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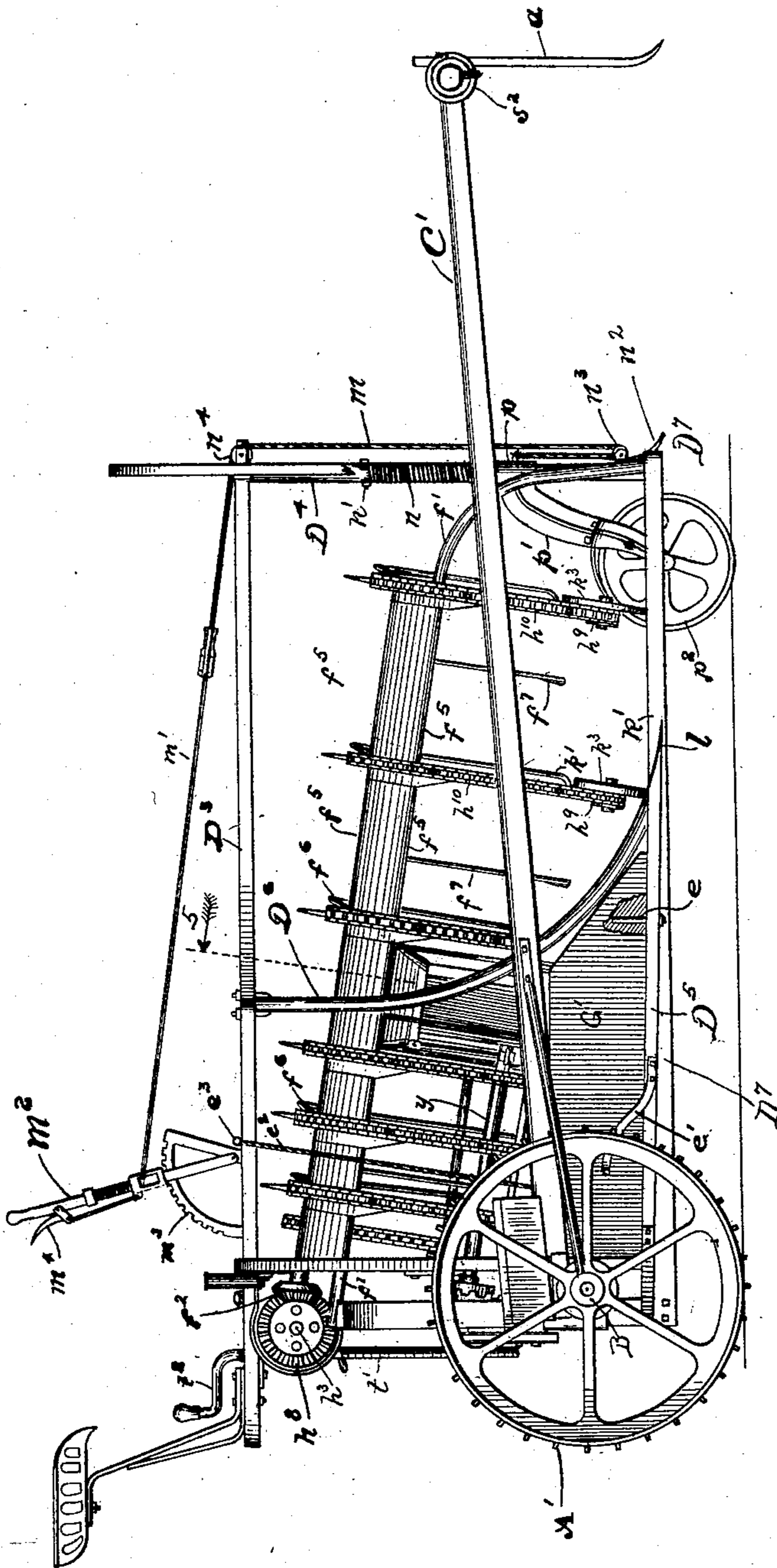
4 Sheets—Sheet 1.

D. T. PHILLIPS.
CORN HARVESTER.

No. 605,650.

Patented June 14, 1898.

Fig. 1.



Witnesses
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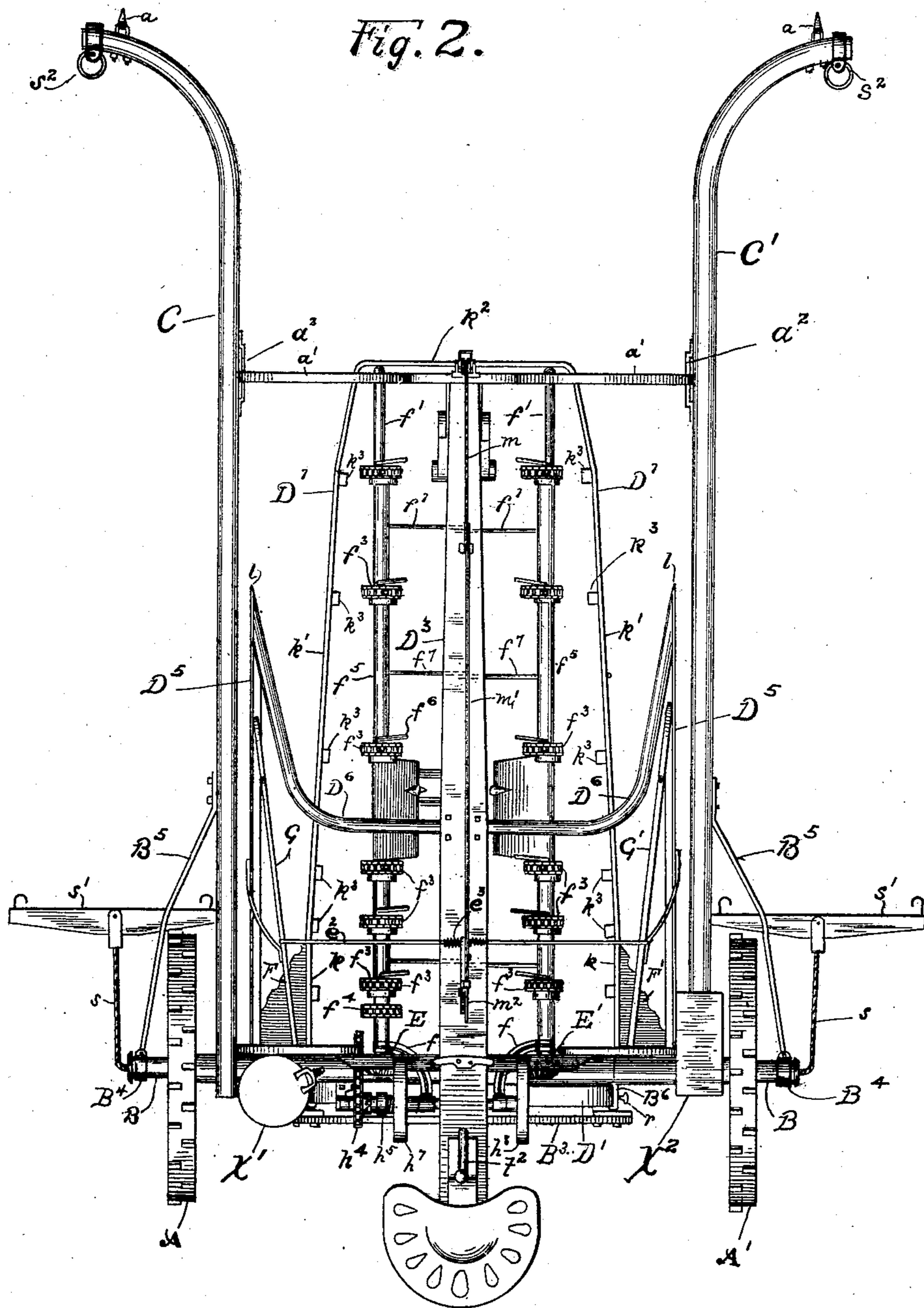
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D. T. PHILLIPS.
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(No Model.)

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D. T. PHILLIPS.
CORN HARVESTER.

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Fig. 3.

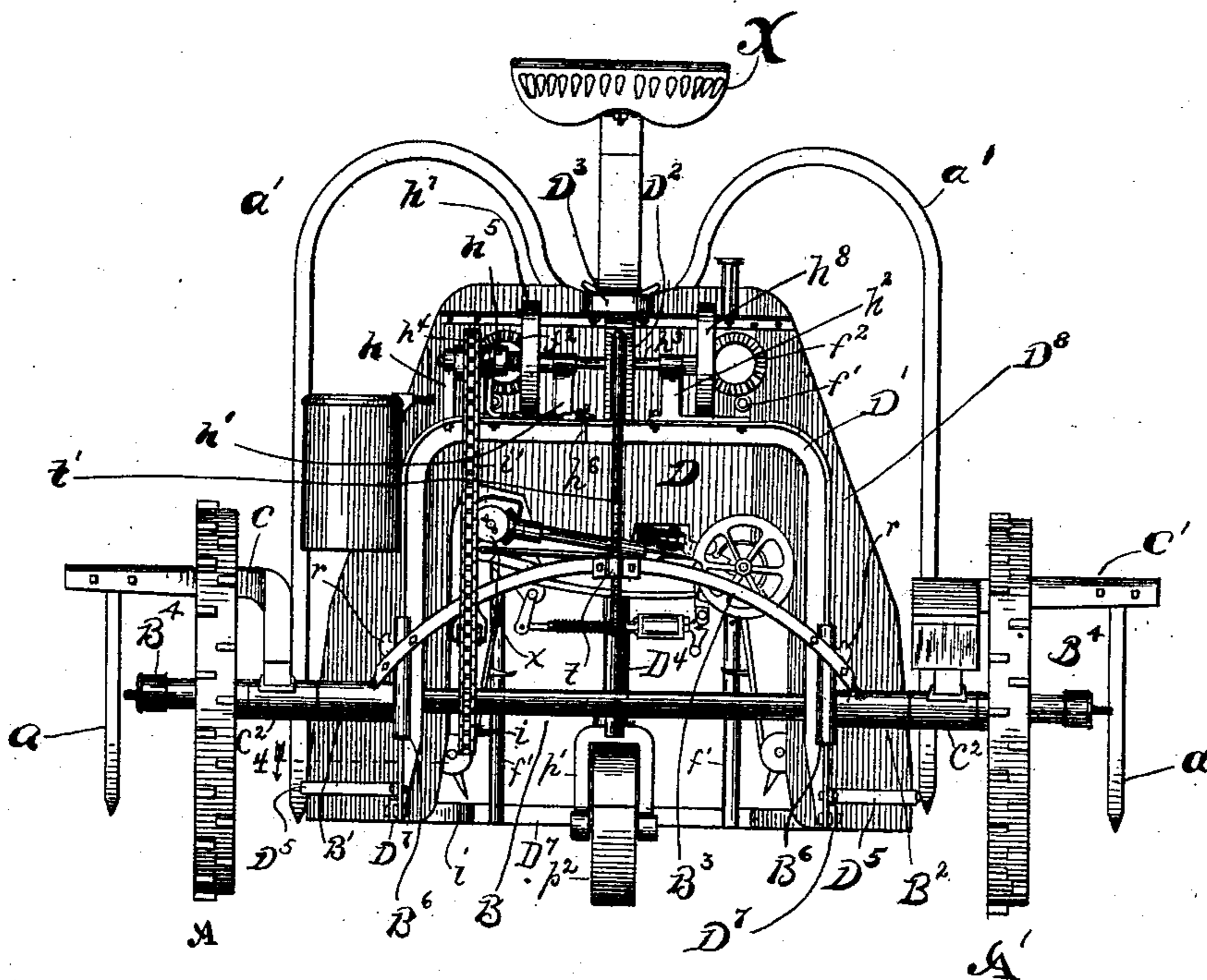
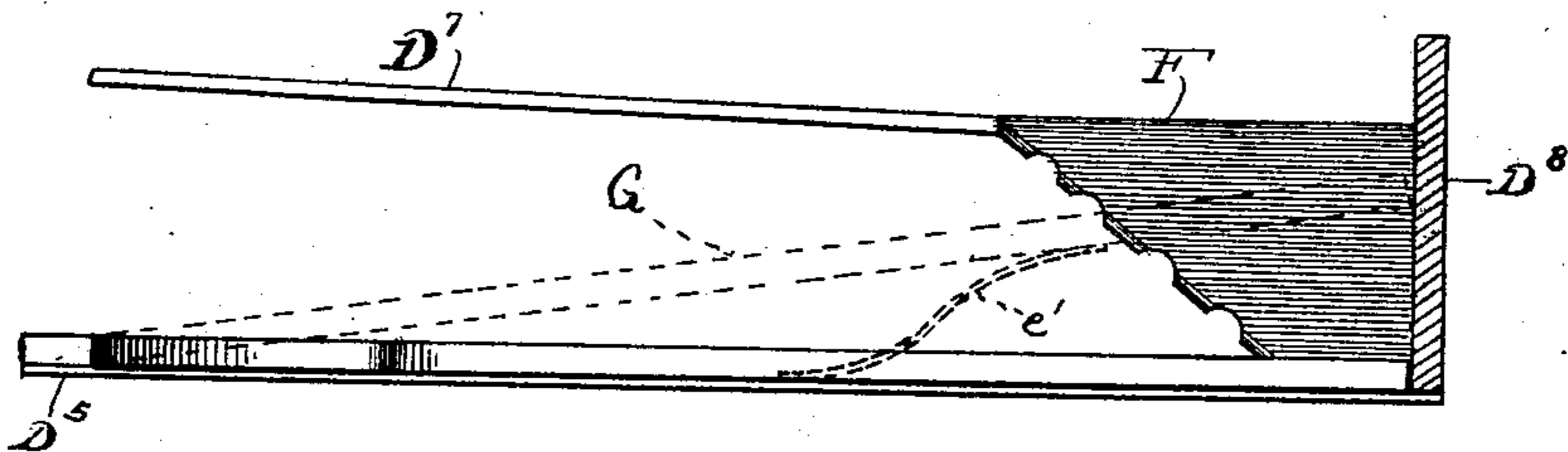


Fig. 4.



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4 Sheets—Sheet 4.

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Fig. 5.

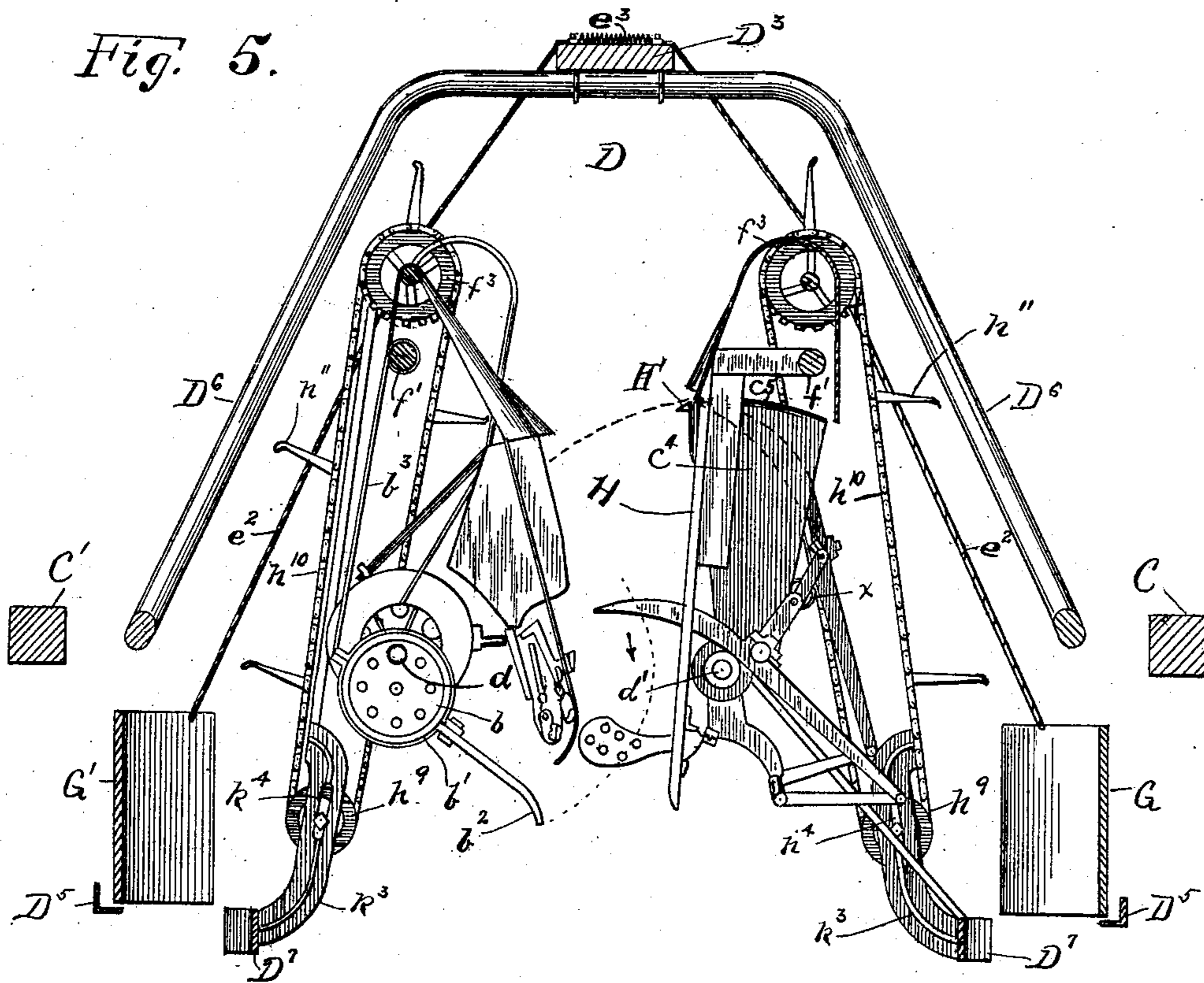


Fig. 6.

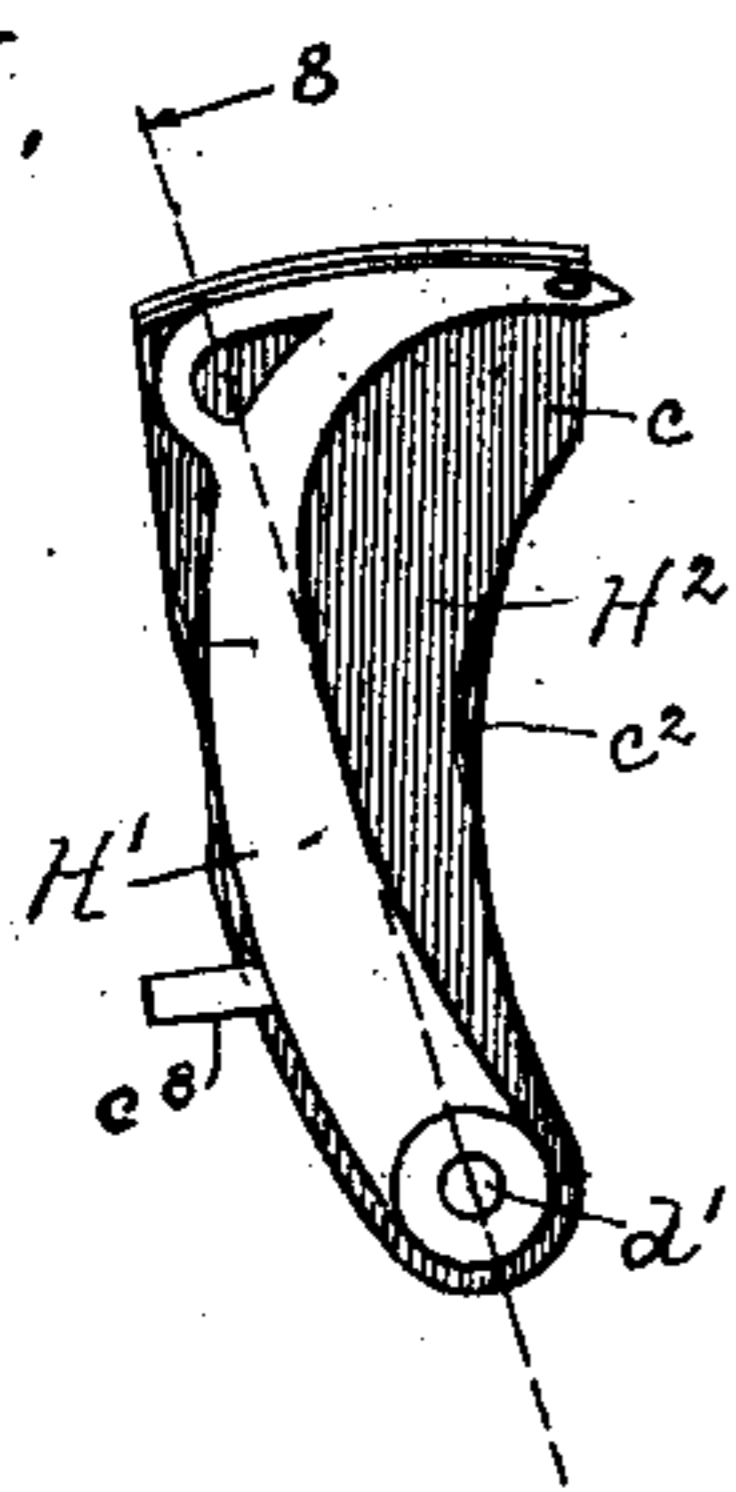


Fig. 7.

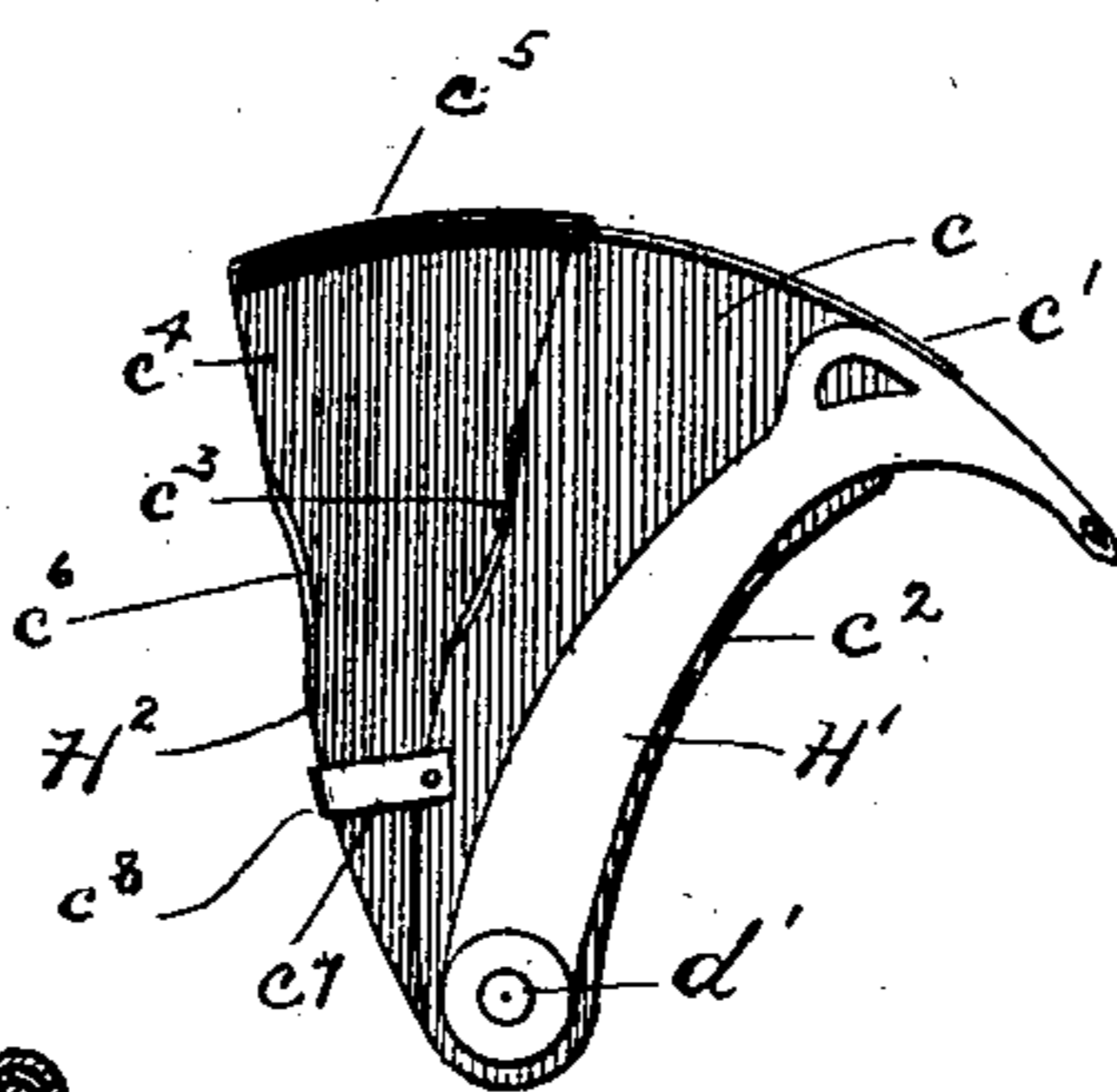
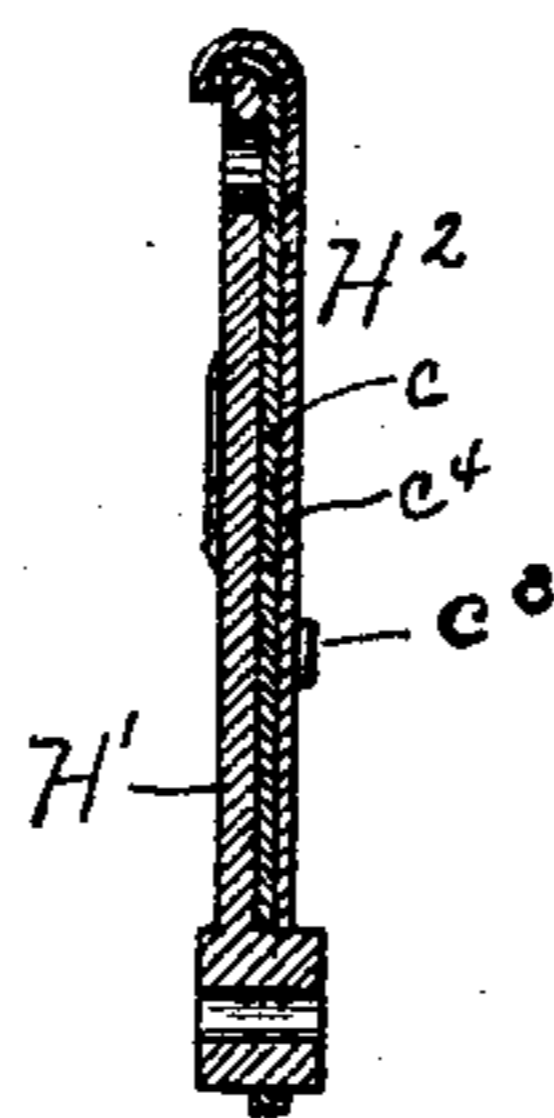


Fig. 8.



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UNITED STATES PATENT OFFICE.

DARIUS T. PHILLIPS, OF CHICAGO, ILLINOIS.

CORN-HARVESTER.

SPECIFICATION forming part of Letters Patent No. 605,650, dated June 14, 1898.

Application filed July 17, 1896. Serial No. 599,552. (No model.)

To all whom it may concern:

Be it known that I, DARIUS T. PHILLIPS, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Corn-Harvesters, of which the following is a specification.

My invention relates to improvements in corn-harvesting machines of the class more especially adapted to operate upon two rows of standing corn at once and is in the nature of an improvement upon a corn-harvesting machine shown and described in Letters Patent of the United States No. 587,535, granted to me August 3, 1897. This machine, which is adapted to be drawn across a field of standing corn and to straddle and cut two rows at once, operates to pick up "fallen" corn and bend all stalks in a forward direction to facilitate the cutting and prostrate them forward against elevating mechanism which lifts the stalks and deposits them from both sides into a binder located between and in front of the cutters, the binder operating to tie the stalks into bundles and discharge them between the rows that are being operated upon.

My present object is to provide certain improvements in the construction of the frame and operating mechanisms to the end of rendering the machine particularly light in weight, easy to handle in the field, and desirable and effective under all conditions.

To the above ends my invention consists in the general construction of my improvements and also in details of construction and combinations of parts, all as hereinafter set forth and claimed.

In the drawings, Figure 1 is a side elevation of my improved machine with the binder and certain other details left out to avoid confusion and with parts broken away; Fig. 2, a top plan view of the machine with the binder and parts of the elevating mechanism removed; Fig. 3, a rear elevation of the machine; Fig. 4, an enlarged broken plan section taken on line 4 of Fig. 3 and showing a cutter and stalk-guide; Fig. 5, an enlarged section taken on line 5 of Fig. 1, showing the binder and the parts of the machine immediately adjacent thereto; Figs. 6 and 7, detail elevations of the binder-needle and folding needle-guard in two positions, and Fig. 8 a

section taken on line 8 of Fig. 6 and viewed in the direction of the arrow.

A A' are traction-wheels fixed to opposite end portions of a hollow rotary axle B. On the axle are bearing sleeves or boxes B' B², which are connected together by an upwardly-bowed brace or supporting bar B³, provided at its center with a threaded socket-piece *t*. Parallel poles or shafts C C' are fastened at their rear ends to sleeves C² on the axle just beyond the sleeves B' B², respectively, and are curved outward at their forward end portions, as shown. On the outer end portions of the axle beyond the traction-wheels are loose sleeves B⁴, to which are fastened brace-rods B⁵, which extend to and are connected with the shafts or poles C C'. Extending loosely through and beyond opposite ends of the hollow axle is a wire cable *s* or other flexible medium, to the ends of which are attached whiffletrees *s'*, the cable being long enough to cause the whiffletrees to extend in advance of the traction-wheels. The machine is intended to be drawn by two horses, which are hitched to the whiffletrees and to pole-strap rings *s*² on the free ends of the poles C C', whereby the paths of travel of the horses are adjacent to those of the traction-wheels.

D is a frame which carries the operating parts of the machine and formed, preferably, of steel tubing, rods, and bars, all as light in weight as possible consistent with the strength required. Forming a part of the frame D is a frame or supporting bar D', preferably in the form of an inverted U and T-shaped in cross-section. The legs or opposite end portions of the bar D' extend through and are movable in vertical guides B⁶, fastened to or integral with the sleeves B' B². The guides B⁶ are provided with set-screws *r*, adapted to be tightened against the legs of the bar D' to fasten them immovably in the guides. On the supporting-bar D' is a bracket or casting D², provided with a vertical bearing opening directly over the socket-piece *t* for the shank of a screw *t'*, which works in the socket-piece. At the upper end of the screw is an operating handle or crank *t*², and the screw is held against longitudinal movement in the bracket D². By turning the screw *t'* when the set-screws *r* are loosened the bar D', and consequently the entire rear end portion of the

frame D, may be raised and lowered with reference to the axle.

D³ is a forward-extending bar or strip, preferably of hard wood, and fastened toward its rear end upon the bracket D². The forward end of the strip D³ is secured to the upper end of a vertical bar D⁴, which at its lower end portion passes through a bearing-sleeve *p* on the frame *p'* of a caster-wheel *p*². Surrounding the bar D⁴ is a spring *n*, confined between the sleeve *p* and a stop *n'* on the bar. On the lower end of the bar D⁴ is a sharpened and forwardly-curved pick-up *n*², and above the pick-up the bar carries a pulley *n*³. A wire cable or other flexible medium *m* is fastened at one end to the sleeve *p* of the caster and extends downward under the pulley *n*³ and thence upward over a pulley *n*⁴ on the end of the strip D³ to a rod *m'*, to one end of which it is secured. The rod *m'* at its opposite end is fastened to an operating-lever *m*² on the strip D³. At the side of the lever is a segmental rack *m*³, with which a spring-pawl on the lever and controlled by a handle *m*⁴ normally engages. Turning the lever in the backward direction raises the bar D⁴ in the sleeve *p* and elevates the forward end of the frame D on the caster, while movement of the lever in the forward direction causes a lowering by gravity of the forward end of the frame. The spring *n* tends to lessen the strain upon the cable *m* and attendant parts and renders the matter of raising and lowering the forward end of the frame easy to accomplish.

Secured at their ends to the lower end portion of the bar D⁴ are brace-bars D⁵, which extend outward toward the traction-wheels and thence forward.

D⁶ is a guide-bar fastened at its center against the under side of the strip D³ and extending at each side outward or laterally, forward and downward, describing curves, as shown in Figs. 1 and 2. At its lower ends the bar D⁶ is fastened to the forward ends of the bars D⁵, and the parts are there pointed to form the pick-ups *l* shown.

D⁷ is a divider-frame which may be formed of a continuous rod or bar fastened at its ends to the lower ends of the supporting-bar D⁴ and shaped to produce the parallel parts *k* *k*, inward-inclined guides *k'* *k'* and front, *k*³. At its center the part *k*² is secured to the lower end of the bar D⁴, whereby the strip D³ and divider-frame are held in rigid relation, both forming part of the frame D.

On the axle B is a sprocket-wheel *i*, from which all the moving mechanisms in the machine are driven. On the bar D⁴ are bearing-brackets *h*, *h'*, and *h*², in which is journaled a shaft *h*³. Loose upon the shaft adjacent to the bracket *h* is a sprocket-wheel *h*⁴, connected by a drive-chain *i'* with the sprocket-wheel *i*. One side of the sprocket-wheel *h*⁴ is serrated to afford a clutch member, and sliding upon the shaft adjacent thereto is a clutch member *h*⁵, actuated by means of a handle *h*⁶, in position to be moved with the foot to engage

and disengage the sprocket-wheel clutch member. The sliding clutch member is feathered upon the shaft, whereby when the clutch members are in engagement the shaft is turned from the sprocket-wheel *h*⁴. Fixed upon the shaft *h*³, in the positions shown, are beveled gears *h*⁷ *h*⁸.

E E' are elevator-shafts journaled at their rear ends in brackets *f* and extending forward in a downward-inclined direction to suitable bearings (not shown) carried by brace-rods *f'* *f'*. At their rear ends the shafts E E' are provided with beveled gears *f*², which mesh with the gears *h*⁷ *h*⁸, respectively. On the shafts E E' are coincident sprocket-wheels *f*³, and on the shaft E is an extra sprocket-wheel *f*⁴, which drives the binder-shafts, hereinafter mentioned. On the parts *k'* of the divider-frame D⁷, at points coincident with the sprocket-wheels *f*³, are brackets *k*³, having longitudinally-extending slots *k*⁴, as shown in Fig. 5. Adjustably fastened in the slots *k*⁴ are the shafts of sprocket-wheels *h*⁹. Extending over the sprocket-wheels *h*⁹ and under the coincident sprocket-wheels *h*⁹ are elevator or carrier chains *h*¹⁰, provided with fingers *h*¹¹. The construction is such that the outer sides of the elevators, afforded by the chains and fingers, extend in an upper and inward inclined direction, and the fastening means for the sprocket-wheels *h*⁹ are such that they may be raised and lowered in the guide-slots *k*⁴ to tighten or loosen the carrier-chains. The elevator-fingers *h*¹¹, which I prefer to employ, are bent downward at their outer ends, as shown in the figures. Fastened against the bars D⁴ D⁵ of the frame D is a board D⁸, affording an abutment at the back of the machine. The elevator-shafts extend through openings in the said abutment.

F F' are stationary cutters fastened at their inner sides against the parts *k* of the divider-frame and at their rear ends against the lower edge portion of the abutment. The knives are formed with inclined and scalloped cutting edges, as shown most plainly in Fig. 4.

G and G' are presser or guide boards pivoted toward their forward ends upon pins *e* on the bars D⁵ to swing in the horizontal plane, and at their rear ends they extend close to the abutment and swing over the cutters. On the bars D⁵ are springs *e'*, which bear against the guide-boards G G' and tend to swing the latter inward to the position shown by full lines in Fig. 2 and by dotted lines in Fig. 4.

Cords or other flexible mediums *e*² *e*² are attached to the upper ends of the guide-boards G G' and pass over the top of the strip D³, where they connect with opposite ends of a helical spring *e*³. The tendency of the spring *e*³ is to draw upon the cords and keep them taut, the cords themselves operating as guides for holding the cornstalks against the elevators, as hereinafter described.

II is a twine-binder of a common construction, except as to the needle-guard and discharger. The shafts *l* *l'* of the binder are

geared together in the usual way, the shaft d' being driven by a chain from the sprocket-wheel f^4 on the shaft E. On the shaft d' , at the side of the needle H', is a needle-guard H^2 , comprising a plate c , pivoted upon the shaft d' , and having a flange c' in the arc of a circle of which the shaft d' is the center, the flange extending over the outer edge of the needle. At the forward edge of the plate c is a flange or stop c^2 in the path of the needle, and at the rear edge of the said plate is a similar flange or stop c^3 , also in the path of the needle. The needle in its movement slides across the surface of the plate c . On the opposite side of the plate c from the needle is a plate c^4 , substantially of the same shape as the plate c , pivoted upon the shaft d' and sliding in contact with the said plate. On the outer edge of the plate c^4 is a flange c^5 , describing the arc of a circle of which the shaft d' is the center and movable along the outer surface of the flange c' of the plate c . At the rear edge of the plate c^4 is a flange or stop c^6 in the path of the plate c . Fastened upon the plate c is a finger c^7 , provided at its free end with a hook c^8 , adapted to engage and release the rear edge of the plate c^4 . In the backward movement of the needle to the position shown in Fig. 6 it slides along the plate c to the stop c^3 and then swings the plate with it across the plate c^4 to the stop c^6 . In the forward movement of the needle to the position shown in Fig. 7 it moves across the surface of the plate c to the stop c^2 and then slides the plate c across the surface of the plate c^4 until the latter is engaged by the hook c^8 on the finger c^7 . A guard for the needle is necessary to prevent stalks from falling behind the needle and clogging the binder. The present construction affords a guard which accomplishes this purpose. In the backward movement of the needle the rear edge of the plate c^4 strikes the binder-frame and is prevented from moving farther than the position shown in Fig. 5. Thus the guard is prevented from projecting into the path of the stalks as they are raised by the elevator. The rods f' , before mentioned, extend from their fastenings at k^2 upward, as shown, and then parallel with the shafts E E', being fastened at their rear ends to the bar D', as shown in Figs. 1 and 3. The rods f' carry housings f^5 , which cover the shafts between the sprocket-wheels carried by the shafts. These housings prevent the revolving shafts from becoming entangled with corn-silk or the like. Fastened upon the housings adjacent to each of the sprocket-wheels f^3 is a spring-rod f^6 , which extends upward and inward and thence downward. These rods operate as guards or shields to maintain the cornstalks deposited in the binder away from the sprocket-wheels and elevator-chains. As the cornstalks are deposited in the binder they rest in a hopper formed by spring-rods f^7 , which are fastened at their upper ends to the bars or rods f' and extend downward and

thence inward from opposite sides, overlapping each other without engagement, as indicated in Fig. 2. The means for discharging the bundle from the binder consists in a disk b , eccentrically mounted upon the end of the binder-shaft d , an eccentric ring b' , in which the disk b rotates, and a discharging arm or finger b^2 , fastened to the ring. At its side opposite the arm or finger b^2 the ring is pivotally attached to the lower end of a rod b^3 , which extends upward and is fastened against the rod or bar f' . In the rotation of the binder-shaft d the disk b is rotated in the ring b' , which latter is held against rotation by the rod b^3 . In operation the arm b^2 travels an elliptical path, moving upward in rear or to the left of the stalk-receiving hopper before mentioned and in its downward movement describing the course indicated by the dotted line in Fig. 5, which carries it over the top of the bundle and downward, thus forcing the bundle downward to separate the overlapping ends of the spring hopper-rods f^7 and discharging the bundle to the ground.

At the forward ends of the poles C C' are downward-extending bars a , pointed and bent forward at their lower ends to afford pick-ups or down-corn raisers. Fastened upon the strip D³, near the forward end thereof, are pick-ups or down-corn raisers a' , which may be formed of a single bar fastened at its center to the said strip, arched upward at opposite sides of the strip to pass over standing corn, and extending thence vertically downward loosely through guide-loops a^2 on the poles C C'. The lower ends of the pick-ups a' are pointed and bent forward, as shown. The lower ends of all the pick-ups a , a' , l , and n^2 are preferably in the plane of the under side of the frame D. The driver's seat X is mounted upon the rear end portion of the strip D³, and mounted on the machine are a twine-box X' and a tool-box X².

In operation the horses are hitched to the whiffletrees s' and pole-strap rings s^2 , as before described. In traveling across a corn-field the divider D⁷ of the machine moves between the two rows of standing corn to be cut, and the horses, the stalk-guide points l , and the traction-wheels travel at the outer sides of said rows. The cable s , to which the whiffletrees are attached, will slide freely through the hollow axle to compensate for any unevenness in draft and prevent the wheels from veering. The pick-ups a will engage any down corn which may extend across the paths of the horses and bend it inward into position to be engaged by the pick-ups a' , and the pick-ups n^2 will tend to engage any down corn that extends across its path and move it into position to be guided to the cutters by the divider D⁷. Down corn will be raised by the pick-ups l and deflected inward by the guides D⁶, while upright corn will be bent forward and inward by said guides. As the cutters F F' engage and sever the stalks the lower ends of the latter are

pressed inward toward the elevators by the guide-boards $G\ G'$. As the stalks are cut they fall forward under the pressure of the guides D^6 and are then engaged by the fingers on the elevator-chains, which raise the stalks and deposit them in the binder to rest in the hopper formed by the separable rods f^7 . When the binder has acted to tie the bundle, the discharger b^2 operates, as before described, to force the bundle from the hopper and deposit it upon the ground between the rows that are being operated upon.

Constructed as described the framework of the machine consists of very few parts, all of which are made as light as possible consistent with the strength required. The axle tends to strengthen the frame very much over frames which employ no axle, and as it is at the rear end of the frame it is entirely out of the way and does not interfere with the work of the cutting, elevating, and binding mechanisms. By providing two shafts or poles connected with the axle, as described, horses hitched thereto are prevented from tramping upon the rows of corn on which the machine is operating, and the horses are also prevented from getting injured by the guards and pick-ups, especially while turning the machine in the field. The pick-ups, disposed as described, operate to guide all the stalks which may be down properly to the cutting and elevating mechanism. The means provided for elevating the rear and front ends of the frame are simple, strong, and easy to operate, so that a driver without leaving his seat may adjust the machine quickly to the varying conditions of the corn. The cutters $F\ F'$, owing to their peculiar construction, sever the stalks with a slanting cut requiring very little power. These cutters have been constructed by me after careful study of the requirements, and I find that owing to the extended cutting-points separated by the scallops the blades engage and cut smoothly through the outer shells and then through the pith in a manner much more smooth and requiring less power than where continuous or serrated blades are employed.

The flexible cable extending loosely through the hollow axle with the whiffletrees connected at opposite ends afford a particularly desirable and effective draft connection which is out of the way of all moving parts of the machine, does not interfere with the discharge of the bundle, and presents an equalizer which is very effective for its purpose. The guide or presser boards $G\ G'$ direct the lower ends of the severed stalks yieldingly against the adjacent elevator-chains and the guide-cords e^2 maintain the stalks by a gentle pressure against the elevators. This construction I find particularly effective and desirable.

The machine constructed as described is lighter by several hundred pounds than any other machine for the same purpose of which I am aware, and while I prefer to construct it in all its parts as shown and described it

may be variously modified in the matter of details of construction without departing from the spirit of my invention as defined by the claims.

What I claim as new, and desire to secure by Letters Patent, is—

1. In a corn-harvester, the combination with the axle and its supporting-wheels, of an adjustable frame carrying the operating parts of the machine supported at its rear end portion upon the axle, to be raised and lowered upon its support, a driver's seat on the adjustable frame, a downward-extending bar at the front end portion of the adjustable frame, a wheel provided with a frame sliding upon said bar, a spring confined between the said wheel-frame and bar and tending to raise the front end of the supporting-frame upon the wheel-frame, pulley-and-cable mechanism on the said bar and wheel-frame, and a lever on the adjustable frame, adjacent to the said seat, with which the said mechanism is operatively connected, substantially as and for the purpose set forth.

2. In a corn-harvester, the combination with the frame carrying the operating parts of the machine, of a hollow rotary axle upon which said frame is mounted, and provided with supporting-wheels, and a flexible cable, or the like, extending loosely through and beyond opposite ends of said axle and provided at its ends with horse-attaching means, substantially as and for the purpose set forth.

3. In a corn-harvester, the combination with the frame carrying the operating parts of the machine, of a hollow rotary axle upon which said frame is mounted at its rear end portion and provided with traction-wheels, shafts pivotally connected with the axle on opposite sides of said frame, a flexible cable, or the like, extending loosely through and beyond opposite ends of said axle, a supporting-wheel for the front end portion of the frame, and draft attachments for horses on the free ends of said cable and front end portions of said shafts, substantially as described.

4. In a corn-harvester, the combination with the axle and its supporting-wheels, of a frame in which the operating parts of the machine are mounted, provided with a rear supporting-frame portion having legs adjustably mounted in guides upon the axle, and a divider-frame, comprising a substantially continuous bar secured at opposite ends to said legs and presenting inclined guide-surfaces k' , substantially as described.

5. In a corn-harvester, the combination with the axle and its supporting-wheels, of a frame carrying the operating parts of the machine provided with a supporting-frame portion having legs adjustably mounted upon said axle, a divider-frame portion comprising a substantially continuous bar connected at opposite ends with said legs and extending forward to present guide-surfaces k' , a forward-extending bar or strip connected at its rear end portion with said supporting-frame

portion, and a wheeling-support for the forward end portion of said strip, substantially as described.

6. In a corn-harvester, the combination with the axle and its supporting-wheels, of a frame carrying the operating parts of the machine provided with a supporting-frame portion having legs adjustably mounted upon said axle, a divider-frame portion comprising a substantially continuous bar connected at opposite ends with said legs and extending forward to present guide-surfaces k' , a forward-extending bar or strip connected at its rear end portion with said supporting-frame portion, parallel brace rods or bars $f' f'$, and a wheeling support for the forward end portion of said strip, substantially as described.

7. In a corn-harvester, the combination with the axle and its supporting-wheels, of a frame carrying the operating parts of the machine provided with a supporting-frame portion having legs adjustably mounted upon said axle, a divider-frame portion comprising a substantially continuous bar connected at opposite ends with said legs and extending forward to present guide-surfaces k' , a forward-extending bar or strip connected at its rear end portion with said supporting-frame portion, parallel forward-extending guide-bars D^5 connected at their rear ends to the said supporting-frame portion, guides D^6 extending from the said strip laterally downward and forward to the guides D^5 , and a wheeling support for the forward end portion of said strip, substantially as described.

8. In a corn-harvester, the combination with the axle and its supporting-wheels, of a frame carrying the operating parts of the machine provided with a supporting-frame portion having legs adjustably mounted upon said axle, a divider-frame portion comprising a substantially continuous bar connected at opposite ends with said legs and extending forward to present guide-surfaces k' , a forward-extending bar or strip connected at its rear end portion with said supporting-frame portion, parallel elevator-shafts journaled at their rear end portions upon the said supporting-frame portion, and at their forward ends supported from the said divider-frame portion, sprocket-wheels upon the elevator-shafts, brackets upon the divider-frame portion, sprocket-wheels upon the said brackets, elevator-chains traveling upon the sprocket-wheels, and a wheeling support for the forward end portion of said strip and divider-frame portion, substantially as described.

9. In a corn-harvester, the combination with the axle, supporting-wheels, shafts $C C'$, and the frame carrying the operating parts of

the machine mounted toward its rear end portion on the axle, of a bar or strip D^3 forming the upper portion of said frame, and pick-up bars a' fastened to said strip and extending from opposite sides thereof upward, laterally and downward, and guides a^2 on the shafts $C C'$ through which said pick-ups extend, substantially as and for the purpose set forth.

10. In a corn-harvester, the combination with the frame carrying the operating parts of the machine, outside stalk-guides D^5 , divider D^7 , cutters and elevators, of guide-boards $G G'$ pivotally mounted toward their forward end portions upon the guides D^5 to swing at their rear end portions over the cutters, springs pressing the said guide-boards normally in the direction of the inside divider, guide-cords, or the like, e^2 , attached to the said guide-boards and extending thence upward at opposite sides of the elevators, and a spring connection between the said cords, at the top of the frame, substantially as and for the purpose set forth.

11. In a corn-harvester, the combination with the cornstalk cutting and elevating mechanisms, of a binder for the cornstalks, and a guard for the binder-needle, comprising plates mounted to slide one upon the other in the movement of the needle, and forming an always-closed wall behind the needle, substantially as and for the purpose set forth.

12. In a corn-harvester, the combination with the cornstalk cutting and elevating mechanisms, of a binder for the cornstalks, and a guard for the binder-needle, comprising a pivotal plate c provided with stops in the path of the needle, and a plate c^4 , across which the plate c slides the plates forming an always-closed wall behind the needle, substantially as described.

13. In a corn-harvester, the combination with the cornstalk cutting and elevating mechanisms, of a binder for the cornstalks a hopper in which the bundle is formed, comprising spring-rods which support the cornstalks and separate to release the bundle, and mechanism for discharging the bundle from the hopper, comprising an eccentric b upon one of the binder-shafts, an eccentric-ring in which the eccentric rotates, a bundle engaging and discharging finger b^2 on the ring, and a pivotal swinging support b^3 for the ring at the side thereof opposite the discharging-finger, substantially as and for the purpose set forth.

DARIUS T. PHILLIPS.

In presence of—

J. N. HANSON,
RICHARD SPENCER.