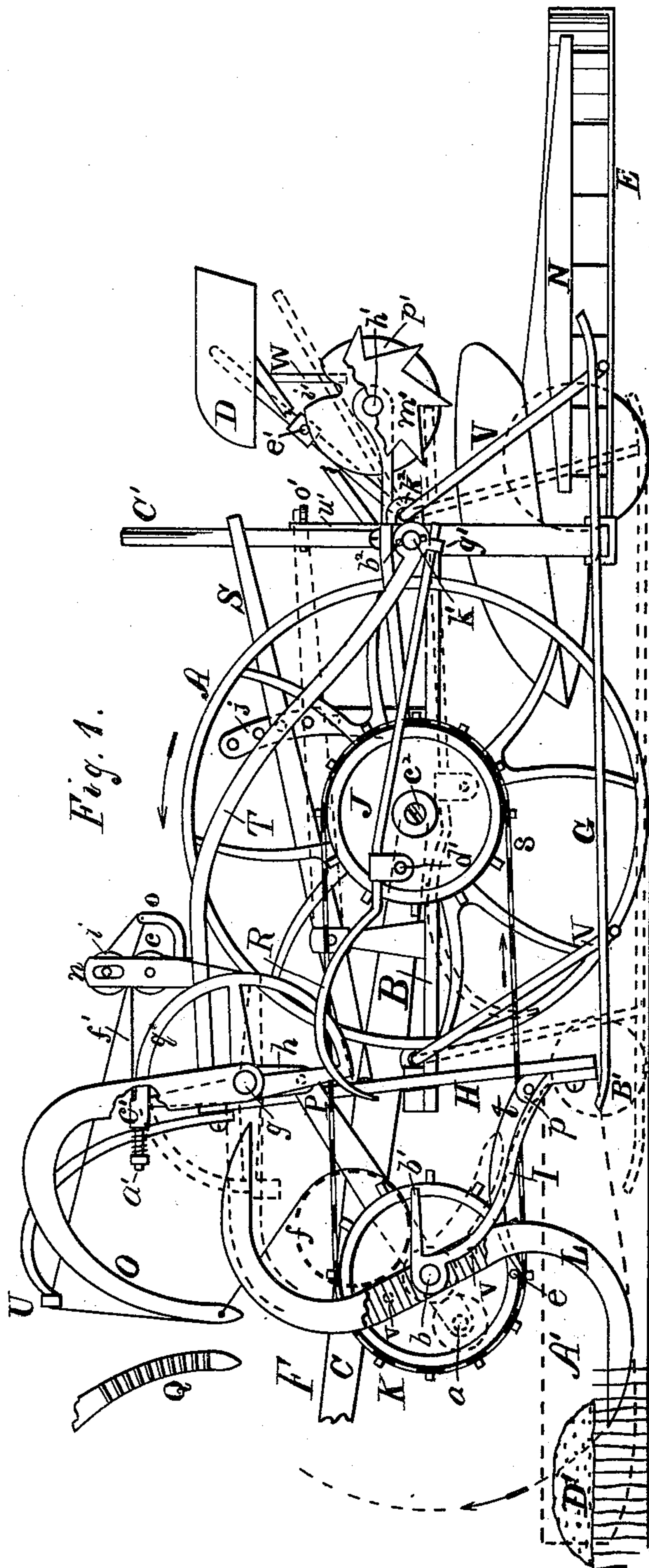


A. ROSS & S. J. PARKER.
Grain-Binder.

No. 215,680.

Patented May 20, 1879.



Attest:
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H. M. Brigham

Inventors:
A. Ross and S. J. Parker,
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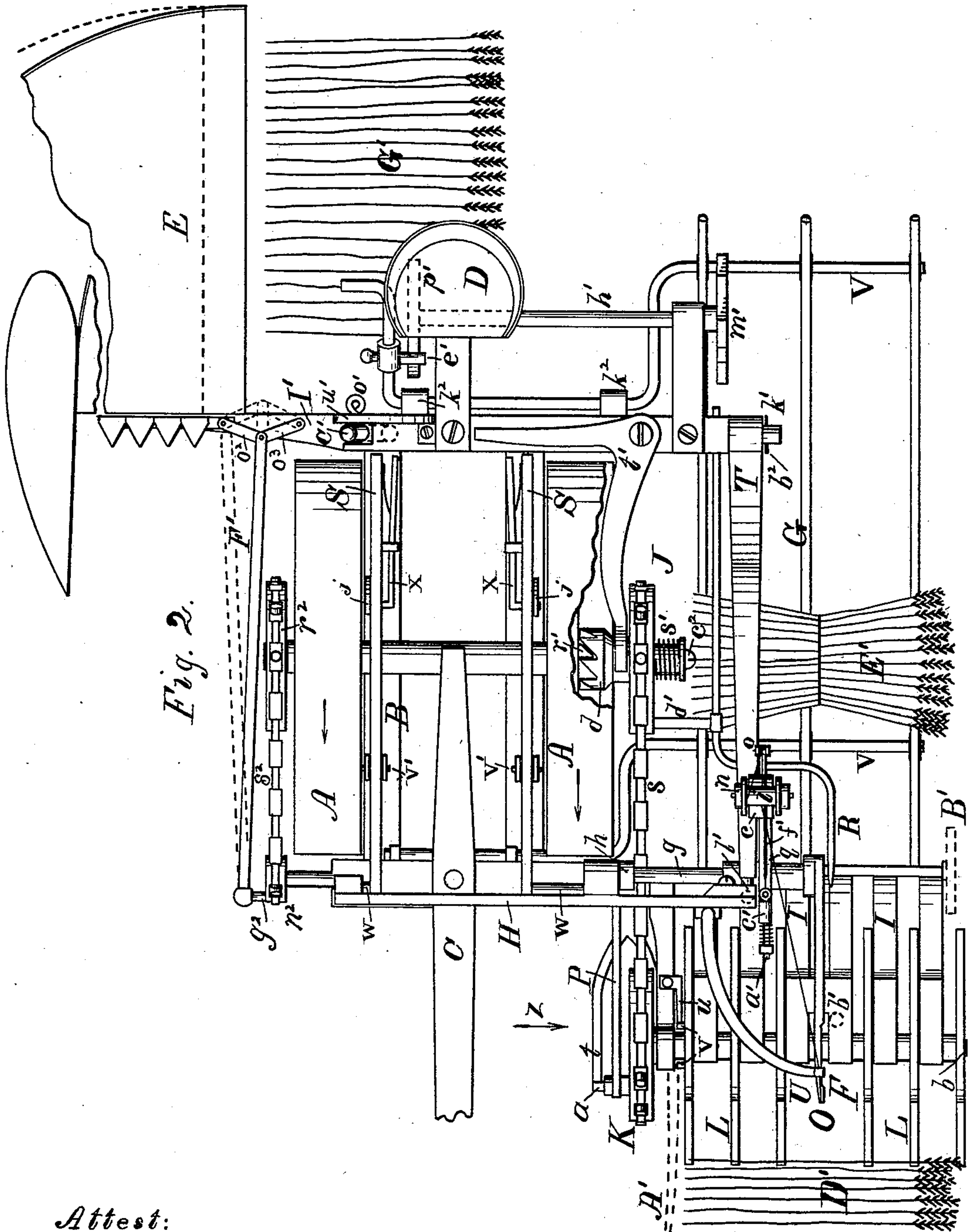


Fig. 2.

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Fig. 3.

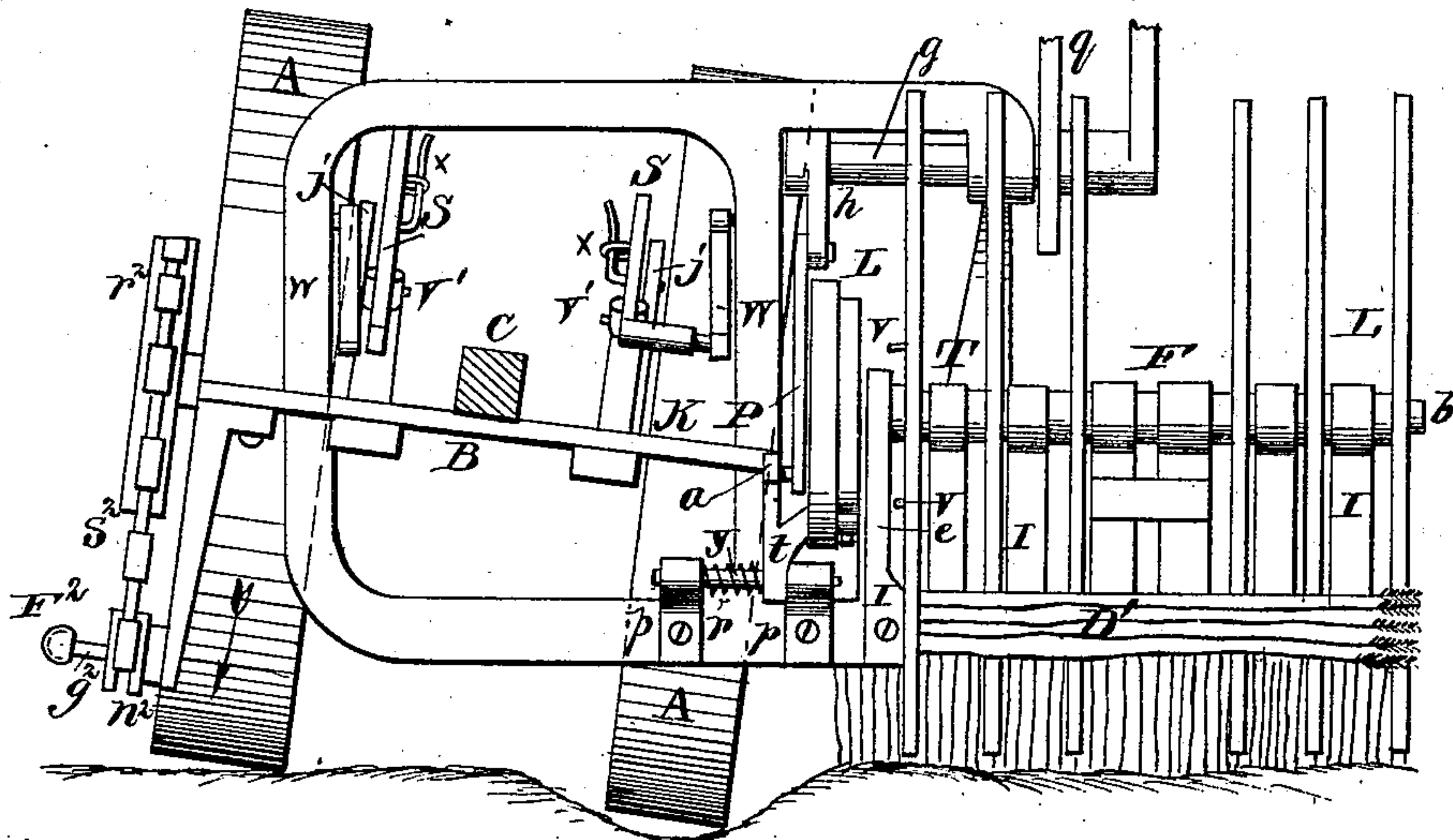
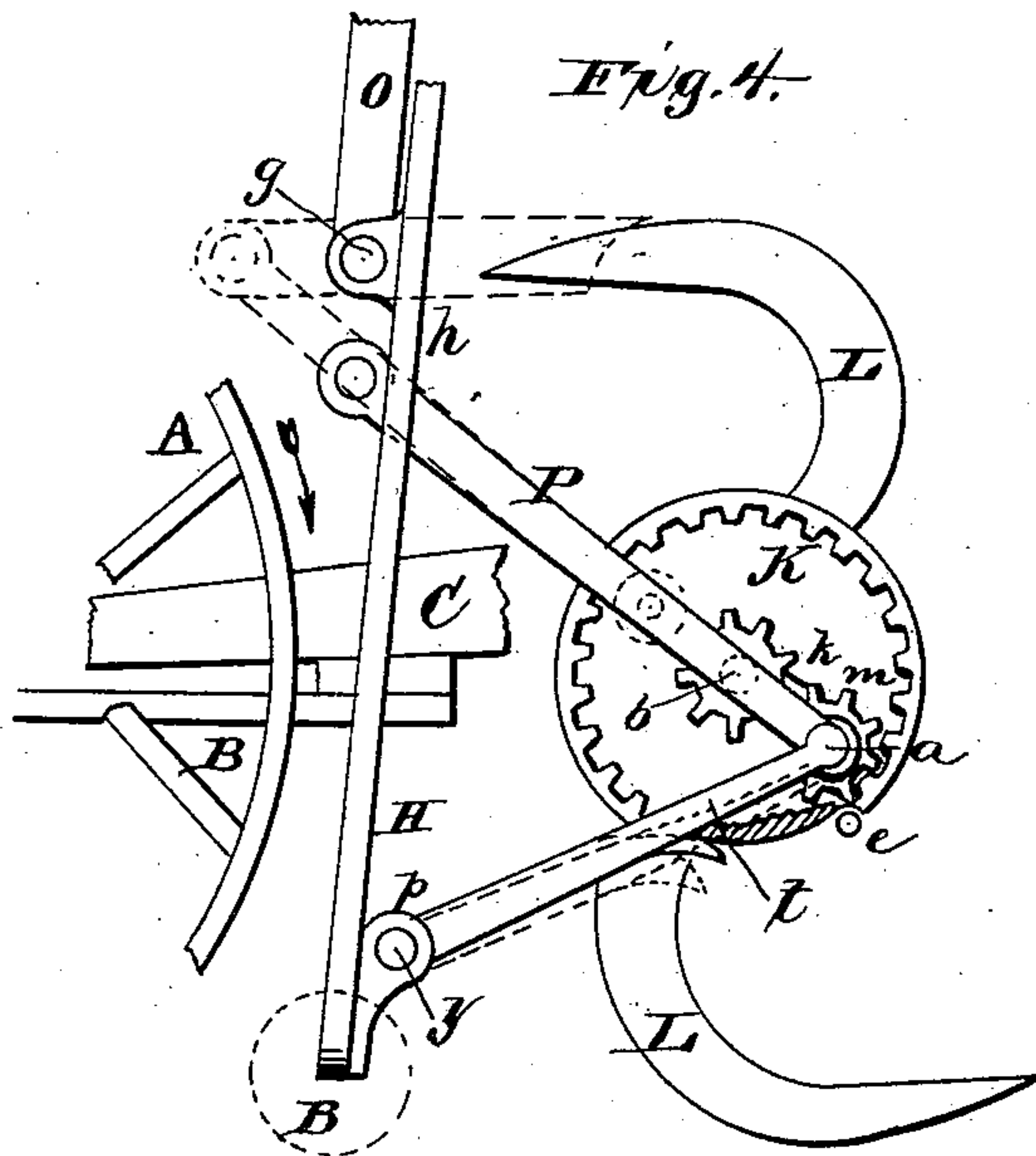


Fig. 4.



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UNITED STATES PATENT OFFICE.

ALEXANDER ROSS AND SAMUEL J. PARKER, OF ROCHESTER, NEW YORK.

IMPROVEMENT IN GRAIN-BINDERS.

Specification forming part of Letters Patent No. **215,680**, dated May 20, 1879; application filed October 16, 1878.

To all whom it may concern:

Be it known that we, ALEXANDER ROSS and SAMUEL J. PARKER, of Rochester, in the county of Monroe and State of New York, have invented a new and useful Improvement in Grain-Binders, which improvement is fully set forth in the following specification and accompanying drawings, in which—

Figure 1 is a left-side elevation of an ordinary self-raking reaper with our improvement attached; Fig. 2, a plan of same; Fig. 3, Sheet 3, a front elevation with various parts omitted; Fig. 4, an enlarged view of a portion of the machine, seen as indicated by the arrow *z* in Fig. 2.

The main object of our invention is to attach an automatic binding device to an ordinary self-raking grain-harvester; and it consists, substantially, in the employment of an intermittingly-revolving gavel-lifter or "pick-up," acting in concert with the binder, by means of which the gavels that have been deposited upon the ground by the rakes are successively picked up and presented to the binder to be bound.

In the drawings, A are the driving-wheels, B the frame, C the draft-tongue, D the seat, E the apron, and N a rake, of an ordinary right-hand self-raking harvester, to the left front of which we attach an automatic pick-up, F, for the gavels, with an accompanying binding-arm and wire-twister and a sheaf-carrier, G, the pick-up and binder being relatively so located with reference to the cutter-bar as to operate upon the gavels of one swath while the next succeeding swath is being cut.

H, Figs. 1 and 3, is a frame, nearly vertical, but slightly inclined forward, hung at the front end of the reaper-frame B, from the lower horizontal bar of which a series of forwardly-inclined supports, I, extend to hold a rotating shaft, *b*.

J, Fig. 1, is a sprocket, fitted to turn freely upon the extended outer hub of the driving-wheel A, and made capable of being locked to said wheel; and K, a similar sprocket, fitted to turn freely upon the shaft *b*, the two being connected by a chain, and, by means herein-after described, the shaft *b* is caused to make intermittent half-rotations.

L are a series of S-shaped bars, collectively forming a lifting device for the gavels, curved alike at both ends, distributed upon the shaft *b*, as shown, and fast thereto, being of such a length that the bottom ends or points comb through the stubble near the ground and arrest or pick up in succession the gavels previously deposited upon the stubble by the rakes as they clear the platform. By means of a half-rotation of the shaft *b*, above mentioned, when the lower hooks of the pick-up have received a gavel it is carried over to the position shown by the heavy dotted circle *f*, where it is bound.

Near the upper edge of the frame H is hung in bearings a shaft, *g*, that carries the binder-arm O. This shaft is provided with a pendent crank, *h*, to the pin of which is attached a connecting-bar, P, leading from a stud or pin, *a*, of a crank or yoke, *k*, Fig. 4, Sheet 3, said yoke occupying a circular depression in the side of the sprocket K, and capable of turning independently of and upon the shaft *b*.

The sprocket K is provided with internal cogs, as shown.

l is a pinion secured to the shaft *b*, having its cogs facing those of the sprocket, and *m* an intermediate pinion, turning independently upon the stud *a*.

It will be understood that when the sprocket K is rotated, the pinion *m*, if not prevented, will be carried around the pinion *l*, the yoke *k* serving to hold it in proper position between the same and the sprocket, causing the binder-arm, by means of the aforesaid connecting-bar and crank *h*, to move upward and downward, its uppermost and lowermost positions being shown, respectively, in full and dotted lines in Fig. 1. It will be understood, also, that if the stud *a*, carrying the pinion *m*, be held at any point, the motion of the sprocket will be transmitted through the pinion *m* to the pinion *l*, causing the shaft *b*, with the gavel-lifter, to rotate. Thus the binder and the pick-up will move alternately, but never both at once.

p, Figs. 3 and 4, are lugs, holding a shaft, *y*; and *t*, a bifurcated bar or stopping device reaching thence, one branch to meet and stop the stud *a* at a point diametrically opposite the crank *h*, in which position the binder-arm

is at its highest, and the other to be encountered by tripping-pins *e*, fixed on the side of the sprocket *K*.

The shorter curved branch of the stop *t* is held against the periphery of the sprocket by the spring *r*, and as the pins *e* pass it, it is forced temporarily away therefrom, as shown in dotted lines, causing the stop *t* to release the stud *a*, and allow the pinion *m* to make one complete revolution around the pinion *l*, and carry the binder-arm through one complete operation of binding a sheaf, all of which will be understood by inspecting Fig. 4.

When the pinion returns, the stud *a* again encounters the stop, where it is held while the pick-up makes a half-rotation, when a pin, *e*, will have again reached and tripped the stop-arm, as before.

A check-spring, *u*, Fig. 2, engaging a pin, *v*, projecting from one of the pick-up bars, prevents a backward rotation of the pick-up.

The frame *H* is hung upon hand-levers *S*, Figs. 1 and 3, extending near the driver's seat, being connected to said levers by links *w*. By means of these levers the driver is enabled to elevate or depress at will the portion of the frame to which is attached the pick-up, and keep it parallel with the surface of the ground over which it passes, this being rendered necessary in case one or the other of the driving-wheels follows in a dead-furrow in the ground, as represented in Fig. 3; and by operating said levers alike, the driver may elevate or depress in parallel positions the whole frame with its adjuncts, causing the hooks of the pick-up to skim along close to or farther from the ground, as occasion may require.

The levers are held at any desired position of adjustment by means of snap-latches *x*, Fig. 2, sprung into holes in the curved pieces *j*, Fig. 1.

T, Figs. 1 and 2, is a steadying-bar, pivoted at *k*¹ to the rear of the reaper-frame, and joined to the frame *H* by a ball-joint, *l*¹. This bar assists to support the overhung portion of the frame *H*, and the ball-joint permits the adjustments of the said frame above described.

n, Figs. 1 and 2, is a forked standard rising from the bar *T*, and holds between its branches a cylinder or drum, *c*, and wire-spool *i*, the latter being vertically adjustable from its trunnions, resting in vertical slots in the jaws of the fork, as shown.

q is a semicircular piece, being a half cord-pulley, seated upon the binder-arm shaft *g*, and having its periphery grooved to receive a cord, *f*¹, which passes over the cylinder *c* in a groove, causing the latter to rotate as the shaft *g* is rotated to move the arm. The cord is secured to the lower end of the half-pulley, and at the other end the cord is fastened in the eye of a tension-bolt, *a*¹, resting within a loop, *e*¹, formed at the upper end of the half-pulley, said bolt, by means of its contained nut and spiral spring, to be adjusted to give to the cord *f*¹ its required tension.

The drum *c* is made shorter than the spool,

so that the flanges of the latter may close over the ends of the former and allow the wire coiled upon the spool to rest upon the surface of the cylinder or drum, on account of which, when the latter is rotated by the cord *f*¹, the spool will be rotated, and give off or take on wire, as the case may be. The wire taken from the top of the spool passes over a pulley contained by a swivel roller-holder, *o*, thence back between the surfaces of the drum and spool to the wire-guide *U* and nose of the binding-arm. (Best shown in Fig. 1.)

It will now be understood that if the binder-arm descend the drum will rotate forward, or in the direction that the driving-wheels rotate, causing the spool to rotate reversedly and give off wire. Should the arm rise, the direction of rotation of the spool would be reversed, by which any slack in the wire would be taken up.

The roller-holder *o* is fitted to turn freely in the fork *n*, so that the upper end, containing the roller, may swing toward one or the other end of the spool, according as the wire is taken therefrom.

Q, Fig. 1, represents the nose portion of the binder-arm reversed, showing cogs forming a rack, which, when the arm descends, rotates a pinion, (not shown,) by means of which the wire-twister is driven.

We intend to use some suitable pattern of wire-twister, placed under the plate *b*¹, as shown in Fig. 2. This, however, forms no part of this present invention.

R, Figs. 1 and 2, is a bent rod, forming a device by which the bound sheaves are moved away from the binder automatically upon a sheaf-carrying device, *G*, presently described. This sheaf-mover is operated by a stud, *d*¹, extending out from a side of the sprocket *J*, and its rear end is arranged to slide through a loop, *g*¹, attached beneath the rear timber of the reaper-frame. A dotted position of the sheaf-mover is shown in Fig. 1.

The sheaf-carrier *G*, Figs. 1 and 2, consists of several parallel horizontal rods, *G*, resting upon offset or crank-shaped rods *V*, extending downward from the reaper-frame *B*. The rear supporting-rod, *V*, at its right-hand end, turns upward near the driver's seat, and forms a handle, by means of which the driver is enabled at will to drop the carrier to the ground, as shown in dotted lines, and cause the sheaves to be discharged therefrom by sliding from under them.

W is a catch pending neath the seat *D*, containing a notch in which to hold the rod *V*, to keep the sheaf-carrier up off the ground; and to dump the same the driver has simply to disengage the rod from said notch and let it drop.

The sheaf-carrier is also constructed to be dumped automatically as follows: *h*¹ is a shaft supported at the rear of the reaper-frame, provided at its left end with a star-wheel or ratchet, *m*¹, and at its right with a circular cam, *p*¹. The star-wheel is so placed that the rear end of the bundle-mover *R*, at each motion of the same, is caused to impinge against

the lowermost of its numerous teeth, rotating it, with the shaft and cam, to the amount of the distance between two adjacent teeth.

The rod V is provided with a finger, e' , fastened with a thumb-screw, which rides upon the periphery of the cam p' , and holds the sheaf-carrier up to its normal position. A notch, i' , in the cam, when presented, allows the finger to drop therein and dump the sheaves, as above described. By loosening the thumb-screw the finger may be turned away from the cam and the dumping done by hand, as aforesaid.

t' , Fig. 2, is a bent foot-lever, to be operated by the driver, forked upon the sleeve d of the sprocket J, by means of which the clutch at the end of the sleeve may be thrown off the pin r' , extending from the hub of the driving-wheel, and the binder, with its accompanying parts, stopped. When the lever t' is released, the spring s^1 will throw the clutch back into gear.

C' , Figs. 1 and 2, is a lever fulcrumed in a timber at the rear of the frame B, to the lower end of which is jointed the finger-bar or other piece supporting the rakes, apron, &c. o^1 is a key or pin passed through the lever C' , and through a hole in the fixed quadrant u' , having other holes corresponding to the hole in the lever, by means of which the lever is held at a position of adjustment. If the driver throw the top of the lever to the left, as shown in dotted lines in Fig. 2, the whole cutting and raking mechanism will be moved to the right, as shown in dotted lines, or vice versa. Thus the lateral distance—*i. e.*, the distance measured in a direction at right angles with the line of the advance of the reaper—between the cutting-bar and the pick-up may be increased or diminished at pleasure. This control by the driver over the distance between the said parts is important, as allowing the pick-up to be properly presented to the gavels with reference to the length of the straw forming the same, while the cutting-bar is permitted at all times to cut a full-width swath.

It is designed to drive the cutter-bar by means of a pitman, F' , lying at right angles with the said cutter-bar, said pitman being attached to a crank-pin, g^2 , at one end, and at the other end to links o^2 and o^3 , the former being attached to the cutter-bar, while the latter is attached to the stationary finger-bar I' . The pitman is attached to the crank-pin g^2 by a ball-joint, so that it may work freely and equally well when the cutting mechanism is moved to any position of lateral adjustment by means of the lever C' , above described. The pin g^2 projects from the side of a small sprocket, n^2 , which latter is driven by the chain s^2 , leading from a large sprocket, r^2 , fast upon the main driving-shaft.

G' , Fig. 2, represents a gavel just deposited upon the ground from the platform by an automatic rake, N, Fig. 1. D' , Figs. 1, 2, and 3, represents a gavel of the last preceding

swath cut and laid by the reaper about to be taken up by the pick-up.

The rate of motion of the rotations of the pick-up is so related to that of the general advance of the reaper that, regarding Fig. 1, the upper hooks of the pick-up, as the same rotates, strike into the stubble at a point a little back of where the lower hooks leave it, the result of which is, that the stubble is continuously raked by the pick-up, and any scattered grain, as from the "slobbering" of the rakes, will be gathered and bound in the sheaves.

E' , Fig. 2, represents a bound sheaf resting upon the sheaf-carrier, having been pulled back by the sheaf-mover R.

The pick-up works equally well whether the grain is swathed by the rakes or divided into gavels. In practice the field of grain is first cut around once by the reaper, with the pick-up and binder thrown out of gear by means of the foot-lever t' , above described. When around, and the first gavel is reached, the said parts are allowed to operate and successively bind the gavels as they are overtaken, while the reaper lays the next swath. The last swath may be bound by throwing the sickle-bar out of gear and driving back over it with the pick-up and binder operating. The driver, if he wish it, may, by means of the foot-lever, cause the pick-up to carry a gavel to the next, and bind two in one sheaf.

In case the machine is to be used as a mower, the frame H, with the pick-up, binder, and other adjuncts, can be detached therefrom by simply removing the fulcrum-pins v' from the hand-levers S and the pin b^2 , holding to place the steadying-bar T. By removing the screw c^2 from the end of the main shaft, the sprocket J and sheaf-mover may be detached, and the sheaf-carrier may be taken off by removing the loops k^2 , holding the rear rod, V.

We are aware that a harvester has been made in which the grain has been cut and deposited on the ground and immediately taken up by a rake following in the line of the grain thus deposited, and conveyed to a point on the machine for the binder to bind it by hand.

In our machine the grain is deposited on the ground and left there in regular gavels by the rake. When the machine passes along the next time and cuts a new swath, the binder picks up at the same time the gavels of the first swath and binds them automatically into proper-sized sheaves.

We claim as our invention—

1. In combination with a self-raking reaper, a grain-binder attached to the reaper, and arranged to automatically take up and bind the grain of one swath while the reaping-machine is cutting another swath.

2. The combination of a self-raking reaper, a grain-binder attached thereto, and arranged to automatically take up and bind the grain of one swath while the reaping-machine is cutting another swath, and a sheaf carrying and dumping device.

3. A combined self-raking reaper and grain-binder, constructed to admit of a lateral adjustment for the purpose of regulating the distance between the cutter-bar and the binding device.

4. The combination of a self-raking reaper, an automatic grain-binder, arranged to take up and bind the grain of one swath while the reaping-mechanism is cutting another, a sheaf-carrier, G, and an automatic sheaf-moving device, R, all constructed substantially as and for the purposes herein set forth.

5. In combination with a self-raking reaper, an automatic binding device, as shown and described, made capable of being tilted laterally, so as to be kept parallel with the surface of the ground over which it moves.

6. In combination with a self-raking reaper, a combined lifting and binding device, substantially as shown and described, constructed and arranged to be vertically adjusted to different distances from the ground.

7. A self-raking reaper provided with an automatic binding device, constructed substantially as shown and described, and adapted to be readily detached from said reaper, for the purpose set forth.

8. The combination, in a grain-harvester, of an automatic binding and lifting device, substantially as described, frames B and H, and levers S, with which to adjust the said lifter and binder with reference to the ground.

9. The fork or jaws *n*, provided with slots to receive the journals of the spool *i*, for the

purpose of allowing a free vertical adjustment of the same, in combination with said spool and cylinder *c*, substantially as shown, and for the purpose set forth.

10. In combination with the spool *i*, cylinder *c*, and fork *n*, a pivoted roller-holder, *o*, for the wire, hung so as to be capable of freely turning toward either end of the spool as the wire is drawn therefrom, substantially as shown, and for the purpose set forth.

11. The combination, with a binder-arm, of the cord-carrier *g*, fork or frame *n*, drum *c*, gravitating spool *i*, and the cord *f'*, connecting the drum with the cord-carrier, substantially as and for the purposes herein set forth.

12. The combination of the stop *t*, shaft *g*, spring *r*, lugs *p*, and frame H.

13. In combination with the main frame of a self-raking reaper, the adjusting-levers S, the frame H, carrying a grain-binding mechanism, and the steadying-bar T, loosely pivoted to the main frame, and connected to the frame H by a ball-joint, substantially as and for the purposes herein set forth.

14. In combination with the binder-arm, the shaft *g*, crank *h*, connecting-bar P, stud *a*, yoke *k*, pinions *m l*, stop *t*, and sprocket K, substantially as and for the purposes herein set forth.

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