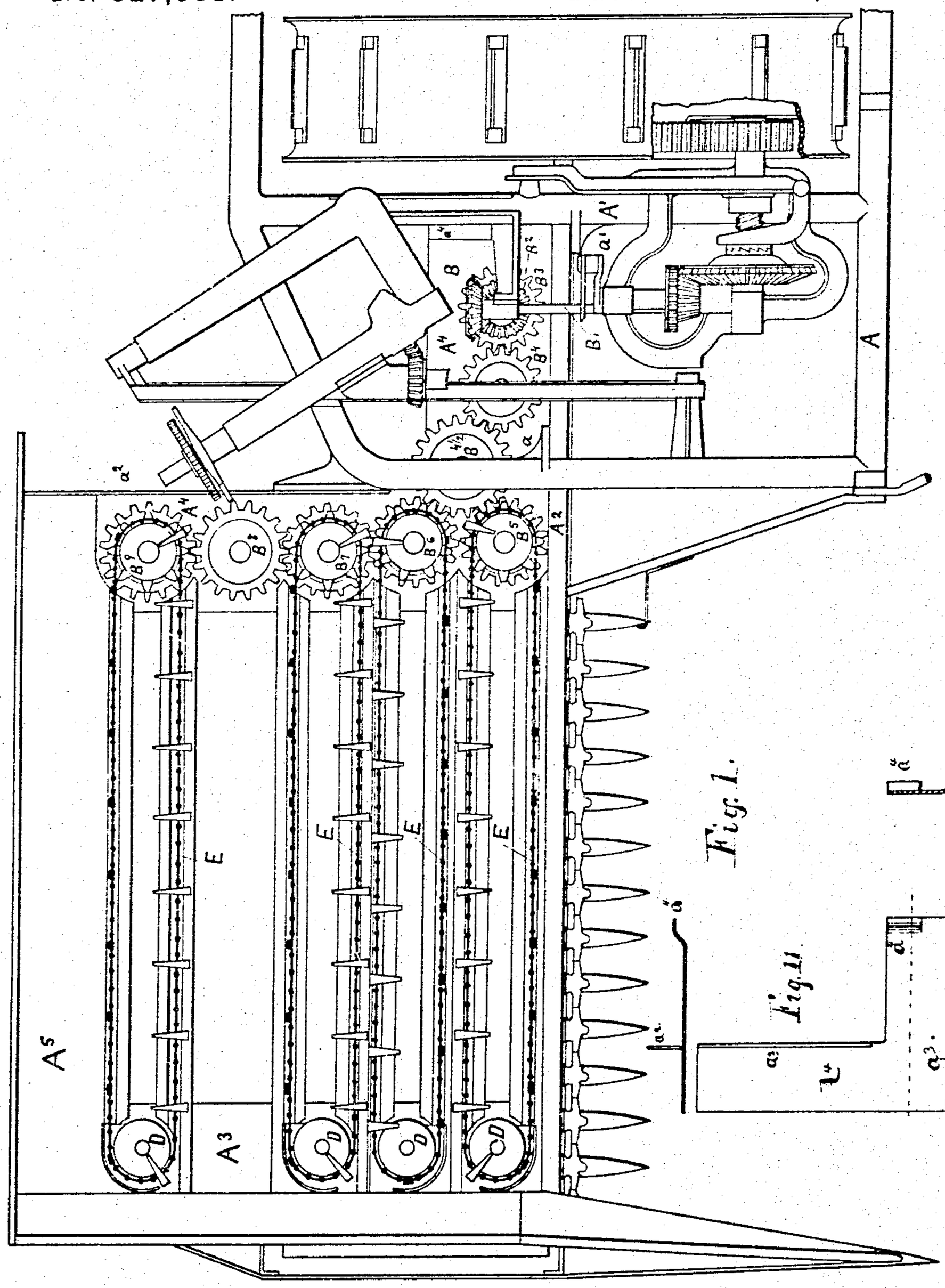
(No Model.) 2 Sheets—Sheet 1.

LA VERNE W. NOYES.

HARVESTING MACHINE.

No. 327,581. Patented Oct. 6, 1885.



Witnesses:
Francis W. Baker
L. C. Riggl.

Inventor:
La Verne W. Noyes
by Chas. D. Burton
his Atty.

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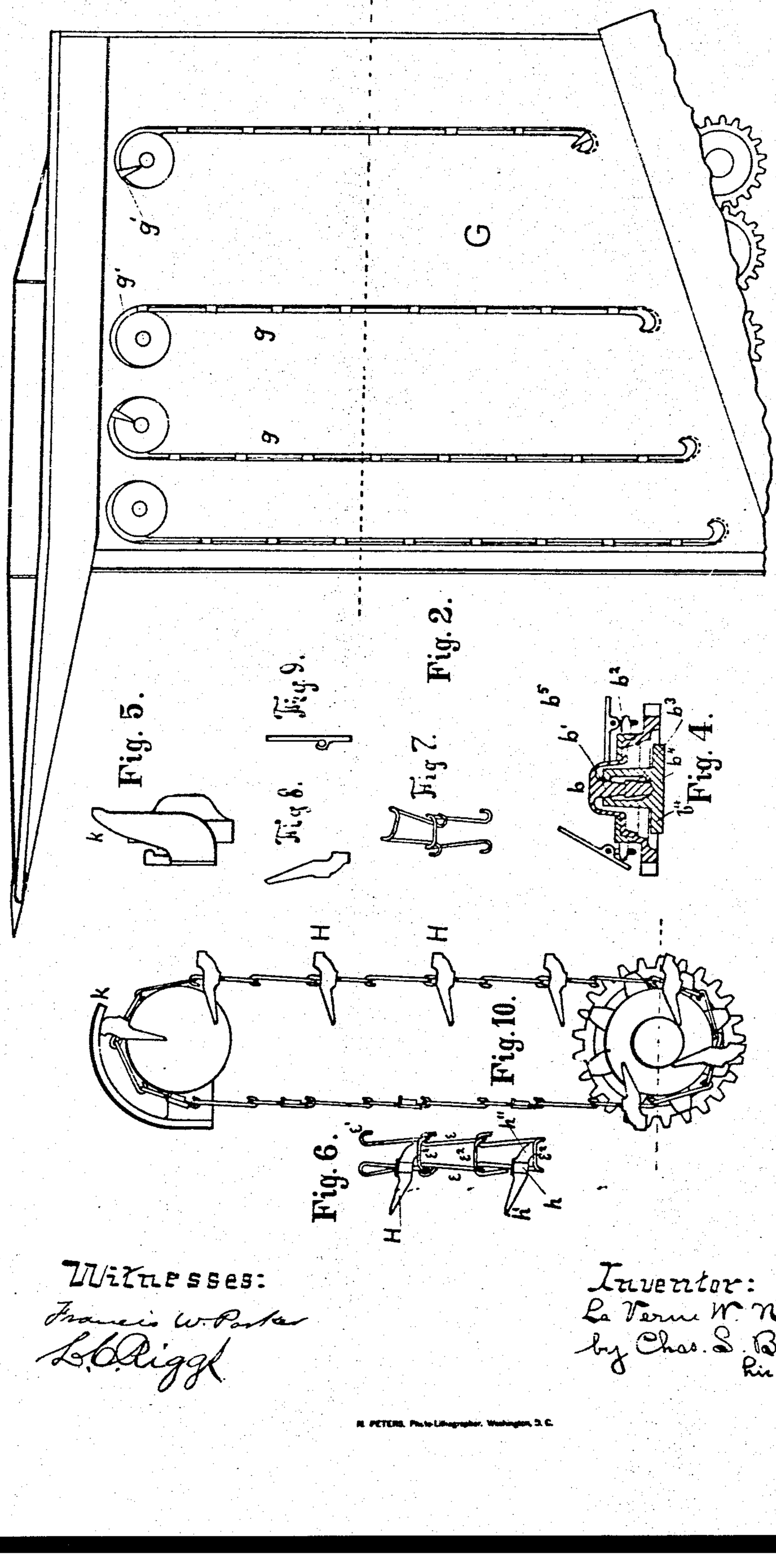

Fig. 2.

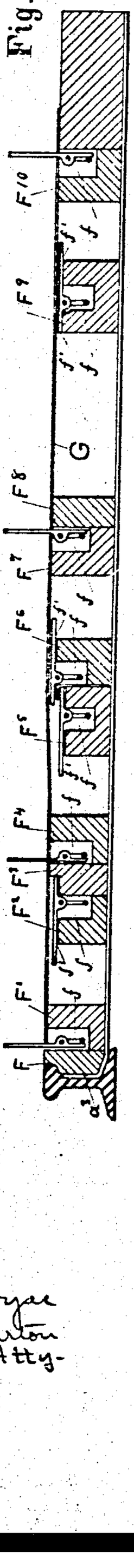

Fig. 3.

Fig. 5.

Fig. 9.

Fig. 6.

Fig. 7.

Fig. 4.

Fig. 10.

Fig. 6.

Witnesses:
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UNITED STATES PATENT OFFICE.

LA VERNE W. NOYES, OF CHICAGO, ILLINOIS, ASSIGNOR TO WILLIAM DEERING, OF SAME PLACE.

HARVESTING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 327,531, dated October 6, 1885.

Application filed October 27, 1884. Serial No. 146,547. (No model.)

To all whom it may concern:

Be it known that I, LA VERNE W. NOYES, a citizen of the United States, and residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Harvesting-Machines, which are fully set forth in the annexed and following specification.

The purpose of this invention is to provide a grain-carrying platform to remove the grain from behind the cutter-bar, which shall combine the advantages of the moving endless-apron platforms and of the stationary platforms wherein the conveying is done by chains, cables, or belts running above the platform or having teeth projecting through slots in the platform. The former class, requiring no interior machinery, can be made of light weight and low—*i. e.*, thin—so as the permit the sickle to operate very close to the ground; but on account of the shrinking and stretching of the canvas apron due to atmospheric changes, and on account of the lack of durability of the material, platforms of this class are not altogether desirable. As heretofore constructed, the other class—the "chain" platforms, as they are commonly called—have been necessarily quite heavy and hard-running, and of too great thickness to permit a close cut, which in case of short grain frequently leaves the straw too short to be securely bound by the automatic binders. I aim therefore by this invention to provide a chain platform which shall be at the same time light and thin, and durable, and free from variability.

A second purpose of this invention is to provide a grain-conveying mechanism which shall be so constructed as to deliver the grain at any angle to the cutter-bar, its primary application being to a grain-harvester having a binding mechanism which binds the grain in a position oblique to the line of the cutter-bar, and so requires in connection with it means for turning the grain into such oblique position after it falls upon the platform.

Figure 1 is a plan of my platform and its driving-connections, the upper sheath being removed to show the arrangement of the conveying-chains. Fig. 2 is a plan of the platform with the upper sheath in place, showing the arrangement of the slots. Fig. 3 is a transverse vertical section made at the line *x x* on Fig. 2. Fig. 4 is a vertical section of the sprocket and gear wheel which carries the conveyer-chains. Fig. 5 is an elevation of the pulley around which the conveying-chains pass at the grain end of the platform. Fig. 6 is a detail view of the chain which I employ as a conveyer. Fig. 7 illustrates the manner of putting the several links of the chain together. Figs. 8 and 9 show in detail the form of a trip-tooth which I use on said chain. Fig. 10 shows a single chain in place around its sprocket-wheel at one end and its guide-pulley at the other end. Fig. 11 is a detail view of an iron plate which forms the support of the gear and sprocket wheels which drive the conveying-chains.

A is the base-frame of the harvester. A′ is a cross-beam of the same. A^2 is the finger-bar, formed of railroad iron, secured rigidly to the base-frame by means of the lugs or brackets *a a′*. A^1 is a metal plate, which has the upturned lip or flange a^2, by which it is secured to the main frame. It has also the upturned lip a^3 by which it is secured to the finger-bar, and the lip or flange a^4, by which it is further secured to the cr ss-bar A′. A^3 is a metal plate fastened rigidly to the finger-bar at the grain end of the platform. It extends across that end, and is secured at the rear side to the under side of the rear sill, A^5, which is bolted fast also to the rear end of the plate A^4.

The parts thus far described constitute the frame of the platform and its means of rigid connection with the main frame of the harvester to which it pertains.

B is a bevel-gear on the shaft B′, which shaft has its bearing on any suitable supports on the main frame, and derives power from the main driving-shaft by any suitable driving-connections. B^2 is a horizontal bevel-gear meshing with and driven by the bevel-gear B. Integral with the bevel gear-wheel B^2 is the horizontal gear-wheel B^3, which meshes with and drives the horizontal gear-wheel B^4,

which meshes with and drives the horizontal gear-wheel $B^{1\frac{1}{2}}$, which in turn drives the horizontal gear and sprocket wheels B^5 and B^6, which last-named wheel drives the similar gear and sprocket wheel, B^7, which drives the intermediate gear-wheel, B^8, which drives the gear and sprocket wheel B^9. Each of the wheels in this train, from B^2 to B^9, inclusive, is formed and provided with the peculiar bearing hereinafter described.

D D D D are pulleys having their bearings similar to those of the gear and sprocket wheels B^2 to B^9, above mentioned and hereinafter described.

E E E E are the endless-chain conveyers, carried by the sprocket-wheels B^5, B^6, F, and B^9, and running around the pulleys D D D D at the grain end of the platform.

F F' F^2 F^3 F^4 F^5 F^6 F^7 F^8 F^9 F^{10} are wooden strips or rails secured at their ends, respectively, to the plates A^3 and A^4. They are formed and combined as shown, so as to contain the grooves *f*, in which the chains E E E E lie vertically and run edgewise throughout the length of the platform. The rails in which the chains travel returning from the grain to the stubble end are cut away on their upper sides, their upper surfaces forming the ledges *f'*, leaving small spaces below the sheathing in which the carrying-teeth may lie horizontally under the sheathing. On rails F^3 and F^4, F^7 and F^8, and F^{10} the sheathing G is slotted lengthwise above the track of the chains moving from the grain to the stuble end of the platform, the slots *g* terminating at the grain end in the circular openings *g'*, into which the pulleys D protrude flush with the upper surface of the platform.

The carrying-chains E are made preferably of detachable links, and have the carrying-teeth hung to their upper horizontal sides, each alternate link as illustrated, but in practice only each third or fourth link being so provided.

I prefer the form of link illustrated in the drawings, which are designed to be made on wire of suitable size, and are formed by bending the wire first into the form of the letter U, but with the sides E E tending toward each other, each end being then bent outward in the same plane to form the hooks E', and the lower part of the U being then bent over upon itself in a plane at right angles to that of the two branches forming the lip or hook E^2. The links are connected in continuous chain by inserting the two ends of one between the sides of the other, as illustrated in Fig. 7, and then turning and drawing them into line, the sides of both springing sufficiently to allow the hooks E' of the inner link to come into engagement with the sides of the hook-lip E^2 of the other link. I do not, however, confine myself to the use of the particular form of link above described, but use any form provided it has one horizontal side adapted to be the bearing and pivot for the swinging trip-tooth H.

The trip-tooth consists of the hub or bearing part *h*, the carrying-tooth *h'*, and the heel or trip *h''*. A preferable form is shown in Figs. 8 and 9, which represent a tooth made of maleable iron, the hub having the rift h^2, so that it may be placed on the side of the link, and then be hammered together to close the rift and so be securely retained on the link. When the wire link above described is employed, I find as convenient to make the hub solid and to bore it to receive the wire of the link, onto which I slip it before turning up the hook E' on the end of that side on which the tooth is so hung. The carrying-tooth *h'*, I prefer to make as illustrated, sloping slightly backward, so as to be relieved of the grain more easily at the stubble end, as hereinafter described. It is of such length as to protrude through the slots in the platform a distance sufficient to enable it to perform its function of advancing the grain across the platform. About two inches I find sufficient for that purpose. When the carrying-tooth *h'* is erect, the heel *h''* stands down across the link in the same vertical plane with the carrying-tooth. It is made about as long as the width of the link, so that when standing erect it bears against the lower side of the link, but does not protrude below it nor prevent the chain running smoothly in its channel across the platform.

At the stubble end of the platform the slots *g* are curved inward, and the edge of the metal bounding the same on the outside of the curve is beveled on the underside, so that when the carrying-tooth *h'* reaches this curved portion of the slot in which it is traveling it will be, by the curve and bevel, turned inward and downward, the entire trip-tooth tipping on the side of the link, so that the carrying-tooth passes under the sheath G and lies horizontally above and upon the sprocket-wheel while the link is passing around the latter, and thereafter, while running to the grain end of the platform, slides on the ledge or upper surface, *f'*, of the rail in the space under the platform-sheathing.

At the grain end of the platform I provide adjacent to each pulley D the switch-plate K, which may be most conveniently secured by being fixed to or, as illustrated, made integral with the base-plate of the cup-bearing of the pulley. This plate has the tongue or switch-cam K', curved upward around the pulley, so that its point *k* stands just beyond the pulley grainward and overhangs the track of the heel *h''* of the trip-tooth H, which heel projects horizontally outward from the chain, while the carrying-tooth lies horizontally, as described. As the chain moves around the pulley at the end of the platform, the heel *h''* of the trip-tooth H is engaged under the overhanging point of the switch cam K', and by it

is guided so as to rock the trip tooth on the link, so that its carrying-tooth *h'* is brought erect and protruded up through the slot *g* as it is carried around the pulley, and so stands erect and drives the grain while it continues its course across the platform stubbleward.

It will be seen that the grain carried by the carrying teeth will be left lying on the platform at the point at which the teeth *h'* withdraw beneath the sheath at the stubble end of the slots *g*. If, therefore, it is desired to leave the grain in any particular position on the platform, it may be accomplished by making the slots terminate in a line in the direction in which it is desired that the grain shall be left. In the drawings, Fig. 2, the slots are shown terminating in a line oblique to the cutter-bar, the front slots being the longest and diminishing in length to the rear slot, which is the shortest. By this arrangement the grain is turned from the position in which it falls upon the platform, which is substantially in line with the direction of travel or of the sweep of the reel, to a position at right angles to a line extending obliquely backward and stubbleward, this position being the position which the grain must assume at some stage of its progress toward the binder in those machines which bind and discharge the bundle obliquely behind the drive-wheel. I do not confine myself, however, in the use of the above-described devices to oblique delivery of the grain, but I use the same structure, except that I make the slots terminate in a line at right angles to the cutter-bar, for the purpose of effecting direct delivery of the grain to the binding devices.

The structure of the combined gear and sprocket wheels and their bearings, and the structure of the bearings of the intermediate and other horizontal gear, and of the pulleys at the grain end of the platform, may be understood from the description of one of the gear and sprocket wheels, the bearings of the remainder being precisely similar, and all said combined gear and sprocket wheels being precisely similar in their structure. I will now describe one of these wheels. As illustrated in Fig. 4, it is formed with a cup-shaped web, *b*, which has integral with it or rooted rigidly at its center the stad or spindle *b'*, standing concentrically within the cup-shaped cavity of the web and serving as the axle of the wheel. The sprocket-rim I make in the form of a ring, b^2, having the sprockets on its outer periphery and of such interior diameter as to fit closely the cup which constitutes the web of the wheel as described, and in that position I secure the said sprocket-rim to said web by suitable bolts or screws. Instead of being so formed they may be cast integral; but for convenience of fitting and dressing the gear I prefer to make them as shown and above described. The bearing for this compound wheel is the cup b^3, having the flange b^4, by which it is bolted to the plate A^4. This cup is of such outer diameter as to pass freely within the cup-cavity, formed, as described, in the web *b* of the sprocket-wheel, and has the socket b^5 to receive the spindle *b'*. The point of the latter I make conical, and the bottom of the socket b^5 is similarly shaped to receive the point. The socket is chambered, and the spindle is diminished in diameter between the bearing-points, and a cavity or chamber thus produced within the cup around the spindle is designed to be filled with Babbitt metal in the usual manner, and by this means the entire wheel is secured in its bearings.

The structure described, it will be observed, makes a "self-oiling bearing"—that is, a bearing which in itself constitutes an oil-holding cavity about the spindle-bearing therein, thereby obviating the necessity for any separate provision.

I claim—

1. In combination, substantially as hereinbefore set forth, the front and rear sills of the grain-platform and the plates A^3 and A^4 securing them together, the horizontal gear and sprocket wheels, all in one plane, having their bearings on the plate A^3, and constituting a continuous train deriving motion in series from the first, and the carrying-chains running in horizontal planes carried by the sprocket-rim on said gear and sprocket wheels, whereby the thickness of the platform is limited to the necessary thickness of the gear and sprocket wheels and their supporting-plate.

2. In combination, substantially as hereinbefore set forth, the carrying-chains running in a horizontal plane, their links standing edgewise, and the trip-teeth pivoted on the upper side of the links and having the heels *h''*, as long as the width of the links, the rails having the grooves on their upper faces for the chains, and the slotted sheathing secured to the upper surfaces of said rails, close above the chains, whereby the trip-teeth are kept upright by their heels bearing against the lower sides of the links and the sides of the grooves, and not by their carrying-teeth bearing against the sides of the slots in the sheath.

3. In an endless conveyer for a grain-harvester, for the purpose of driving the endless chains, the combined gear and sprocket wheels having the cup-shaped web *b*, and the spindle *b'*, rigid with the web, in combination with the hollow bearing-piece b^3, adapted to receive the spindle, substantially as set forth.

4. In an endless conveyer for a grain-harvester, the chain composed of the detachable links formed of wire, having the converging sides terminating in the hooks turned outward in the same plane, and with the hook-lip turned up in a plane at right angles to the plane of the two sides, in combination with the trip-tooth pivoted on and adapted to rock

over the side of said link, substantially as set forth.

5. For the purpose of a separable chain, the detachable link made of wire, having the sides *e e*, converging toward the open end and terminating in the hooks *e' e'*, turned outward in the same plane with the sides *e e*, and having the closed end turned to form a hook on each side at right angles to the plane of the sides, substantially as set forth.

In testimony whereof I have hereunto set my hand, in the presence of two witnesses, at Chicago, Illinois, this 16th day of August, A. D. 1884.

LA VERNE W. NOYES.

Attest:
J. K. WEST,
CHAS. S. BURTON.