are suitably connected. The short post a^{10} has two angles or bends, so as to provide for the attachment to it of the rear sills of both the gearing-frame and the platform-frame, as shown in Fig. 3 of the drawings.

The upright frame C is composed of a front section c and a rear section c', both of which are of substantially rectangular form, the rectangle being open at one side and the free ends of the bars bolted to the sills of the gearing-frame. These upright sections may each be made from a single bar bent into the required shape or from two or more pieces fastened together to make the required form. They are connected at the top by two parallel cross-bars c^2, arranged near the inner side. It will be seen that the shape of these upright sections provides long flat bearing-surfaces at the upper portion of the frame.

The several parts of the main frame may be braced in any suitable manner. In the drawings I have shown an inclined brace c^3, connecting the rear upright section with the rear sills of the platform-frame, and a brace a^5, extending diagonally from the lower rear sill of the gearing-frame to the front sill of the platform-frame, which brace is in turn supported by a short brace a^6, running from its central portion diagonally backward to the rear sill of the gearing-frame, both these braces being bolted to the inner cross-sill a^3, as shown in Fig. 3 of the drawings. There is also a short diagonal brace a^7 at the rear outer corner of the gearing-frame connecting the lower sills. This bracing is a mere arbitrary matter, however, and may be varied in any suitable way, according to judgment or as occasion may require.

To this main frame the several parts of the machine are applied, as will now be described. The guide-racks D for the axle of the main wheel are mounted on the cross-sills of the gearing-frame, being bolted at their respective ends to the respective cross-sills, as shown in Fig. 3 of the drawings. These guide-racks are of usual construction, except that instead of being curved in the ordinary way they are straight, but are set at an incline on the frame, the inclination being forward as the guide-racks extend upward. They are provided with the usual rack d, and a lip d' on the inner side of the latter, and a flange d^2 raised on the face to provide guideways for the axle, as usual. The main wheel E is loose on its axle e, as usual in machines of this type, and the latter is provided with pinions e', which engage with the said racks, the ends of the axle being arranged between the flanges on the guide-racks, in the usual way, as seen in Fig. 4 of the drawings. The guide-racks not only serve their usual purpose, but also brace the transverse sections of the gearing-frame on account of their arrangement and attachment, as described.

At the rear end of each of the transverse sections of the gearing-frame is a block or bracket F, which may be cast, and is preferably provided with ribs, as seen in Fig. 9 of the drawings, which shows the outside block. This block or piece is made wide enough to fill the entire space between the upper and lower sills, to which it is respectively bolted, and is provided with a horizontal slot f, running nearly its entire length. Within this slot a journal-box f' is mounted so as to slide back and forth. The two boxes in the respective blocks are connected together at their rear ends by a bar f^2, extending across the gearing-frame, which may be cast in one piece with the boxes, and of course moves back and forth with them. The boxes are suitably perforated to receive the journals. The outer block is also provided at its rear end with a socket f^3, running horizontally across the web of the block; but the inner one has not this device, and consequently is not extended quite so far back.

A counter-shaft G is mounted in the sliding journal-boxes f', preferably by means of sleeve-bearings f^4, inserted in the perforations or openings of the boxes and extending more or less inward upon the shaft, as seen in Fig. 7 of the drawings. Radius-bars G′ connect this shaft to the main axle about the same, as usual. Preferably they are attached to the shaft by mounting their rear end around the extensions of the sleeve-bearings, as shown in Fig. 7 of the drawings, while at their forward ends they are mounted upon the axle just outside of the pinions thereon. This counter-shaft has fixed upon its outer end a bevel gear-wheel g just outside of the frame of the machine. Just inside of the outer pair of cross-sills is a chain-pinion g', mounted loosely on this shaft by means of a long sleeve g^2, terminating at its inner end in clutch-teeth. A sliding clutch g^3 is fastened to the shaft, so as to turn with it, and is adapted to engage with the clutch-teeth on the sleeve just mentioned to connect the shaft with or disconnect it from the chain-pinion. The clutch is backed by a spring g^4, coiled around the shaft and held in place by an arm extending forward from the cross-bar f^2. A small chain-pinion g^5 is mounted loosely on the counter-shaft, the other side of the arm just mentioned, which extends forward from the bar f^2. The bearing of this pinion is preferably on the inner journal-sleeve bearing, as seen in Fig. 7 of the drawings, and immediately adjoining it is a worm gear-wheel g^6, either cast with the pinion or connected to it,

so that the two will turn together. In the drawings, Fig. 7, they are shown cast in one piece. A large chain-wheel e^2 is mounted loosely on the main axle and connected to the main wheel E, or its hub, so as to turn therewith. This wheel is arranged on the outside of the main wheel, and a chain E′ runs over it and the chain-pinion g' on the counter-shaft G, so that the revolution of the main wheel will communicate a rotatory motion to the counter-shaft. The chain E′ passes over a take-up pinion e^3, mounted on one of the radius-bars, as shown in Fig. 5 of the drawings. The crank-shaft H, which drives the cutter, is arranged at the stubble end of the machine outside of the gearing-frame and extending nearly across the latter, being mounted in boxes $h\,h'$, the former of which is mounted in a bracket H′, fastened to the outer cross-sills near their front ends, and the latter mounted in the socket f^3 in the outer block F, at the rear of the same pair of cross-sills. The boxes $h\,h'$ are provided with stems or shanks, which are seated, respectively, in the socket f^3 of the block F and a similar socket or opening in the bracket H′, and are held in place by nuts on the ends of these shanks, as seen in Fig. 11 of the drawings. A bevel-pinion h^2 is secured to this shaft in any ordinary way, which permits it to slide but not to turn thereon, and is arranged to engage with the bevel gear-wheel g on the outer end of the counter-shaft G, thus providing for driving the crank-shaft from the said counter-shaft. An arm f^5 extends outward from the outer end of the bar f^2 and is bent around to inclose the pinion on the crank-shaft, being preferably formed to make a kind of casing for the under side of the pinion, as seen in Fig. 5 of the drawings, but arranged so that any movement back and forth of this arm will slide the pinion on its shaft. On the inner side of the main wheel is a smaller chain-wheel e^4, which is fastened to the axle of the main wheel, and over which a chain E^2 is passed to and around the chain-pinion g^5 on the counter-shaft. A worm I on a shaft i is mounted in a bracket i', arranged so that the worm will engage with the worm gear-wheel g^6. The shaft i extends to the rear of the machine, where it terminates in a crank i^2, by means of which the shaft may be turned, thereby rotating the worm gear-wheel and chain-pinion connected to it, and so rotating the chain-wheel e^4, which, being fast on the axle, rotates the latter, and thereby raises and lowers the frame on the axle, in a well-known way, through the medium of the pinions on the axles and racks on the frame with which they engage. A clutch-lever J is pivoted on the cross-bar f^2 and engages with the clutch g^3 on the counter-shaft. At its rear end it is connected by a rod j to a crank j' on the lower end of an upright rod or shaft j^2, provided with a crank upon its upper end, where it is brought within reach of the driver upon the seat K, mounted on the upper cross-bars c^2. By the oscillation of this upright rod the clutch-lever is vibrated to connect the chain-pinion g' to the counter-shaft, or disconnect it therefrom, as may be required. The pole L is hinged to the front part of the main frame and is provided with an upright post or frame l at its rear end, to the upper end of which is connected a rod l'. This rod extends back and is connected at its rear end to a horizontal sliding rod M, passing through a bracket m on the main frame at its front end, and at the rear through a suitable bracket m' on an upright post N at the rear of the machine. The rear end of this sliding rod is provided with a threaded section m^2. A chain O runs around a threaded nut o, provided with sprockets to engage with the chain and mounted on the threaded section of the sliding rod, between the post N and the bracket attached thereto. This chain passes up over a chain-pinion o' on a crank-shaft o^2, mounted in a bracket n at the upper end of the post N, and brought within easy reach of the driver. The turning of this crank will obviously rotate the nut below, thereby moving the sliding rod forward or backward, and so tilting the main frame of the machine, so as to adjust the front edge of the platform with reference to the ground.

The usual canvas carrier is mounted in the platform-frame back of the cutter; but it is not shown in the drawings and requires no explanation. There is also the usual elevator P, mounted in an inclined frame, the sides p being secured to the metal frame-work already described.

A grain-binder Q is secured to the frame by means of a gas-pipe rod q, which is set in suitable bearings q' on the outer portion of the front and rear sections of the upright frame C. The lower portion of the binder rests upon a roller R, mounted in a bracket r on the outer cross-sills of the gearing-frame. This mounting permits the binder to be swung upward and also to be moved backward and forward to suit different lengths of grain.

The binder constitutes no part of my present invention, and so will not be described, and there is nothing new in the mode of mounting as stated above, for that is also well known and shown in earlier patents. A reel S is mounted on suitable supports attached to the upright frame, and the machine is provided with any of the ordinary devices for driving the several movable parts; but as there is nothing new about the elevator, grain-binder, reel, and the driving mechanism generally, and their construction constitutes no part of my present invention, I have not fully shown them and shall not further describe them. It will be understood, of course, that the grain-binder is provided with any ordinary device for moving it backward and forward on its supports in the well-known way in which this part of the machine has long been adjusted.

The construction of the frame-work of the machine as described furnishes a very strong, comparatively light, and compact frame, to which all the ordinary parts of a harvester are readily attached, and also provides a wide platform-space on the upper part of the upright frame. It will be seen that as the guide-racks for the main axle are straight instead of curved, but are arranged at an inclination forward, the raising and lowering of the frame upon the axle of the wheel will also change its horizontal relation thereto, moving it forward and backward as it is raised and lowered. When the frame is lifted upon the axle, it is obvious that it will be thrown forward somewhat at the same time, and when it is lowered it will be moved backward to the same degree. This horizontal movement of the frame is for the purpose of counterbalancing to some extent the grain-binder as its position is changed in adjusting it to different lengths of grain. In short grain the binder is of course moved forward, thereby throwing greater weight upon the pole; but as in short grain the cut must be low, the frame at the same time should be lowered for this purpose, and, as already explained, when lowered it is moved backward somewhat. Obviously this will counteract the effect of moving the binder forward and so restore the proper balance of the machine. For long grain the grain-binder is moved backward, but at the same time the frame is raised to cut higher, thereby thrusting it forward and so maintaining the proper balance of the machine. In order to accommodate this horizontal movement of the frame, the journal-boxes of the counter-shaft are made movable, as described. Obviously without this device the driving of the machine by the devices mentioned could not be effected unless some mechanical means were provided for taking up the slack in the driving-chain, so as to keep it properly taut. These journal-boxes, therefore, move back and forth as the frame is raised and lowered to accommodate the change in strain upon the driving-chain. This will of course move the bevel gear-wheel on the end of the counter-shaft back and forth, and in order to keep the bevel gear-pinion on the crank-shaft in mesh therewith the said pinion is made movable on the shaft, as described, and is slid back and forth thereon by the arm extending out from the journal-box, as already specified, so that when the box moves the pinion moves correspondingly. The adjustment of the frame is effected by the worm-gear specified, whereby the main axle is rotated in the proper direction to raise or lower the frame as the pinions on the axle roll up or down in their respective racks.

Modifications may be made in parts of the machine without affecting other parts, and I do not wish to be understood as limiting myself to all the specific details of construction, as herein described and shown.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a harvester-frame, the inner cross-sills a^3 a^4, in combination with the front platform-sill b, connected at its inner end to the lower of said cross-sills, and a diagonal brace b^3, connected at its upper end to the upper cross-sill, and extending downward and outward toward the platform to the front sill b, to which it is connected at its lower end, substantially as and for the purposes specified.

2. In a harvester-frame, the inner cross-sills a^3 a^4, in combination with the front platform-sill b, connected at its inner end to the lower of said cross-sills, the post b^2, connecting the two cross-sills at the point where the platform-sill joins the lower, and the inclined brace b^3, connecting the said platform-sill with the upper cross-sill, substantially as and for the purposes specified.

3. In a harvester, a metal platform-frame B, composed of a front sill b, a pair of rear sills b^4 b^5, arranged one over the other, and an end sill b^7 and beam b^8, all rigidly connected together, substantially as and for the purposes specified.

4. In a harvester, the metal rear sills a a' of the gearing-frame, arranged one over the other, in combination with the metal rear sills b^4 b^5 of the platform-frame, arranged one over the other, and the metal post a^{10}, constructed as described, and connected to the inner ends of both said pairs of sills, substantially as and for the purposes specified.

5. In a harvester, the metal sills a a', arranged one above the other and one pair at the front and the other at the rear of the gearing-frame, in combination with the metal cross-sills a^3 a^4, arranged one above the other and with one pair on each side of the main wheel, the single metal sill b at the front of the platform, the pair of metal sills b^4 b^5, arranged one above the other at the rear of the platform, the metal end sill b^7 and beam b^8 at the outer end of the platform, the upright metal sections c c', arranged one at the front and the other at the rear of the gearing-frame and rigidly connected thereto, and the metal cross-bars c^2, arranged upon the top of the upright sections and rigidly fastened to each, all substantially as and for the purposes specified.

6. In a harvester, the gearing-frame, in combination with straight guide-racks set on said frame at an inclination, and the main-wheel axle provided with pinions engaging with said racks, substantially as and for the purposes specified.

7. In a harvester, the gearing-frame and the main-wheel axle, provided with pinions, in combination with the straight guide-racks set at an inclination on the gearing-frame, the counter-shaft, movable journal-boxes in which said shaft is mounted, and a chain-gearing connecting the axle and counter-shaft, substantially as and for the purposes specified.

8. In a harvester, the gearing-frame, in com-

bination with the blocks F, set therein and provided with horizontal slots *f*, the journal-boxes *f'*, sliding in said slots, the counter-shaft G, having its bearings in said boxes, and a chain-gearing connecting said shaft with the main axle, substantially as and for the purposes specified.

9. The counter-shaft G, in combination with the movable journal-boxes *f'*, the bevel gear-wheel *g* on the end of said shaft, the cutter crank-shaft H, and the sliding bevel-pinion h^2, mounted thereon and connected to the sliding journal-boxes so as to move therewith, substantially as and for the purposes specified.

10. The counter-shaft G, in combination with the movable boxes in which it is mounted, the bevel gear-wheel *g*, crank-shaft H, bevel-pinion h^2, arranged to slide on said shaft, and the arm f^5, connected to the movable boxes and embracing said bevel-pinion, substantially as and for the purposes specified.

11. The hinged pole, in combination with the sliding rod M, connected to a post or frame on the pole, the chain-nut *o*, the chain O, and the chain-pinion *o'* on the crank-shaft o^2, substantially as and for the purposes specified.

12. The block F, provided with socket f^3 at its rear end, arranged transversely to the block, in combination with the crank-shaft H, parallel to said block, and the journal-box *h'* for the crank-shaft, seated in said socket, substantially as and for the purposes specified.

13. In a harvester, the gearing-frame, in combination with the guide-racks mounted thereon and inclined forward, the main wheel and its axle, adjusting devices for raising and lowering the gearing-frame on the axle, and a grain-binder mounted on the machine and adjustable toward the front or rear thereof, substantially as and for the purposes specified.

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