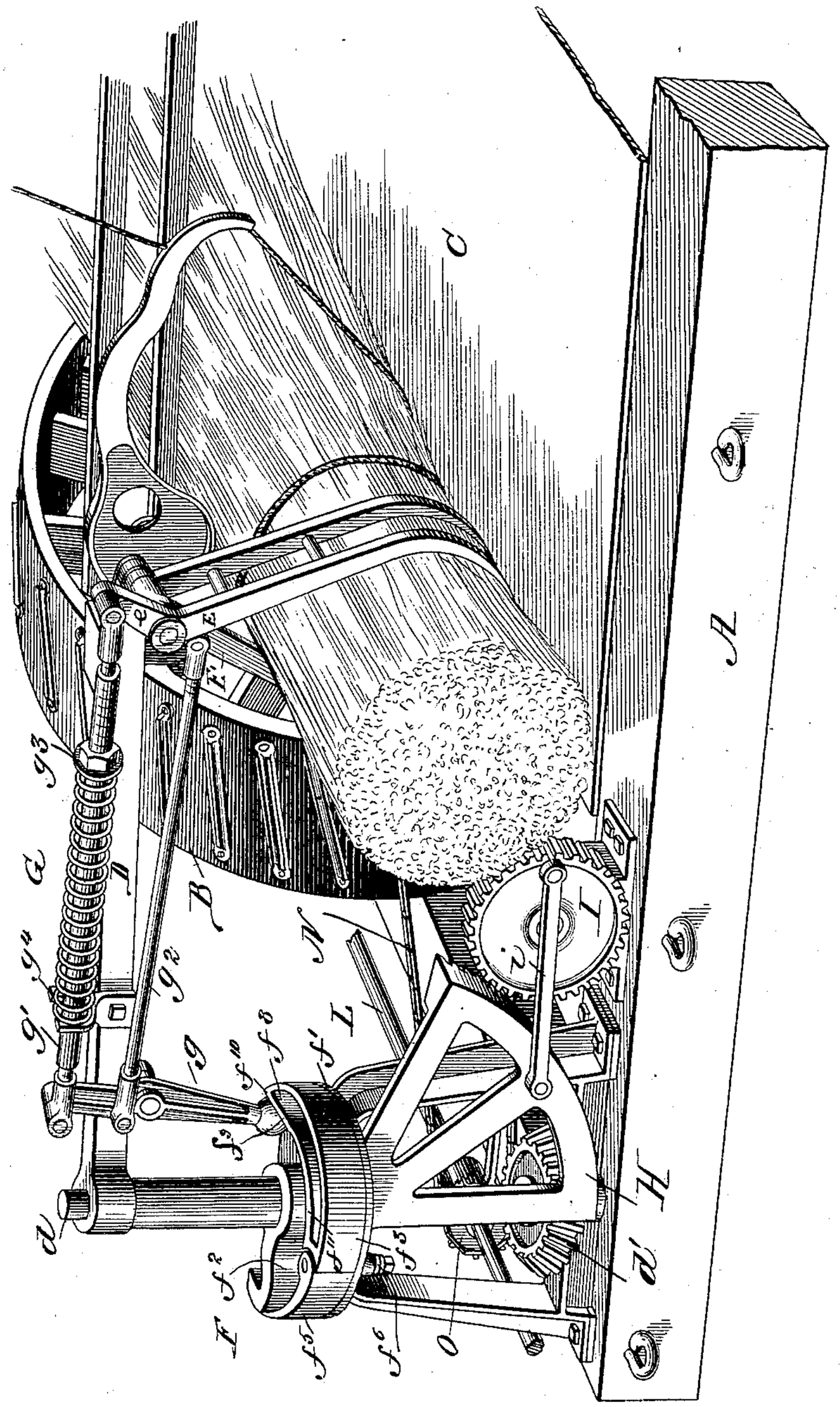
(No Model.) 4 Sheets—Sheet 1.

M. M. HOOTON.

SHEAF DISCHARGER FOR GRAIN BINDING HARVESTERS.

No. 374,303. Patented Dec. 6, 1887.



Witnesses.
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L. S. Logan

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(No Model.) 4 Sheets—Sheet 2.

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SHEAF DISCHARGER FOR GRAIN BINDING HARVESTERS.

No. 374,303. Patented Dec. 6, 1887.

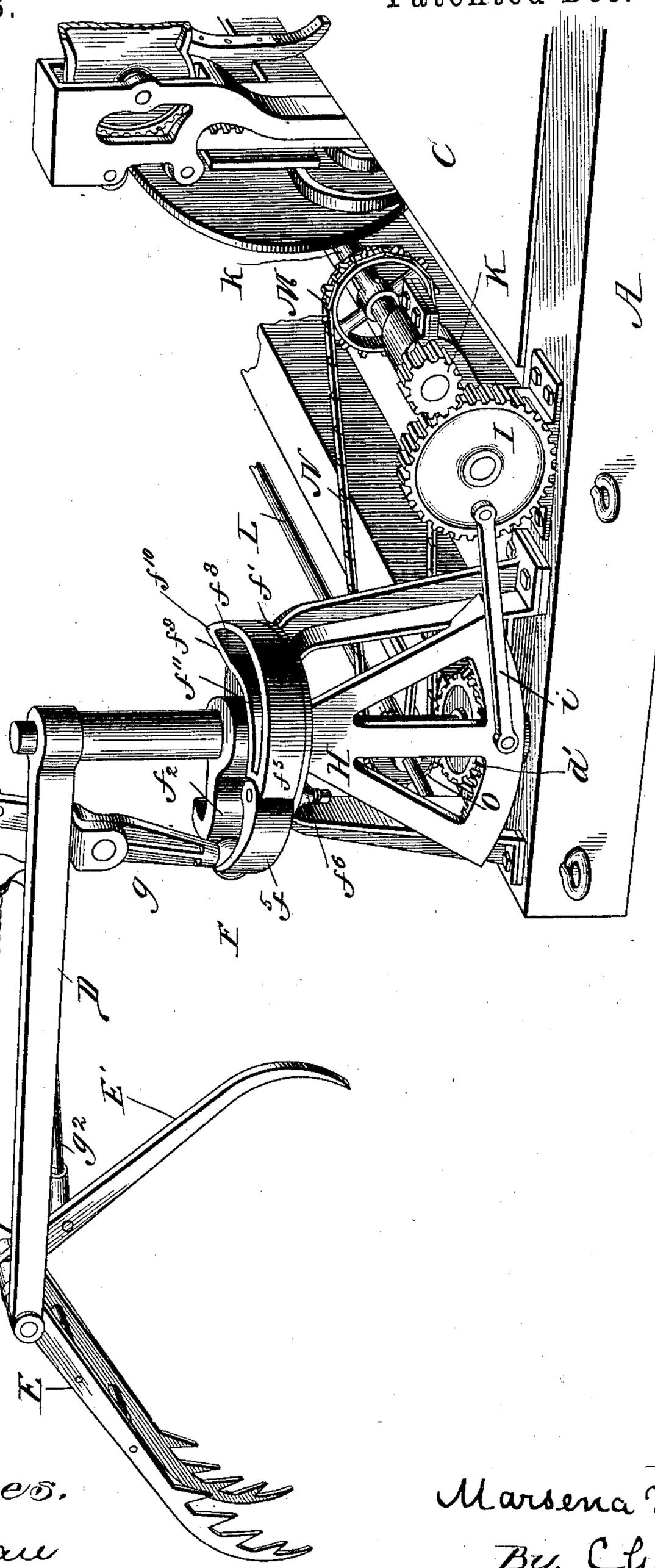

Fig. 2.

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4 Sheets—Sheet 3.

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SHEAF DISCHARGER FOR GRAIN BINDING HARVESTERS.

No. 374,303. Patented Dec. 6, 1887.

Fig. 3.

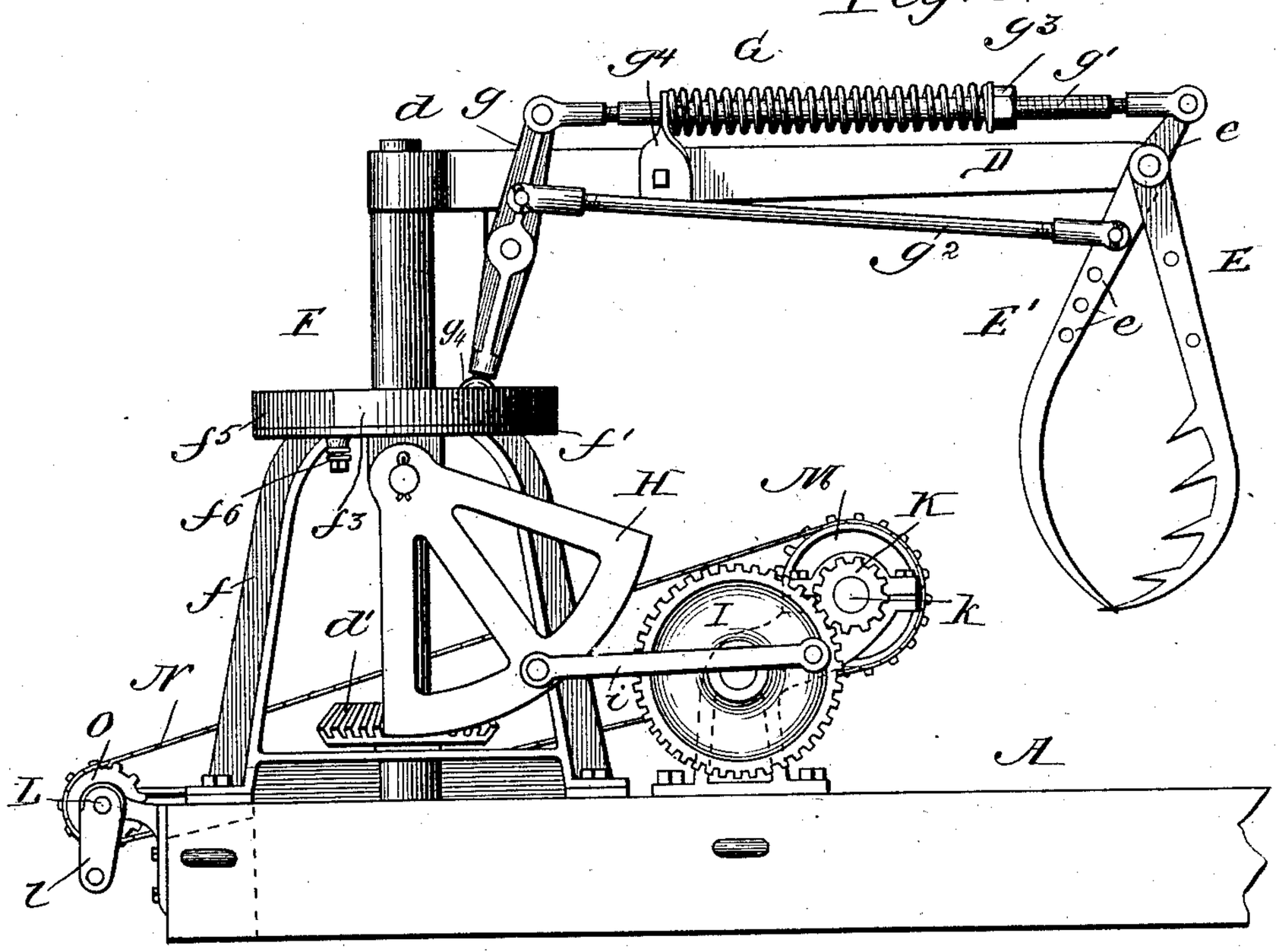


Fig. 4.

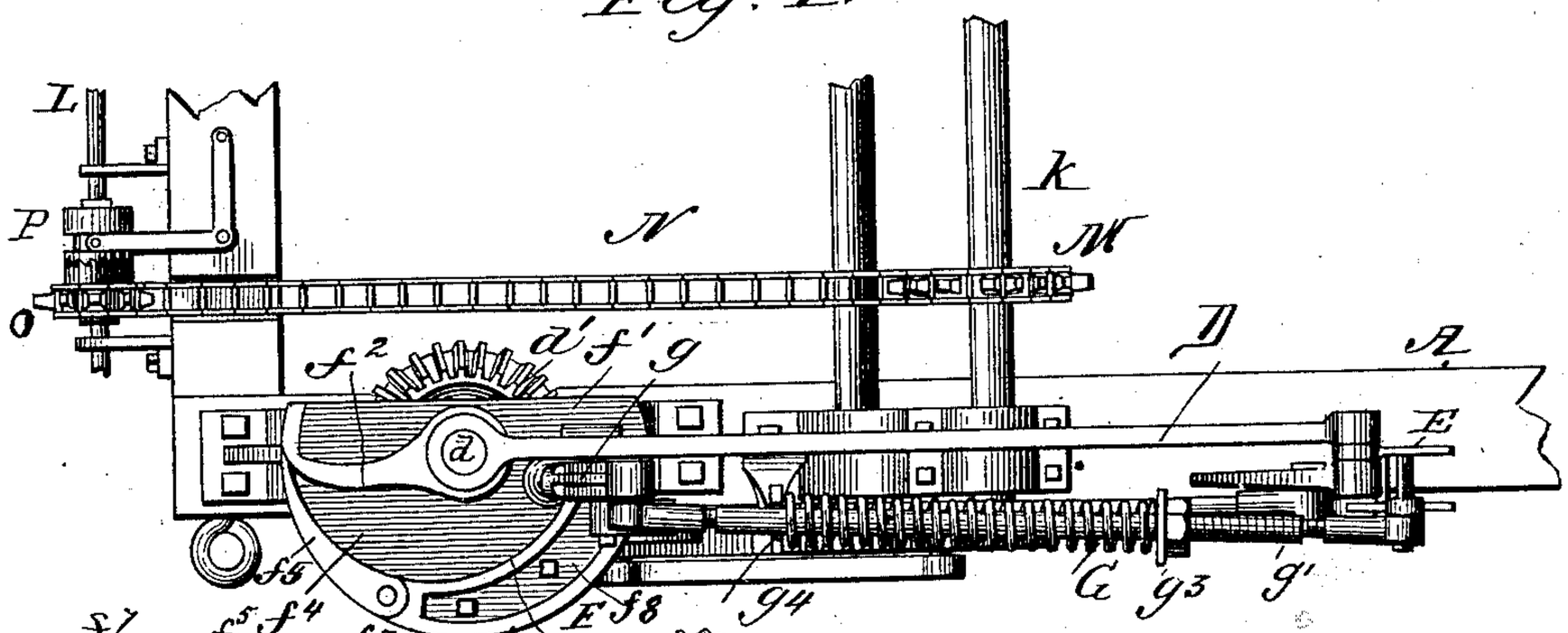


Fig. 5.

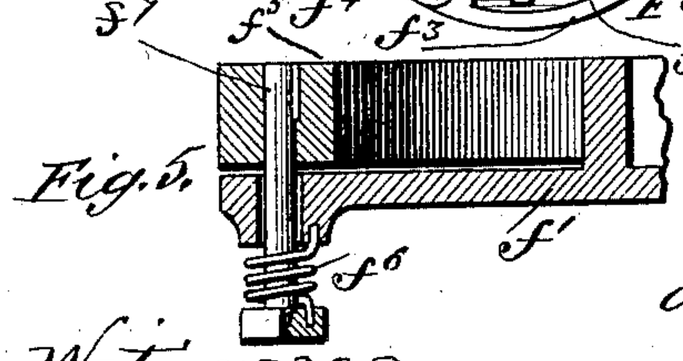
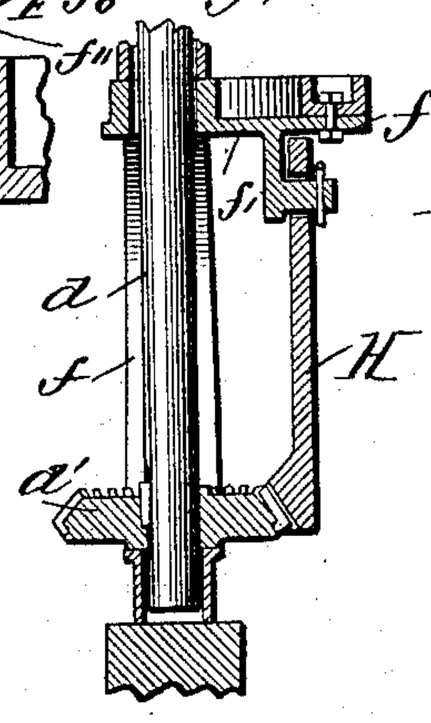


Fig. 6.



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(No Model.) 4 Sheets—Sheet 4.

M. M. HOOTON.

SHEAF DISCHARGER FOR GRAIN BINDING HARVESTERS.

No. 374,303. Patented Dec. 6, 1887.

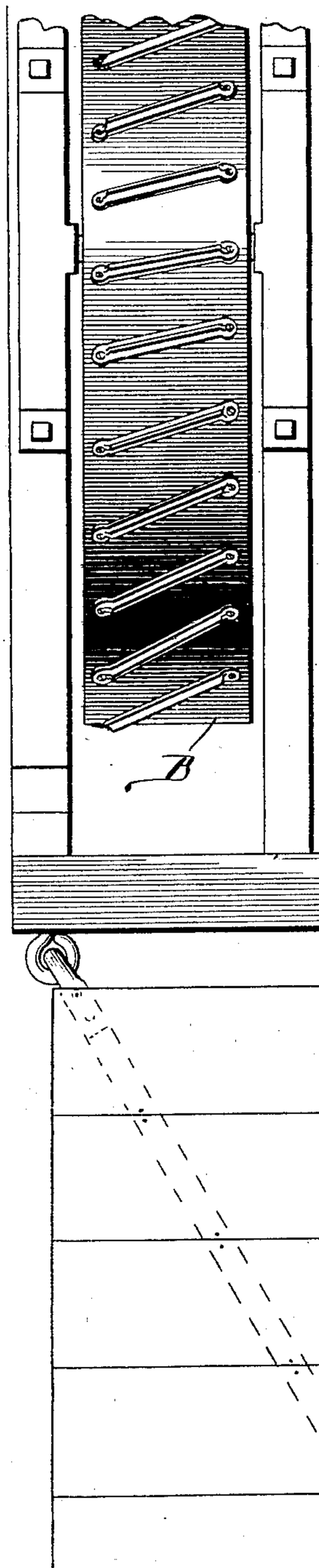
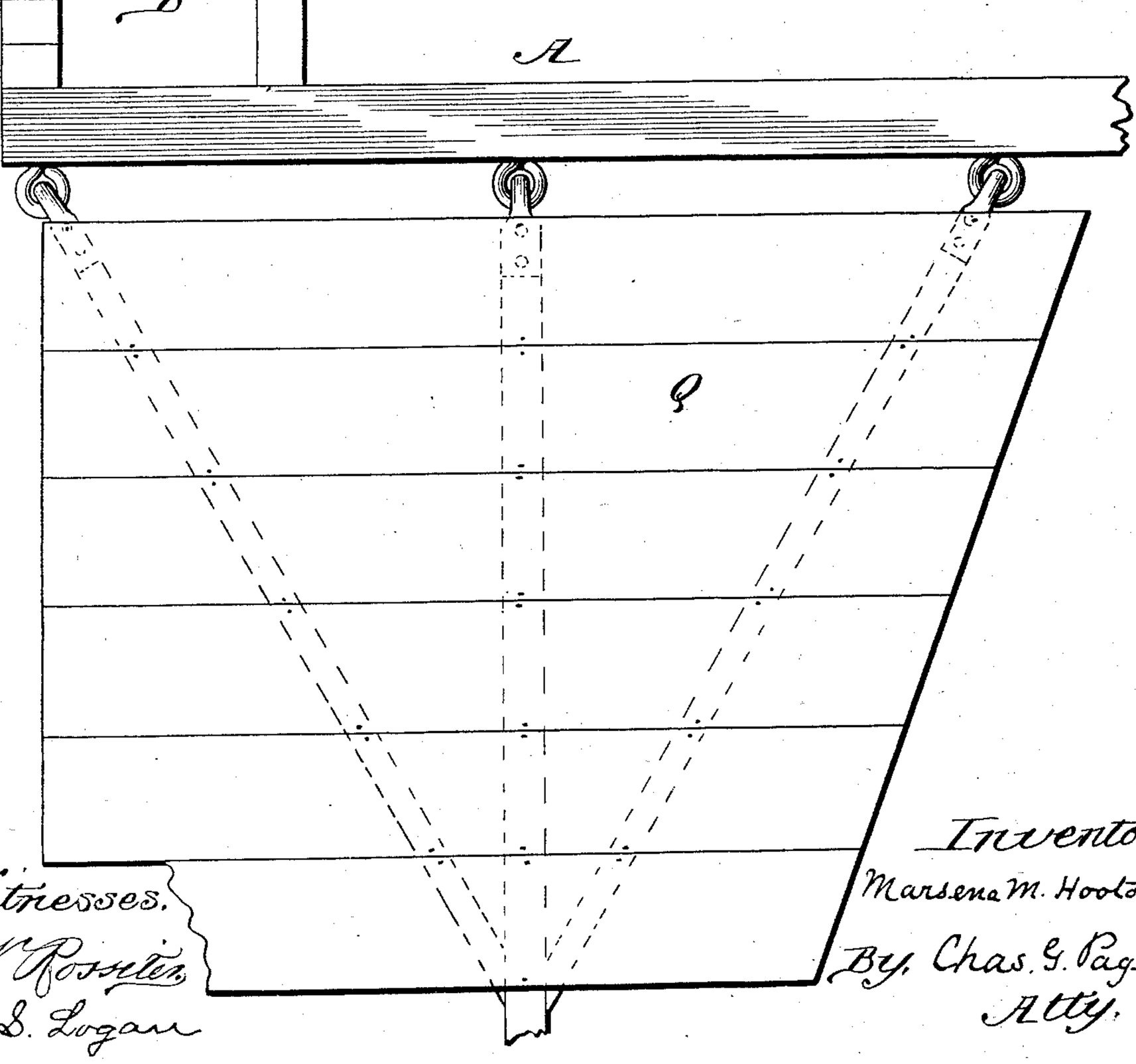


Fig. 1.



Witnesses.
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UNITED STATES PATENT OFFICE.

MARSENA M. HOOTON, OF CHICAGO, ILLINOIS.

SHEAF-DISCHARGER FOR GRAIN-BINDING HARVESTERS.

SPECIFICATION forming part of Letters Patent No. 374,303, dated December 6, 1887.

Application filed November 5, 1886. Serial No. 218,111. (No model.)

To all whom it may concern:

Be it known that I, MARSENA M. HOOTON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Sheaf-Dischargers for Grain-Binding Harvesters, of which the following is a specification.

This invention relates to an improvement in means for discharging the bound sheaves from self-binding grain-harvesters, and is particularly directed to the discharging of sheaves from self-binding grain-harvesters of that kind commonly known as "low-down binders," in contradistinction to the kind known as "high binders," wherein the grain is invariably carried up over the main driving and supporting wheel, (or "bull-wheel," as it is frequently termed,) and preparatory to the discharge thereof bound at an elevation outside of or beyond what is known as the "stubble" side of such wheel.

Prior to my invention, so far as I am aware, the sheaf has been formed and discharged from a grain-binder in three ways only, the first being to carry the grain up over the bull-wheel and to discharge the sheaf after it has been bound at an elevation beyond or opposite the stubble side of the bull-wheel, as in the machines known as the "high binders," the second being to discharge the bound sheaf either over the bull-wheel or to the rear of the same, and the third being to crowd the sheaf down between the bull-wheel and the point where the sheaf is bound.

The production of a practical, successfully-operating low-down self-binding harvester, which shall more effectively perform the work of and avoid the many disadvantages of the cumbersome high binder, has long been desired, it being observed that among some of the many disadvantages attending the high binder in use at the present day, and well known to those familiar with grain-harvesters, the act of carrying up the grain over the bull-wheel preparatory to binding and discharging thrashes out the grain to a serious extent. Crowding down the sheaf at a point between the bull-wheel and the point at which the sheaf is bound fails to overcome all of the objections to the high binder, and, while necessitating an increased width of machine, prevents, by the very presence of a discharge-passage at such point, the employment of simple and desirable means for compressing and binding the sheaf. To bind opposite the inner side and discharge over the bull-wheel would attain but little, if any, desirable results over the high binder, and to bind opposite the inner side of the bull-wheel and discharge back of the same is objectionable for at least two prominent reasons: first, that the sheaf would be carried grain end foremost, thereby tending to shell the grain, and, secondly, the separation of the grain ends of the sheaf from the grain in a succeeding gavel, in case of entanglement, cannot be freely accomplished. It is also desirable in constructing a low-down binder to avoid the objectionable features of the old and practically abandoned form of rear-cut machine, wherein the sheaf is bound in rear of the bull-wheel, machines of such character being of too great length and having so great side draft as to render them unmarketable.

The more prominent objects of my invention are to avoid the disadvantages attending the operation of discharging the sheaf by either of the several foregoing-stated methods and to discharge the sheaf from the front of the machine in advance of and to the outer or stubble side of the driving-wheel; to avoid shelling of the grain during the discharge of the sheaf, and at the time the sheaf is dropped in the field; to cause the sheaf to be taken with certainty and freely carried off; to readily separate the grain of the sheaf from grain collected to form a gavel, in case the two should become tangled up, and to insure a ready release of the sheaf from the sheaf-discharger at the proper moment.

To the attainment of the foregoing and other useful ends my invention consists in matters hereinafter described, and particularly pointed out in the claims.

In providing a sheaf-discharger for a grain-binding harvester in accordance with my invention the sheaf-discharger is arranged to discharge from the front of the machine around in advance of and to the outer or stubble side of the driving-wheel, upon which the main frame of the machine is at the stubble side thereof supported. The bound sheaf upon the binding-table is taken between jaws of the

sheaf-discharger and carried off butt-end foremost, the jaws being opened at the proper moment for dropping the sheaf by means of a cam. The jaws are held open during the return movement of the sheaf-discharger until they have straddled another bound sheaf at a desired point, at which moment the jaws are closed by the action of the spring.

The devices which are more directly connected with the jaws, and which are alternately controlled by the cam and the spring, will be hereinafter more particularly described, as will also other devices herein involved and constituting features of improvement.

In the drawings, Figure 1 represents a portion of a low-down grain-binding harvester-frame with a sheaf-discharger arranged to operate in accordance with my invention, the jaws of the sheaf-discharger being shown as having grasped the sheaf and drawn the same slightly forward. Fig. 2 is a perspective showing the sheaf-discharger in its forward or outward position. Fig. 3 is a side elevation mainly representing the sheaf-discharger in its back position with the jaws closed. Fig. 4 is a top plan view of Fig. 3. Fig. 5 is a detail section taken through what may be termed the "cam device" and its latch. Fig. 6 is a detail section mainly representing the device for swinging the sheaf-discharger. Fig. 7 is a detail representing in plan the forward portion of the machine at the outer or stubble side thereof.

The main frame A, which is herein but partially represented, is of any suitable construction and is supported at the outside or stubble side of the machine from the bull or driving wheel B, as usual.

The low-down binding table or platform C, whereon the gavel is received and bound into a sheaf, is in point of location alongside of and substantially opposite what may be termed the "inner" side of the driving-wheel, which latter, in consideration of its required size, stands higher than the low-down binding-table.

The sheaf-discharger is arranged to discharge the bound sheaf from the front of the machine around in advance of and to the outer or stubble side of the driving-wheel—that is to say, it is arranged to take the bound sheaf from the binding-table, carry the same round in a path between the driving-wheel and the horses, and then drop the sheaf at a point beyond the stubble side of the machine.

A desirable disposition of the sheaf-discharger for the foregoing-stated purpose is to support it upon the front of the main frame of the machine in front or advance of but to some extent toward the outer side of the driving-wheel B. When placed in such locality, the sheaf-discharger may be constructed and operated without reference to any accommodation on its part to the driving-wheel, and, furthermore, a clear field in front of the binding-platform and driving-wheel is offered for the full sweep of the sheaf-discharger and the sheaf which it carries during the operation of discharging the sheaf. The cut grain falls upon the grain-receiving platform of the harvester with the butt-ends of the grain toward the front of the machine and just back of the sickle-bar. When the gavel is bound into a sheaf, the butt-end of the sheaf is substantially on a line with the sickle-bar of the harvester and toward the front of the machine, as in Fig. 1, wherein the sheaf-discharger is represented as having grasped the sheaf and being at the commencement of its discharging action.

I find it particularly desirable to discharge or carry off the sheaf both endwise and butt-end foremost, first, for the reason that shelling of the grain on the binding-table is avoided, since the sheaf is not drawn off oppositely to the direction in which the beards of the grain lie and point; secondly, for the reason that when the sheaf is being bound and grain is collecting in the gavel-gage to form a new sheaf the grain of the two often interlace and become tangled up at their bearded ends, and hence by carrying off the sheaf butt-end foremost and with an end movement the grain of the sheaf will be readily drawn out and separated from the grain which has collected in the gavel-gage; thirdly, for the reason that owing to the position of the sheaf it may be taken hold of by the sheaf-discharger near the butt-end of the sheaf, whereby each successive sheaf can always be taken hold of at the same point, since its butt will always lie in one position substantially in line with the sickle-bar whether the grain be long or short, and, furthermore, the sheaf can be released by the sheaf-discharger, so as to drop butt-end down, thereby avoiding shelling grain on the ground. To the attainment of such ends I provide a sheaf-discharger having a horizontally-swinging support or arm, D, which is pivotally supported and provided with a pair of jaws, E and E′, for alternately grasping and releasing the sheaf at proper moments during the operation of the machine. These jaws can be variously constructed with reference to their adaptability to grasp and hold the sheaf during the discharging movement of the sheaf-discharger, one of the jaws herein shown being, however, desirably double-pronged and provided with teeth, while, if preferred, the other can consist simply of a single prong. These jaws are closed upon the sheaf by spring-power, in preference to the employment of any positively-acting closing mechanism, it being desirable that they should be spring-controlled with reference to their closing action in order to permit them to adapt themselves to the size of sheaf. The jaws are, however, opened against the spring-resistance by a mechanism acting positively, which mechanism serves at the required moment to bring the jaws apart to an extent sufficient to permit the sheaf to drop from their grasp, and also to open the jaws to an extent to permit them to straddle the sheaf preparatory to grasping the same.

As a simple and effective means for the attainment of the foregoing ends, the jaws are opened by a cam, f^2, and closed by a spring, G, appropriate connecting or power-transmitting devices being employed to permit said cam and spring to alternately control the actions of the said jaws. The swinging arm or jaw-carrier D of the sheaf-discharger is mounted upon an upright oscillatory shaft, *d*, forming a pivot which at proper times is oscillated for the purpose of swinging the arm over the binding-table, so as to bring the pendent pivotally-hung jaws into position for taking hold of the sheaf, and also for swinging the said arm round at the front of the machine in order to discharge the sheaf after the same has been taken by the jaws.

The swinging arm or jaw-carrier D of the sheaf-discharger carries a vibratory lever, *g*, which is connected with the jaws in a manner whereby, when the lever is turned about its pivot or fulcral point in one direction, it shall serve to positively open both jaws. As a simple mode of thus transmitting power from the lever to the jaws, one of the jaws--for instance, the jaw E—has a shank or tail-piece, *e*, extending beyond the pivotal support for the jaws, and this tail-piece is connected with the outer end of one of the arms of lever *g* by a connecting-rod, *g'*. The jaw E' is connected with the same arm of said lever by a connecting-rod, g^2, the rod in this instance being, however, at one end connected with the prong which forms the jaw, and at its other end connected with the above-mentioned arm of lever *g*, desirably at a point somewhat nearer to the fulcrum or pivot of the lever than the point at which the rod *g'* is connected to said lever-arm. By such arrangement it is obvious that when the lever is swung or turned in one direction the jaws will open, and that when it is swung or turned in a reverse direction the jaws will close, it being observed, however, that in closing the jaws the lever is operated by the spring, while in opening the same the lever is actuated by the cam device.

The spring G, which serves as the jaw-closing power, is arranged upon the rod *g'*, with one end abutting against an adjustable abutment or nut, g^3, upon the rod, and with its opposite end abutting against an abutment, g^4, which is fixed upon the arm D, and which may also serve as a guide for the rod, the adjustable nut serving under such arrangement as a means for varying the spring-power. When the spring is in its normal or proximately normal condition, the jaws will close at a point over the binding-table, as in Fig. 3, whereby, when the sheaf is present upon the binding-table, the jaws will close on the sheaf, as in Fig. 1, and grip the same. The action of the spring on the jaw E is obviously exerted through rod *g'*, while its action on jaw E' is exerted through the medium of lever *g* and the rod g^2. On the other hand, when the lever *g* is swung or turned so as to compress the spring between the two abutments g^3 and g^4, the jaws will necessarily be opened against a spring-resistance.

In addition to the cam f^2 for opening the jaws during the outward swing of the jaw-carrier, I provide an outer guide or cam, f^3, both for holding the jaws open during the return swing of the jaw-carrier and for still further opening the jaws during such movement on the part of the swinging support or jaw-carrier from which they are hung. These two cams may, for convenience, be included in the general designation of "cam device," F, since they serve, substantially, the purpose of an inner and an outer camway.

The cam device F is supported in any suitable manner in position about the axis of the oscillatory shaft *d*, which carries the arm D of the sheaf-discharger, the support herein illustrated for the said cam device being a stand, *f*, mounted upon the main frame of the machine, and adapted to afford a support for a plate, *f'*, upon which the cam device is provided. This plate affords a convenient bearing for the oscillatory shaft *d*, which carries the arm of the sheaf-discharger and admits of a proper disposition of the cam device relative to the axis of said oscillatory shaft. The lower end of lever *g* traverses the cam device when the arm D of the sheaf-discharger is swung either way, and for such reason the lever *g* is desirably provided at its lower end with an anti-friction roller, which will ride easily along the different face portions of the cam device which are eccentric to the axis about which the lever *g* is carried by its support D in order to cause the required action on the part of said lever.

With regard to the member herein referred to as a "cam device," its principal functions are to open the jaws of the sheaf-discharger after the latter has been swung round to a point proper to drop the sheaf, and to hold the jaws open during the back or return swing of the sheaf-discharger and until the jaws are in proper position for grasping a bound sheaf upon the binding-table. To the foregoing, however, a third function may be ascribed to the cam device—namely, that of opening the jaws still wider as they approach the sheaf, in order that they may freely straddle the same, irrespective of the size of the sheaf. To such ends the cam device is in effect a camway having an inner and an outer cam-face with a way or passage intervening between the two, the inner cam-face, f^2, being for opening the jaws, and the outer cam-face, f^3, for holding the jaws open during the back or return movement of the swinging sheaf-discharger, and also for opening the jaws still wider during the back or return swing of the sheaf-discharger.

The space or passage f^4, which is provided between the said two cam-faces in order that the lower end of lever *g* may pass between the two, so as to traverse the inner cam-face, is open at one end for the entrance of the lower or roller end of the lever *g*, while at its other end said passage is provided with a spring-

controlled latch, f^5. This latch is pushed open by the lever g during the forward swing of the sheaf-discharger, in order to permit the lever to pass out of said passage. The latch, however, closes as soon as the lever has cleared it, thereby preventing the lever from returning through said passage and compelling its roller end to ride along both the outer side of the latch and the outer cam-face, f^3, during the back or return movement of the sheaf-discharger. During the return movement of the sheaf-discharger the lower end of the lever g rides along the outer cam-face, f^3, which latter is desirably formed eccentric to the axis about which the sheaf-discharger swings, so that as the lever approaches the inner end, f^{10}, of said cam-face its lower arm will be swung outwardly to a still greater extent than it has been previously swung out by the inner cam-face, f^2, the effect of this being to spread the jaws still farther apart, and thus permit them to freely straddle the sheaf. During the return movement of the sheaf-discharger the lever g is held by the outer cam-face, f^3, in position to hold the jaws open against the resistance of spring G; but as soon as the lever has cleared the outer cam face, which clearance occurs as soon as it has passed the point f^{10}, the force of the spring throws the lever into or about the position shown in Figs. 1 and 3, with the exception that in Fig. 3 the sheaf is omitted, whereby the jaws are brought closer together. The jaws close upon the sheaf at a point preferably between the butt-end thereof and the cord or band by which the sheaf is bound. This part of each succeeding bound sheaf will invariably be found in one and the same place, and hence the sheaf can be taken hold of with certainty. The inner cam-face, f^2, serves to swing the lower end of the lever outwardly and away from the center or axis about which the sheaf-discharger swings, thereby opening the jaws in a manner to permit them to drop the sheaf just as the lever is about to clear the latch, or soon after it has left the same.

Fig. 2 clearly represents the lever at the moment it is about to clear the latch, the jaws being held open by reason of the inner cam-face, f^2. As soon as the lever has passed the latch, the latter is closed by the spring f^6, which is applied to the pivot f^7 of the latch, as best shown in the sectional detail Fig. 5. During the return swing of the sheaf-discharger the lower or roller end of the lever g passes first along the outer side of the latch and then along the outer cam-face, f^3, as hereinbefore stated.

Between the inner or back end of the cam-face f^3 and the open entrance to the space or passage the rib or raised portion f^8, with which the outer cam-face, f^3, is provided, has its end formed with a bevel, as at f^9, the plane of this bevel being tangential, or proximately so, to the shaft or axis about which the sheaf-discharger swings. The object of this bevel is to guide the lever into the said passage should the sheaf be of a size to prevent the spring-power from throwing the lower end of the lever far enough back to enter the passage, and in so doing it further serves to tighten the jaws upon the sheaf. Thus, should the roller of lever g be in the position shown in Fig. 3, or still nearer the point f^{10} at the back end of the cam-face f^3, after the sheaf has been grasped by the jaws, the roller end of the lever will, during the outward swing of the sheaf-discharger, be forced inwardly by the bevel-end face f^9 of the rib or raised portion f^8, and then carried along the inner wall, f^{11}, of said rib or abutment, which wall will keep the lever in position to hold the jaws tight upon the sheaf until the lever engages the inner cam-face, f^2, and strikes the latch. It will also be observed that in such case the jaws will be caused to tighten their grasp on the sheaf, thus effectively holding the same.

The force of the spring may be regulated by adjusting the nut upon the rod g', and the rods g' and g^2 can be adjusted by turning them in sockets that are pivotally attached to the jaws, as herein shown.

The socket to which the rod g^2 is attached at one end can be pivoted in any one of a series of holes, e', formed through the jaw E', thereby varying the limit to which the jaws may be opened or closed.

As a means for oscillating the shaft d so as to swing the sheaf-discharger forward and back at proper intervals, I provide a vibratory gear-segment, H, which may hang from the plate at the top of stand f, or from any other suitable support, and which engages a bevel-gear, d', fixed upon the oscillatory shaft d. This swinging or vibratory gear-segment is operated from a gear-wheel, I, through the medium of a connecting-rod, i, that is attached at one end to a suitable stud or wrist-pin upon the said wheel. The means for driving said wheel will in practice be so arranged and timed that the wheel I will make one revolution during the process of transferring the grain, binding the sheaf, and discharging the same, it being observed that one revolution of said wheel brings back the sheaf-discharger from its outer position, so as to permit it to take the bound sheaf, and then swings the sheaf-discharger forward to its first-mentioned position.

During the operation of the harvester the wheel I commences to turn at the proper moment—that is to say, it operates synchronously with the binding devices—so as to cause, through the medium of the devices last described, the sheaf-discharger to take and discharge the sheaf as soon as the latter has been bound. The wheel I, which forms a part of the sheaf-discharger-operating mechanism, stops when the sheaf-discharger is at or about at the point where it drops the sheaf, said wheel being started up again in time to swing the sheaf-discharger back and into position to take a new sheaf as soon as the knot has been tied.

Under the arrangement herein shown the

wheel I is driven from a cog-wheel, K, on a shaft, *k*, from which the binding devices are operated. This shaft is driven intermittingly or at successive periods from a shaft, L, carrying the crank *l*, Fig. 3, from which the knife or sickle is operated. The said shaft *k* carries a sprocket, M, which is connected by a link-belt, N, with a sprocket, O, on the shaft L, whereby power is transmitted from the latter to the former. Either of the sprocket-wheels M or O could be thrown into or out of gear with their allotted shafts—as, for instance, the sprocket-wheel O can be loose on its shaft and thrown into or out of gear with the same by a clutch, P, as in Fig. 4. Where the driving-gear mechanism is thus arranged, the gears are so sized or timed that the wheel I will make but one revolution at the times hereinbefore stated, said revolution serving to impart a vibration to the gear-segment, which will in turn swing the sheaf-discharger back from its out or forward position proximately, (shown in Fig. 1,) and then swing the sheaf-discharger forward to the point where it is to and will drop the sheaf.

In order to prevent the head ends of the bound grain from catching upon the braces or other like devices employed at the front of the harvester for connecting the tongue or pole therewith, a platform, Q, can be arranged over the braces, as in Fig. 7. By such arrangement, when the sheaf is discharged from the front of the machine and in advance of and to the outer or stubble side of the driving-wheel, the grain will pass over the platform Q without shelling.

It will be observed that the sheaf-discharger provided with a pair of jaws operating as hereinbefore described will always discharge the sheaf whether the same is perfectly or imperfectly bound, and should the binding device at any time fail in binding the sheaf the sheaf-discharger will still carry off the grain which should have been bound into a sheaf.

With reference to the arrangement of a sheaf-discharger which thus discharges from the front of the machine and in advance of the driving-wheel, I desire to be understood as broadly claiming any construction of swinging sheaf-discharger arranged to thus discharge the sheaf, it being a feature of decided improvement to thus locate and arrange for operation the sheaf-discharger of a grain-binding harvester.

In Figs. 1 and 2 portions of the binding mechanism are represented in order to illustrate the general relative arrangement of the binding-table, the driving-wheel B, and the swinging sheaf-discharger. Since, however, no claim is herein made to the binding devices, a description thereof is regarded as unnecessary.

Mention has hereinbefore been made of the grain collecting in a gavel-gage to form a gavel. The gavel-gage forms a subject of a claim in an application hereinbefore filed by me, and is therefore not shown in the present case.

What I claim as my invention is—

1. In a low down self-binding harvester, the combination, with the binding-table whereon the sheaves are bound, located substantially opposite the inner side of the main driving and supporting wheel B, of a swinging sheaf-discharging device located toward the front of the machine, and means for swinging the same for discharging a bound sheaf butt-end foremost from the binding-table in a path from the front of the machine around in advance of and to the outer or stubble side of the said main driving and supporting wheel, substantially as and for the purposes described.

2. In a low-down self-binding harvester, the combination, with the binding-table located substantially opposite the inner side of the main driving and supporting wheel, of a sheaf-discharging device comprising a swinging jaw-carrier supported to swing over the plane of the binding-table and provided with pendent pivotally-hung opening and closing jaws, means for swinging the jaw-carrier in a path for discharging the sheaf from the front of the machine around and in advance of the main driving and supporting wheel, means for closing the jaws upon a sheaf on the binding-table, and means for opening the jaws to an extent to allow a sheaf to drop directly from between them after the jaw-carrier has been swung to its outer position away from the machine, substantially as described.

3. In a low-down self-binding harvester, the combination of the binding-table whereon the sheaves are bound, located substantially opposite the inner side of the main driving-wheel B, an overhanging swinging jaw-carrier located toward the front of the machine and provided with the pivotally-hung sheaf-discharging jaws, a cam device for opening the jaws when the swinging jaw-carrier is at its outer position, away from the machine, a coiled spring for closing the jaws when the swinging jaw-carrier is at its inner position over the binding-table and the jaws are in position to straddle a sheaf thereon, and suitable power-transmitting devices, as described, through which the jaws are subject alternately to the respective action of the cam and spring for dropping the sheaf butt-end foremost from the binding-table in a path from the front of the machine around in advance of the main driving-wheel and clear of the machine, substantially as described.

4. In a low-down self-binding harvester, the combination, with the binding-table whereon the sheaves are bound, of the swinging jaw-carrier provided with pendent pivotally-hung sheaf-discharging jaws, the spring for closing the jaws upon a sheaf that is to be discharged, the cam for opening the jaws at a time for permitting the sheaf to drop from between the jaws clear of the machine, and the second cam adapted and disposed for still further opening the jaws during the return swing of the swinging jaw-carrier, said second cam being formed for delivering the jaws in their full-open con-

dition to the closing action of the spring, and the spring being applied to close the jaws as soon as they have straddled a sheaf upon the binding-table and are free from the control of said second cam, substantially as described.

5. The combination, with the opening and closing jaws depending from the swinging jaw-carrier D, that is supported to swing over the binding-table and outwardly from the machine, of the lever *g*, pivotally attached to the swinging jaw-carrier, and connections, substantially as described, between said lever and the opening and closing hanging jaws, the cam engaged by the lever during the outward swing of the jaw-carrier, whereby the jaws are opened, a second cam engaged by the lever during the return swing of the jaw-carrier, whereby the jaws are delivered in an open condition in position for straddling a sheaf on the binding-table, and a spring, G, applied as the power for closing the jaws upon a sheaf on the binding-table after the jaws are free from the control of said second cam, substantially as described.

6. The combination, with the swinging jaw-carrier provided with depending opening and closing jaws arranged for straddling and closing upon a sheaf on the binding-table, of the cams f^2 and f^3, stationed about the axis of the oscillatory vertical shaft to which the swinging jaw-carrier is secured, the latch f^5, provided at one end and arranged for opening and closing one end of the space or passage f^4 between the two cams, the lever *g*, pivoted to the swinging jaw-carrier, the rods g^2 and g', and the spring upon the latter, said rods being connected with the jaws, substantially as and for the purpose set forth, and means for oscillating the shaft to which the swinging jaw-carrier is secured, substantially as described.

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Witnesses:
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