No. 686,810. Patented Nov. 19, 1901.

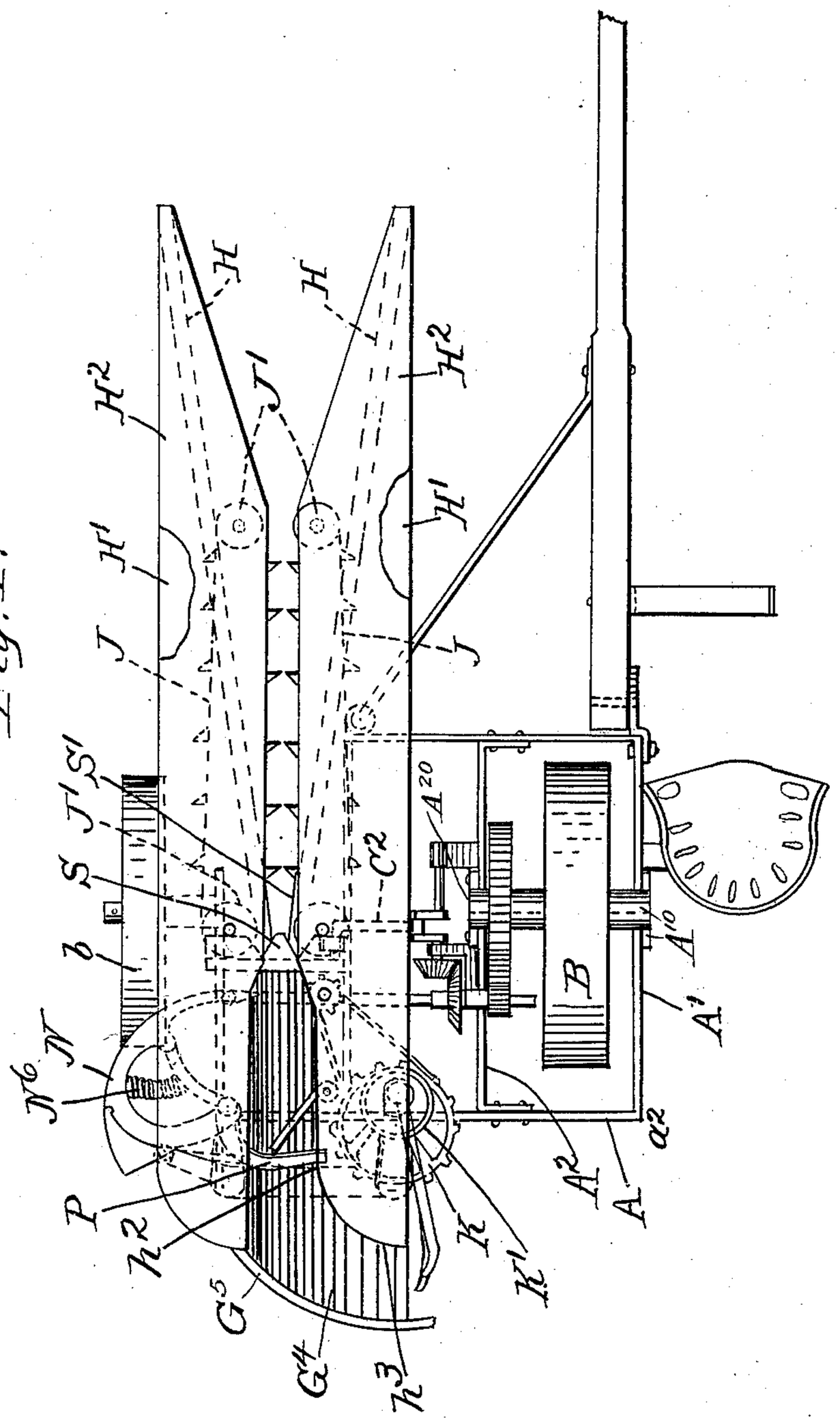
E. M. KELLOGG.

CORN HARVESTER.

(Application filed June 14, 1895. Renewed Mar. 15, 1901.)

(No Model.) 4 Sheets—Sheet 1.

Fig. 1.



Witnesses:
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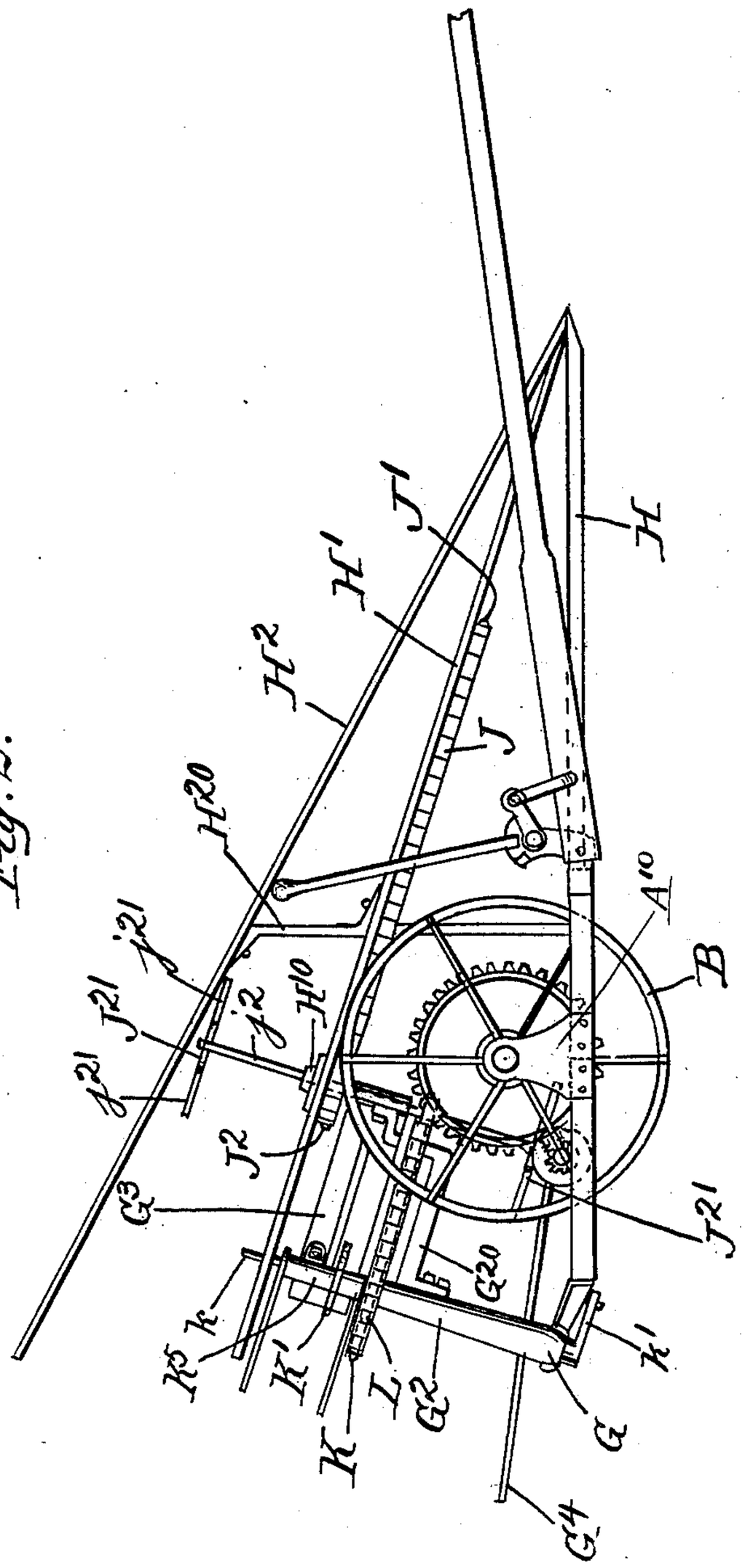
(No Model.) 4 Sheets—Sheet 2.

Fig. 2.



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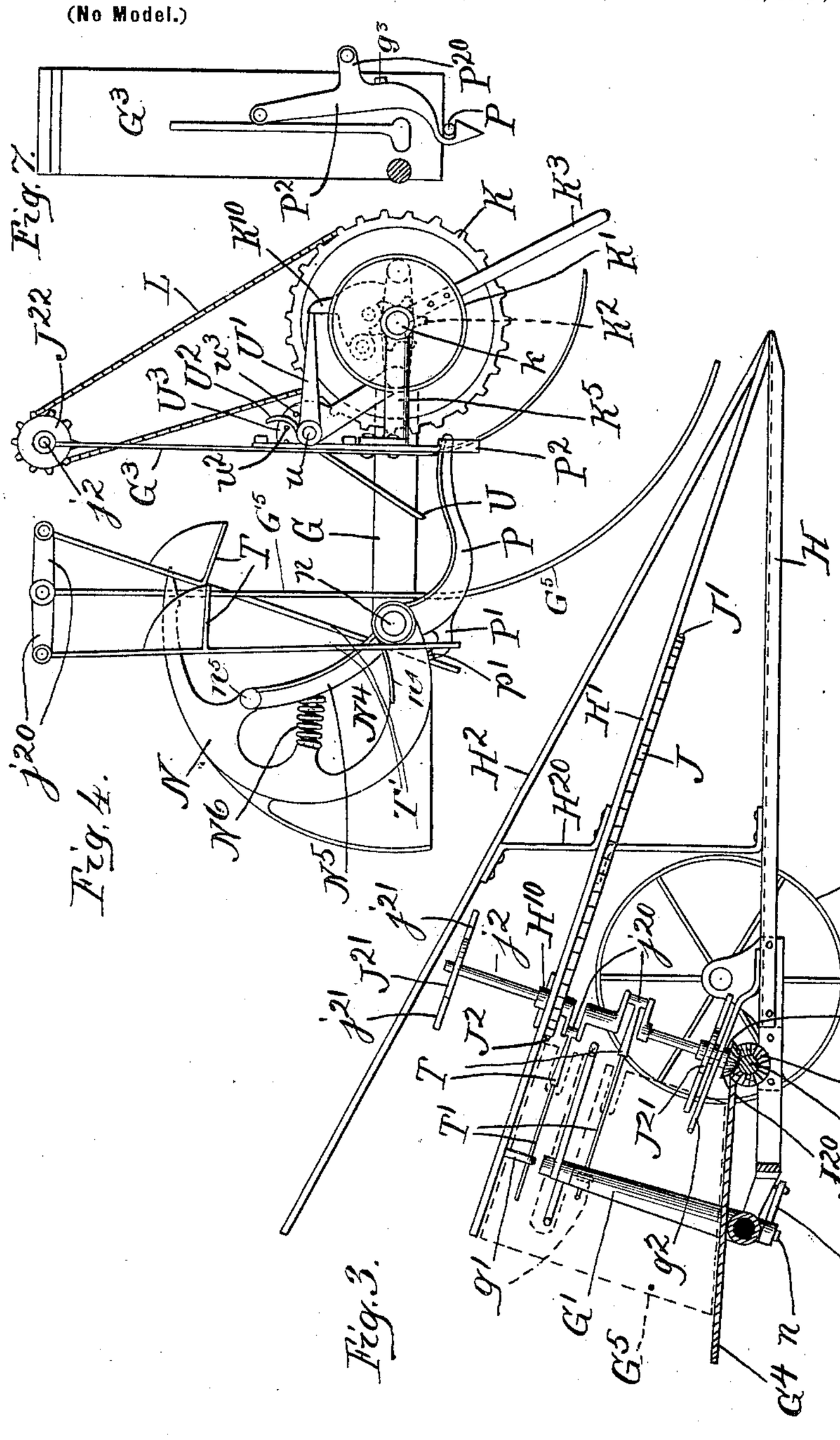
(No Model.) 4 Sheets—Sheet 3.



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(No Model.) 4 Sheets—Sheet 4.

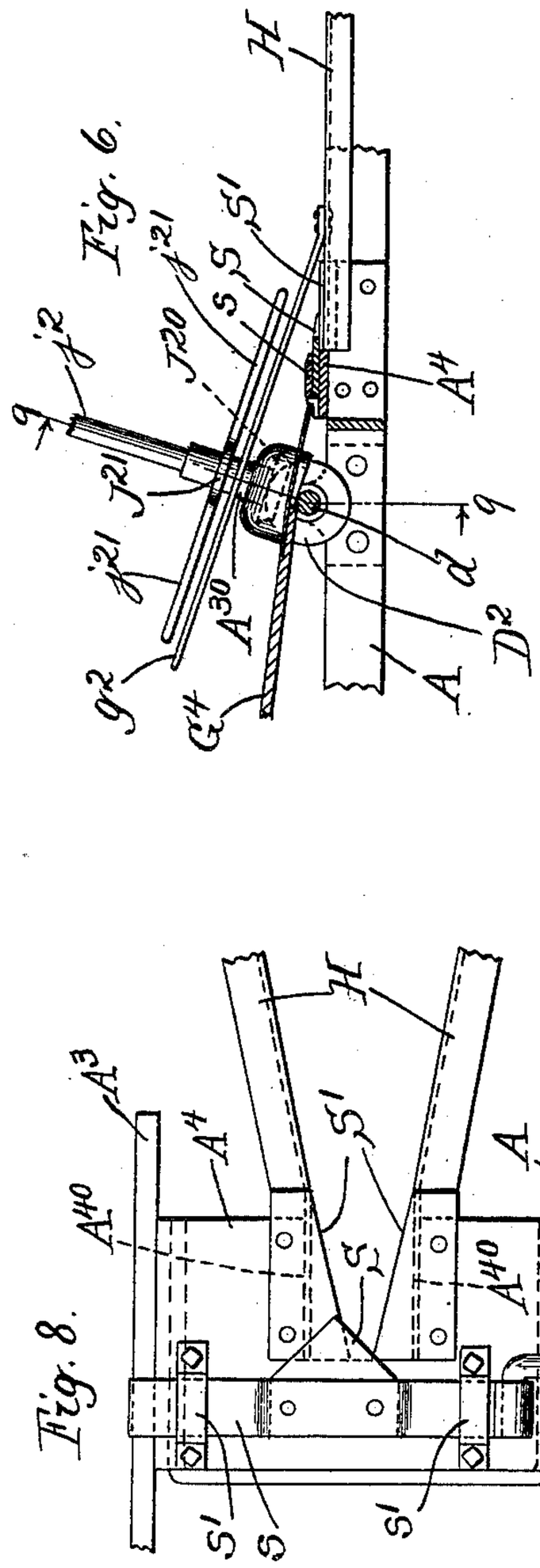

Fig. 6.

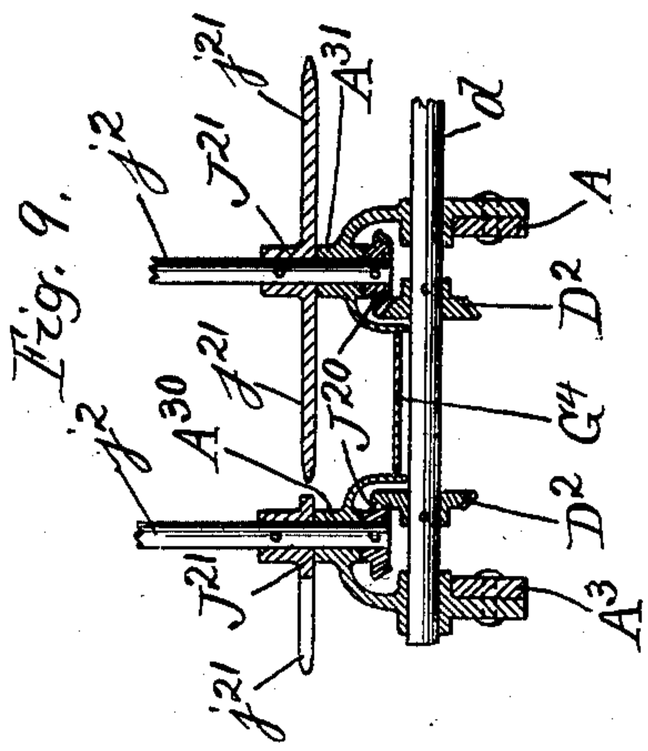

Fig. 9.

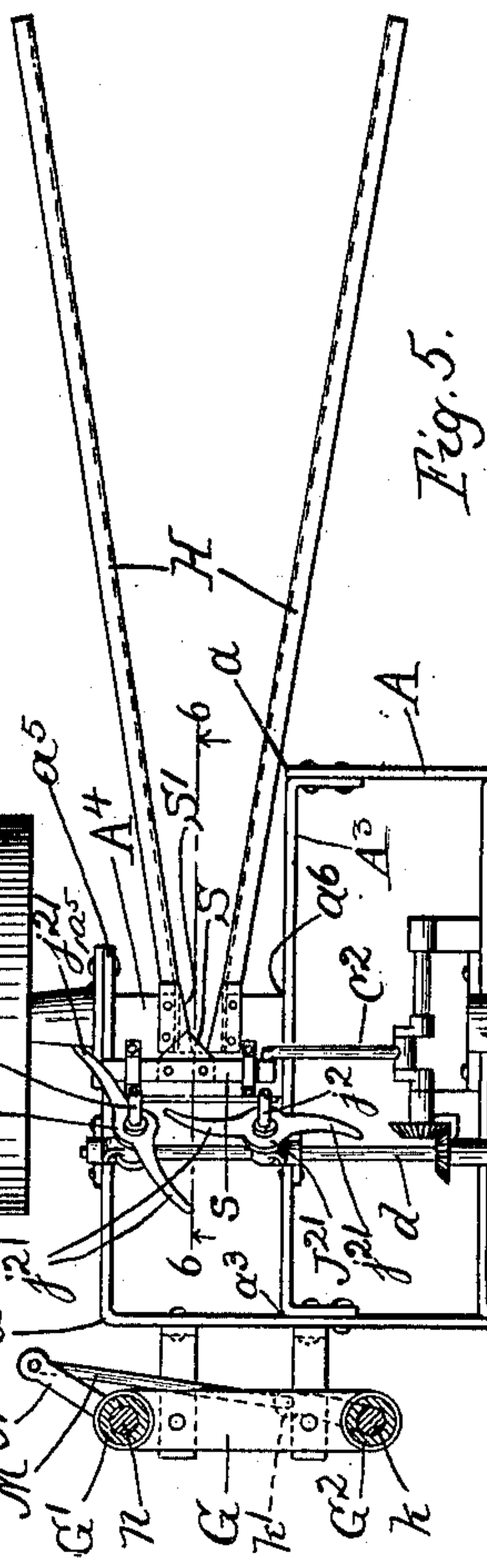

Fig. 5.

Fig. 8.

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UNITED STATES PATENT OFFICE.

EDWIN M. KELLOGG, OF DELAVAN, WISCONSIN, ASSIGNOR OF TWO-THIRDS TO A. P. DICKEY MANUFACTURING COMPANY, OF RACINE, WISCONSIN, A CORPORATION OF WISCONSIN.

CORN-HARVESTER.

SPECIFICATION forming part of Letters Patent No. 686,810, dated November 19, 1901.

Application filed June 14, 1895. Renewed March 15, 1901. Serial No. 51,364. (No model.)

To all whom it may concern:

Be it known that I, EDWIN M. KELLOGG, a citizen of the United States, residing at Delavan, county of Walworth, and State of Wisconsin, have invented certain new and useful Improvements in Corn-Harvesters, which are fully set forth in the following specification, reference being had to the accompanying drawings, forming a part thereof.

The purpose of this invention is to provide an improved machine for cutting and binding Indian corn or maize without prostrating the same and without materially elevating it after it is severed.

It consists of the details and features of construction which are specified in the claims.

In the drawings, Figure 1 is a plan of my improved corn-harvester, certain of the stalk-actuating devices being omitted. Fig. 2 is a stubble side elevation. Fig. 3 is a vertical section fore and aft between the binder-arms looking grainward. Fig. 4 is a detail plan of the binder, the stalk-guard plates of the gatherers being removed. Fig. 5 is a detail sectional plane showing the frame with portions of the mechanism thereon, the binder-frame arms being cut horizontal close to the trunk. Fig. 6 is a detail section at the line 6 6 on Fig. 5. Fig. 7 is a detail elevation showing a latching device for the binder-gate. Fig. 8 is a detail plan showing the sill-plate on which the cutter is mounted and adjacent parts of the frame mechanism. Fig. 9 is a section at the line 9 9 on Fig. 6.

A rigid frame A, which may be made of flat iron bar set edgewise and suitably folded at the corners, supports the mechanism and is supported by two wheels B b, the former being the traction or drive wheel and the latter being a mere carrying-wheel at the inner or grainward side of the machine. The frame A comprises two rectangles, one whose corners are at a, a', a^2, and a^3 and the other whose corners are at a^3, a^4, a^5, and a^6. Commencing at a I extend the bar across the front, forming the part referred to as the "front sill," to the corner a', thence rearward to the rear stubbleward corner a^2, thence grainward to the corner a^4, forming the rear sill, and thence to a^5. The fore-and-aft bar A^3 is then extended from the front sill, to which it is attached at the corner a, to the rear sill at the corner a^3 of the larger rectangle, the bar being suitably secured to the front and rear sills in any reliable manner, as by folding a portion at each end of the bar at right angles and bolting to the sills, respectively. The cutter-sill A^4, which forms the forward side of the smaller rectangle, is made of metal plate about eight inches wide and folded down at each end to form lips which seat against the bar A^3 at the stubbleward end of said cutter-sill and against the end portion of the bar A at the corner a^5 of the smaller rectangle. A fore-and-aft bar A^2, suitably folded and bolted to the front and rear sill portions of the frame A, partitions off from the stubble side of the frame A a portion which may be called the "traction-wheel frame," within which said traction-wheel is located, being journaled in the upper ends of brackets A^{10} A^{20}, which are bolted, respectively, to the outer side bar A' of the frame A and to the intermediate bar A^2 just described.

Rigid with the frame are the rigid gatherers, which project forward from the smaller rectangle. The cutter-sill A^4 is recessed at the middle part of its length, and the two lateral edges A^{40} A^{40} of the recess are depressed to form a shallow seat, which is adapted to receive the horizontal lip or flange of the angle-iron sills H H of the gatherers. These angle-iron sills are secured in this manner with their horizontal flanges lodged in the seat thus formed at the edges of the recess in the cutter-sill, so that they are flush with the surface of that sill, the vertical lips of the bars H extending downward and facing each other. These bars H H extend from their points of fastening to the cutter-sills, as described, forward a few inches, parallel with each other. They then diverge equally from a fore-and-aft line and extend still forward several feet, being at their foremost edges separated about twenty-four inches or far enough to admit the most widespread hill of cornstalks likely to be encountered. The gatherer further comprises the plates H' H', which are secured

at the forward ends of the bars H H, respectively, and extend thence rearward with an upward inclination overhanging at their rear ends the binder mechanism. These plates at their forward ends are tapered by cutting away their proximate edges for a distance of twenty-four inches or thereabout, so that although at their forward ends they are separated at least twenty-four inches at the end of the taper they are separated not more than three or four inches, their proximate edges being parallel from the end of the taper rearward to a point over the cutter or sickle. From that point rearward they are again cut away at their proximate edges for a few inches, widening the space between them to six or eight inches, the edges continuing parallel across the space to be occupied by the bundle during binding—that is to say, to about the point h^2, which is the position of the gate, hereinafter described, which closes the bundle-space at the discharge side, and from that point stubbleward the plate H′ is cut away in a curve and terminates in the curved end h^3. The other plate H′ may terminate abruptly at about the same rearward position. These plates may be braced to the main frame A at any convenient position. Above the plates H′ H′ are guards H^2 H^2, which extend from the forward points of the gatherers, respectively, obliquely upward and rearward and toward a vertical plane which bisects the space between the gathering-points until said guards are as close together as the plates H′ H′ above the sickle, and thence extending farther rearward the guard-arms H^2 are parallel. They are supported by brackets H^{20} H^{20}, mounted on the plates H′ H′, in addition to the fastening which they obtain at the forward points of the gatherers. The sickle consists of a single V-shaped blade S, mounted on a suitable bar *s*, which is guided in the bearings *s′ s′*, mounted on the top of the cutter-sill at opposite sides of the recess in said sill, above described, and reciprocated by the pitman C^2, as already stated. To cooperate with this sickle-knife, I mount on the sickle-sill fixed knives S′ S′, whose proximate edges converge toward the rear at the middle of the recess in the sickle-sill, said edges extending a considerable distance forward of the edges A^{40} A^{40} of the recess along the upper edge of the bars H H, which they overhang. The sickle-knife S rests upon the upper surface of these fixed knives S′ S′ and pass across the angle between them, coöperating with them alternately to reach the stalks of corn as it reciprocates. The long slope of the cutting edges of the knives S′ adapts them to sever the standing stalks with a drawing cut as the machine advances over the field, so that the work left for the reciprocating cutter to do is reduced to a minimum, the stalks being frequently more than half severed by the drawing cut of the fixed knives as the machine travels before the work of the reciprocating knife is required. On the under side of the plates H′ H′ are mounted endless carriers consisting of toothed chains J J, driven around sprocket-wheels J′ J′, journaled on studs projecting from the under side of the plates H′ near the point where the proximate edges of said plates become parallel, said chains being driven by sprocket-wheels J^2 J^2 on the forwardly-inclined shafts j^2 j^2, located one upon each side of the path of the corn as it passes through the machine. Said shafts j^2 are journaled at their lower ends in step-bearings in the brackets A^{30} A^{31}, respectively, mounted on the frame A and extended upward with a forward inclination. The brackets A^{30} have horizontal bearings also for the shaft *d*, above mentioned, which extends through said brackets, and adjacent to said step-bearings has beveled gears D^2 D^2, which mesh with the beveled gears J^{20} J^{20} on the shafts j^2 j^2, respectively, to rotate said shafts in opposite directions—that is, so that they have the same direction in their proximate sides. The shafts j^2 j^2 beside the step-bearings in the brackets A^{30} A^{31} have suitable bearings H^{10} H^{10}, mounted on the plates H′. The teeth of the chains J J protrude beyond the proximate edges of the plates H′ H′, so that they are adapted to engage the stalks which may be entered between those plates and feed them rearward to a point above the sickle, and for the purpose of further feeding the stalks rearward and controlling them properly the shafts j^2 j^2 are provided each with two toothed disks J^{21} J^{21}, one near the lower bearings, respectively, and one near the upper ends, respectively, of said shafts. The fingers j^{21} j^{21} of the lower disks sweep over the sickle, and the upper disks revolve close under the upper guard-bars H^2 H^2 of the gathering-arms, the two disks at each level being timed so that their teeth do not interfere. These toothed disks all tend to reel the stalks in rearward while they are still retained between the proximate edges of the plates H′ H′, which are between the levels of the upper and lower disks J^{21} J^{21}. The arms H^2 serve the purpose of stripping the stalks off the fingers of the upper disks, and for the purpose of suitably stripping the lower disk-fingers I provide a guard g^2, which extends from the binder-frame and coincides substantially with the vertical plane of the edge of the plate H′, which overhangs the disk J^{21} at that point.

The binder-frame is of familiar U shape, having its arms upstanding and inclined forward.

In the arm G^2 of the binder-frame the main binder-shaft *k* is journaled, having at the lower end, where it protrudes from the binder-frame, the needle-operating crank *k′*, and loose on it at the upper end of the arm G^2 of the binder-frame the sprocket-wheel K, which is driven by a chain L, deriving power through a sprocket-wheel J^{22} on the shaft j^2, the inclination of said shaft being the same as that of the binder-frame arms and shafts journaled therein. The knotter cam-wheel K′ is

fast on the shaft *k* immediately above the sprocket-wheel K, and upon the back or under side of the knotter cam-wheel the clutch-dog K^{10} engages with the clutch-hub K^2 on the upper side of the sprocket-wheel K. I have thus brought the prime sprocket-wheel of the binder mechanism and the tier cam-wheel into such proximity that they form the two members of the clutching device, through which power is transmitted to the binder, and which being disengaged leaves the binder inactive, while the sprocket-wheel runs continuously. The specific style of the dog and clutch-rim shown are familiar, and any suitable familiar device may be employed at this point for the purpose. The needle N is driven in the customary manner by a link M, connected by a crank-arm *k'*, said link extending across the bundle-space underneath the deck G^4 and connected to the crank-arm N' of the needle rock-shaft *n*. The breast plate G^3 is supported by a bracket G^{20}, rigid with the binder-frame arm G^2, and it is sleeved onto the shaft j^2 and attached to the knotter-frame K^5, which is sleeved in the customary manner on the shaft *k*. On the needle rock-shaft there is pivoted an arm P, which operates as an outer gate, bounding the bundle-space at the discharge side and affording resistance against which the bundle is packed.

P^2 is a latch pivoted to the breastplate, provided with a hook-nose adapted to engage the end of the gate P when the latter is swung into closed position. This latch is adapted to operate by gravity to engage the gate, being stopped in suitable position by a projection g^3 on the breastplate, and it has a tail P^{20}, which projects into the path of the discharge-arm K^3, which revolves with the shaft *k* in the customary manner just as said discharge-arm reaches a position at which it begins to engage the bundle, and the said discharge-arm pressing said tail disengages the latch from the gate P and permits the latter to drop back out of the way of the bundle while the bundle is being ejected. The tail P', extending from the arm P, is adapted to bear upon the back of the needle at *p'*, so that when the needle retreats the gate is swung around into the position closing the bundle-space at the discharge side, as seen in Fig. 1. The deck G^4 is a plate or sheet which extends above the trunk of the binder-frame G and terminates with its upper surface substantially flush with the upper surface of the knife S and abutting close against the rear edge of the latter. At ordinary position of the machine in operation the deck G^4 is designed to be substantially horizontal, though of course the machine may be tilted down at the forward end, so as to give this deck a slight upward inclination at times; but it is not designed to have the effect of elevating the stalks as they are carried rearward upon it.

For the purpose of gathering the stalks at the grainward side after they are severed and during binding a plate G^5, which corresponds to the deck in an ordinary horizontal binder, is secured to the arm G' of the binder-frame, said arm being provided with the lugs sufficiently extended to hold such plate rigidly without other support. This plate extends forward toward the guard-shaft j^2 and is suitably slotted to permit the packer-driving cranks and the packers themselves to play through it to feed the stalks rearward.

For the purpose of advancing the stalks rearward after they are severed and accumulating them into a bundle ready for binding I employ packers T T, which are actuated by cranks j^{20} j^{20} on the grainward of the shafts j^2, the movement of the packers being controlled by guiding-fingers T', which constitute the rear terminals of said packers, said fingers sliding in eyes *g' g'* on the arm G' of the binder-frame in which the needle rock-shaft is journaled. The action of the packers thus driven and controlled will be well understood without further description.

Stubbleward of the breastplate in suitable bearings formed thereon I provide the short vertical rock-shaft *u*, having an arm U, which projects past the plane of the breastplate into the bundle-space and receives the pressure of the stalks as they accumulate between the stubbleward guard and the breastplate. Another arm U' of the rock-shaft projects into the path of the clutch-dog K^{10}. A spring U^2 is coiled about the rock-shaft and has one end stopped against the arm U' and the other end by the pin u^2, which may be set in any one of the holes u^3 in the segment-flange U^3, which projects from the bracket in which the rock-shaft *u* is journaled, and this spring determines by its tension the pressure necessary to be produced by the accumulated stalks on the trip-arm in order to disengage the arm U^2 from the dog, and thereby cause the latter to bring the binding mechanism into action, and the tension of the spring is determined by the position of the pin u^2 in one or another of the holes u^3.

I employ no "compressor," in the ordinary sense in which that term is used in grain-binders; but having provided the gate P to receive the pressure of the stalks as they are packed into the binder I provide for the necessary elastic compression of the bundle in binding by recessing the needle-arm deeply, as seen at N^4, and pivoting to it at n^5 an arm N^5, which is adapted to swing back into the recess N^4, a spring N^6 being interposed to resist such movement of the arm N^5, permitting it only under pressure. The edge n^4 of the recess N^4 is shaped in the arc of a circle about the point n^5, and the end of the arm N^5 as it swings follows said edge. As the needle advances upon the stalks which have been fed by the packers against the gate P in quantities sufficient to operate the trip U the arm N^5 yields back against the spring N^6, the ten-

sion of which determines the compactness which the bundle will have when the needle has completed its stroke.

By placing the binder-shafts in the inclined position described — leaning forward — the stalk-actuating arms in their forward sweep to engage the stalks are caused to take hold of the latter at a lower point than if their sweep were horizontal, and as they move rearward actuating the stalks they move upward along the stalks, thereby tending by friction and by engagement with the leaves and ears in some cases to lift the stalks a little, so that the butts do not drag on the binder-floor and are not held back on that account, but are easily moved rearward in their normal upstanding position into the bundle-space of the binder. I thus overcome the tendency which is always more or less of a hindrance to smooth operation—to wit, the tendency to prostrate the stalks in the process of carrying them rearward into the binder and the partial prostration of some of the stalks in each bundle, which, dragging at the butts and leaning at the heads against the accumulation of stalks ahead of them make the bundle uneven at the butts and further compel the needle to bend them and sometimes even to break them in compacting the bundle. Another important advantage is gained by the inclination of the binder-shafts and the oblique sweep of the binder-arm in that the binder arm or needle in its forward sweep penetrates the incoming stream of stalks so low that it is not liable to encounter any ears of corn, but, on the contrary, is quite certain to pass freely between the stalks and cleanly to separate from the incoming stalks the proper quantity for the bundle. Having thus penetrated the stream, its rearwardly-inclined movement causing it to slide upon the stalks, as above mentioned, hanging ears are likely to be lifted and not encompassed by the band, which is, on the contrary, passed about the stalks below all ears, and if in exceptional cases there are ears so low that the band would ordinarily encompass them the stalks having such ears are likely to be lifted a little when the needle engages underneath the ear, so that even in these instances the band is placed below the ear. It is obviously desirable that the needle should encircle the stalks by a movement as nearly as possible at right angles to their length, and since it is desirable for the reasons above explained that the sweep of the needle should be inclined it becomes desirable that the stalks should be delivered within reach of the needle correspondingly inclined, so that the needle may sweep directly across their length to take them. For this reason I make the devices which bring the stalks over the cutter and deliver them within the sweep of the arms operated by the inclined binder-shafts, so that they deliver the stalks in such inclined position. I accomplish this by making the delivery-point of the devices which actuate the butts farther rearward than the delivery-point of the devices which actuate the heads. Thus it will be noticed that while the delivery-point of the gatherer-chains J J is about vertical above the cutter the delivery-point of the toothed disks J^{21} J^{21} is considerably rearward of the cutter. As nearly as possible I intend that the stalk delivered by these two devices at the instant that it gets beyond their reach at the butts and at the upper part, respectively, shall be inclined substantially as much as the binder-shafts. Of course it will be understood that exactness in this respect is not attained nor necessary. By making the shafts which drive the gatherer-chains and which are necessarily inclined in order to drive said chains in the oblique direction desirable for the purpose of gathering parallel with the binder-shafts the driving-train is greatly simplified, because it is rendered possible to drive directly from the inclined conveyer-shafts to the binder without intermediate mechanism to change the direction.

It will be noticed that the drive-wheel is located at a position which brings its axle forward of the vertical plane of the cut. This of course prevents extending the axle across the plane of the cut. By locating it thus far forward I am able to reduce the space between the sickle and the binder to a minimum, so that the stalks have the shortest possible distance to travel after they are cut before they are bound. It will be noticed also that the binder is driven from the upper end and that the clutching mechanism is on the knotted cam-wheel, the clutch-dog being pivoted to said wheel and immediately below it. It will be noticed also that I employ no compressor or arm operating at the discharge side of the bundle to compress the bundle during binding, and that the gate, which occupies the position usually occupied by such compressor, is operated and released without any mechanism except such as can be located at the upper end of the binder-frame. The location of the clutch mechanism at the upper or knotter end of the frame permits the location of the very simple tripping devices which are necessary at the same position. All of these features I have adopted to avoid the necessity of mechanism at the lower end of the binder-frame, where it will be observed that the only moving parts are the crank-arms and link concerned in the transmission of the movement from the main binder-shaft to the needle rock-shaft. It will be noticed also that even these parts operate in the angle that is formed between the plane of the main frame produced rearward and a plane at right angles to the binder-frame arms, which are tilted forward, so that not even these parts project below the plane of the main frame A. The avoidance of mechanism at the lower end of the binder-frame is for the purpose of avoiding the necessity of elevating the deck or making it necessary to elevate the stalks

in order to pass them over such mechanism as has been more frequently located at the bottom of the binder-frame in all attempts to bind corn without prostrating it.

I claim—

1. In a corn-harvester in combination with mechanism adapted to gather the stalks and feed them rearward with respect to the machine to a point above the cutter; the cutter adapted to sever the stalks while upstanding; and a binder located rearward of the vertical plane of the cutter having its binding-arm operating in a plane inclined upward from front to rear throughout all operative positions of the machine.

2. In a corn-harvester in combination with mechanism adapted to gather the stalks and feed them rearward relatively to the machine to a point above the cutter; the cutter adapted to sever the stalks while upstanding; and a binder located rearward of the vertical plane of the cutter having its floor substantially horizontal throughout its entire extent, and its binding-arm operating above such floor in a plane inclined upward from front to rear.

3. In a corn-harvester in combination with mechanism adapted to gather the stalks and feed them rearward relatively to the machine to a point above the cutter; the cutter located under the rearward portion of the path of such gathering mechanism; a binder located in the rear of the vertical plane of the cutter having the shaft of its binding-arm inclined forward at all operative positions of the machine, and its binding-arm which engages the stalks to encompass them in a bundle, operating against the same rearward with an upward inclination.

4. A corn-harvester in combination with gathering mechanism, a cutter located under the rearward portion of the path of such gathering mechanism; a binder located in the rear of the vertical plane of the cutter having its floor substantially horizontal throughout its entire extent, and its binding-arm which encompasses the stalks to form a bundle, operating rearward with an upward inclination above the binder-floor.

5. In a corn-harvester in combination with a cutter, stalk-gathering devices operating from a point forward of the cutter to a point above the same and adapted to engage the stalks above the butts; butt-actuating devices operating immediately above and in the rear of the cutter, the rearward limits of the operation of said devices upon the stalks being, at all operative positions of the machine, in a line which is inclined forward; and a binder located rearward of such forwardly-inclined line and having the shaft of its binding-arm journaled at substantially the inclination of such line.

6. In a corn-harvester in combination with a cutter, stalk-gathering devices operating from a point forward of the cutter to a point above the cutter, and adapted to engage the stalks above the butts, and butt-actuating devices operating immediately above and in the rear of the cutter, the rearward limits of the operation of said devices upon the stalks being in a line which is inclined forward with respect to a line at right angles to the plane of the binder-floor; and a binder situated rearward of such line and having its operating-shafts similarly inclined with respect to its floor.

7. In a corn-harvester in combination with a cutter, gathering-arms projecting forwardly from the cutter-sill, endless conveyer-chains operating along such gathering-arms in a path which at all operative positions of the machine, is inclined upward from front to rear; driving the shafts for such conveying mechanism which are correspondingly inclined; and a binder located at the rear of the conveying mechanism having the shaft of its binding-arm journaled at substantially the same inclination as the driving-shaft of the conveying mechanism, and having its floor substantially or approximately horizontal.

8. In a corn-harvester, in combination with a cutter, gathering-arms projecting forwardly from the cutter-sill; endless conveyer-chains operating along such gathering-arms in a direction inclined downwardly in front; driving-shafts for such conveying mechanism inclined forward with respect to the binder-floor, the binder located in the rear of such conveying mechanism and having its operating-shafts similarly inclined with respect to its floor; substantially as set forth.

9. In a binder, in combination with the binder-frame; the tier-cam-wheel shaft journaled therein and the tier cam-wheel on said shaft; a continuously-driven wheel loose on said shaft at the same end of the frame-arm in which said shaft is journaled as the tier cam-wheel; and clutching mechanism adjacent to said continuously-driven wheel adapted to clutch it to said shaft.

10. In a corn-harvester, in combination with the main frame, the driving-train mounted and operating on such main frame, a U-shaped binder-frame mounted on the main frame with its arms upstanding; a tier-cam-wheel shaft journaled on one of said binder-arms, and a power-communicating wheel loose on said shaft at the upper end of said arms and means for communicating motion to said wheel from the driving-train on the harvester-frame, and clutching mechanism adjacent to said loose wheel adapted to clutch the same to the shaft.

11. In a binder for a corn-harvester, in combination with the binder-frame, a continuously-driven wheel on the binder-frame; a shaft journaled on the binder-frame and having said continuously-driven wheel journaled loosely on it; the tier cam-wheel fixed on said shaft, and clutching mechanism on said shaft adapted to connect the tier cam-wheel

and the continuously-driven wheel, said shaft having no journal-bearing on the frame between the wheels.

12. In a binder for a corn-harvester adapted to bind the corn upstanding, in combination with the binder-frame; the tier-cam-wheel shaft journaled therein and the tier cam-wheel on said shaft; a continuously-driven wheel loose on said shaft at the same end of the frame-arm in which said shaft is journaled, as said tier cam-wheel; clutching mechanism which operatively connects said continuously-driven wheel to the shaft; a yielding trip-arm supported on the binder-frame and protruding into the path of the bundle through the binder; an arm connected to and moving with said trip-arm, and protruding normally in the path of the clutch-dog and constructed and arranged to be moved positively out of said path by the movement of the trip-arm which is caused by the pressure of the accumulating bundle.

13. In a binder for a corn-harvester adapted to bind the corn upstanding, in combination with the binder-frame, the shaft of the tier cam-wheel journaled in an upstanding arm of such frame; a continuously-running wheel journaled on said shaft at the upper end of said arm, and clutching devices which connect the continuously-running wheel operatively to the tier cam-wheel: substantially as set forth.

14. In a binder for a corn-harvester adapted to bind the corn upstanding, the tier-cam-wheel shaft journaled in the binder-frame and the tier cam-wheel thereon; a continuously-driven wheel loose on said shaft below the tier cam-wheel, and clutching mechanism interposed between said continuously-driven wheel and the tier cam-wheel adapted to connect the two, said shaft having no journal-bearing between said wheels: substantially as set forth.

15. In a binder for a corn-harvester adapted to bind the corn upstanding, in combination with the tier-cam-wheel shaft, a continuously-driven wheel and a tier cam-wheel to which the same is clutched, both located on said shaft at the upper end of the frame-arm on which the latter is journaled, the clutching mechanism which connects said wheels, a rock-shaft mounted on the binder-frame at the same side of the path of the bundle as said wheels and clutching mechanism; an arm of said rock-shaft which protrudes normally into the path of the bundle, and a second arm which stands in the path of the clutch-dog; the movement of said rock-shaft caused by the pressure of the bundle against the first arm forcing said arm out of the path of the bundle being such as to carry the other arm out of the path of the clutch-dog; and suitable means for restoring said shaft and its arms to normal position; combined and operating substantially as set forth.

16. In a binder for a corn-harvester adapted to bind the corn upstanding, in combination with a rigidly-locked gate at the discharge side of the bundle-space; a trip which protrudes into such space and is adapted to yield laterally with respect to the path of the bundle when pressed thereby; the tier-cam-wheel shaft, the clutched wheels on said shaft at the upper end of the frame-arm on which the latter is journaled, and the clutching mechanism which connects them, and an arm connected to and moving with said yielding trip-arm and adapted to stand normally in the path of the clutch-dog and to be moved out of said path by the lateral movement of the trip-arm yielding to the pressure of the bundle: substantially as set forth.

17. In a corn-harvester in combination with means for cutting the corn and moving it rearward upstanding the binder having the continuously-driven wheel which actuates it and the wheel to which the same is clutched located on the tier-cam-wheel shaft at the upper end of the bearing, the clutch mechanism which connects said wheels, laterally-yielding trip-arm, and an arm connected thereto and moving therewith which projects normally into the path of the clutch-dog and is moved out of such path by the lateral movement of the trip-arm produced by the pressure of the bundle; a gate at the discharge side of the bundle: adapted to be locked, and when locked to constitute an unyielding stop for the stalks, whereby the pressure of the stalks is caused to actuate the laterally-yielding trip-arm; and the needle or binder arm having an elastically-yielding arm which presses the stalks as the needle advances against them; and suitable means for unlocking the gate after the bundle is bound.

18. In a corn-harvester, in combination with means for cutting the corn and moving it rearward upstanding, a binder comprising, in combination, a gate fulcrumed on the frame at the side of the bundle's path at which the needle rock-shaft is located and adapted to be swung across said path at the discharge side; and a latch or catch for said gate on the breastplate or knotter side of the path, and suitable means operated by the tier cam-wheel for disengaging said latch to permit the gate to open to discharge the bundle: substantially as set forth.

19. In a binder for a corn-harvester, in combination, a gate loosely journaled on the needle rock-shaft and adapted to be closed by the needle when the latter retreats; a latch on the breastplate adapted automatically to engage the gate when the latter is closed, and a projection on the tier cam-wheel which operates the latch to release the gate at the discharge of the bundle: substantially as set forth.

20. In a corn-harvester, in combination, a gate fulcrumed at the needle side of the bundle-space and adapted to close said space at the discharge side; a latch on the breastplate adapted automatically to engage the gate when closed, said latch having an abutment which stands normally in the path of

the discharge-arm and is engaged thereby to disengage the latch from the gate when the discharge-arm commences to eject the bundle: substantially as set forth.

21. In a binder for a corn-harvester, in combination with a gate at the discharge side adapted to be rigidly locked, the latch which detains the gate fulcrumed on the breast-plate and having a projection extending into the path of the discharge-arm, said discharge-arm being adapted when it encounters the bundle in its discharge movement to encounter said projection and disengage the latch.

22. In combination, substantially as set forth, the gate P fulcrumed on the needle rock-shaft and adapted to be actuated by the needle to close the bundle-space as the needle retreats; the latch P^2 pivoted on the breast-plate and having its nose normally in position to be encountered and pushed aside by the closing gate and to engage and lock the gate when fully closed, and having the abutment P^{20} in the path of the discharge-arm, said discharge-arm being adapted to engage said abutment and unlatch the gate when it commences to eject the bundle: substantially as set forth.

In testimony whereof I have hereunto set my hand, in the presence of two witnesses, at Chicago, Illinois, this 11th day of June, 1895.

EDWIN M. KELLOGG.

Witnesses:
CHAS. S. BURTON,
JEAN ELLIOTT.