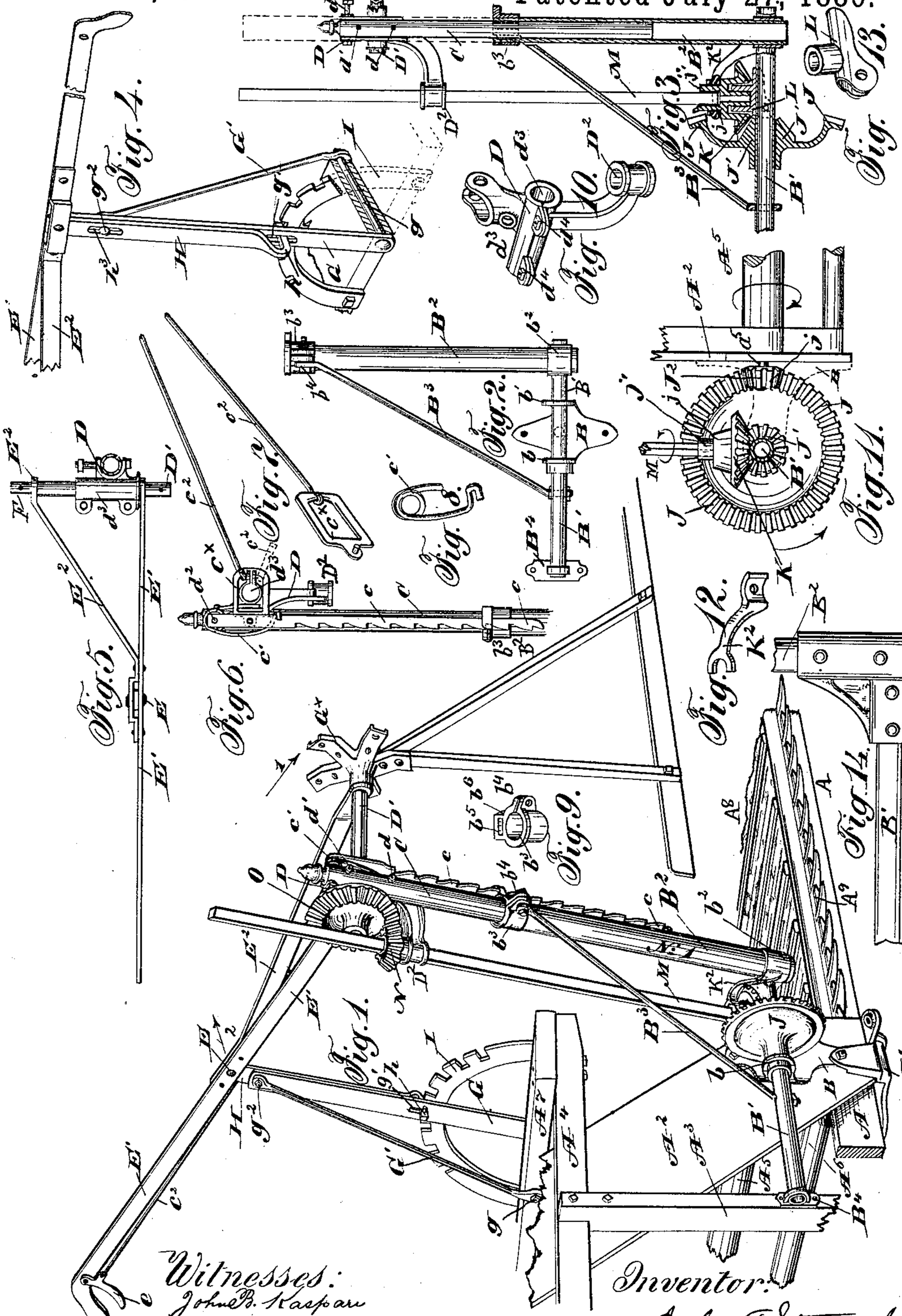
(No Model.)

J. F. STEWARD.

HARVESTER REEL.

No. 346,232. Patented July 27, 1886.



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HARVESTER-REEL.

SPECIFICATION forming part of Letters Patent No. 346,232, dated July 27, 1886.

Application filed March 1, 1884. Serial No. 122,559. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. STEWARD, of Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Harvester-Reels, of which the following is a full description, reference being had to the accompanying drawings.

The object of my invention is to improve harvester-reels; and its nature consists in a combination of three pivoted frames, (preferably triangular,) two of them pivoted or hinged to the frame of the harvester, and connected by the third in such a manner that the reel shaft may be given the required adjustments, both vertical and forward and back; in providing driving mechanism that shall impart motion to the reel, whatever the adjustment of the latter, and be automatically adjusted in relation thereto; and in the devices and combinations of the mechanical elements necessary to make the principles involved in the invention practical.

In the drawings, Figure 1 is a perspective view of my invention, showing enough of the harvester to give a correct idea of the position of the parts which constitute my invention. Fig. 2 is a front view of the braced frame or reel-post, which forms the main support of the reel. Fig. 3 is a view of the same partly in section, and the bracket in which the reel-shaft is journaled. Fig. 4 is a perspective view of the braced bar G and locking-plate on the seat-board. Fig. 5 is a plan view of the braced lever for making the adjustments of the reel. Fig. 6 is an elevation from the grain side of the reel-post, showing the means for adjusting the height of the reel in relation to the said post. Fig. 7 is a detached perspective view of the latch-rod. Fig. 8 is a perspective view of the latch-spring. Fig. 9 is a perspective view of the ring or sleeve clamped to the upper end of the pipe B^2, to which the brace B^3 is secured. Fig. 10 is a perspective view of the reel-supporting bracket having a bearing for the reel-shaft. Fig. 11 is a side elevation of the gearing for driving the reel from the grain side. Fig. 12 is a perspective view of the bracket-arm for keeping certain of the gears in mesh. Fig. 13 is a perspective view of a socket which forms a journal for the bevel-pinion at the foot of the shaft which transmits motion from the fixed gearing on the harvester-frame to that on the reel-shaft bracket. Fig. 14 is a view of a modification.

In the drawings, all parts lettered A, whatever the index, are of the harvester-frame, A being the finger-bar, A′ the shoe, a strong casting to which the front board of the elevator-frame A^2 is secured.

A^3 is a post which forms, in part, a support for the girt A^4.

A^5 and A^6 are the usual drums for carrying the elevator-canvases. The drum A^5 in this case performs more than the ordinary function, in that from it the reel is driven.

A^7 is the seat-board of the harvester, upon the rear of which, in the usual place and manner, is secured the seat for the driver.

A^8 is the endless platform-carrier, and A^9 is the cutting apparatus.

B is a metallic bracket bolted to the framework of the harvester, and B^1 is a yoke-bolt, in which and in eyes in the two wings *b* and *b′* of B is the horizontal rock-shaft B′, made of gas-pipe for lightness. Its grain end projects somewhat beyond the bracket B, and to and beside it is secured, by means of the clip or yoke b^2, the reel-post B^2, formed of gas-pipe. The rock-shaft and reel-post form the base and perpendicular of a right-angled triangle, while the brace-rod B^3, firmly secured to said rock-shaft and post, forms the hypotenuse. The brace-rod has a screw-thread at its lower end. It is passed through the rock-shaft B′ and secured by a nut.

b^3 is a split metallic collar, of internal size equal to the outside diameter of the gas-pipe B^2, provided with two lugs, b^4, through which a bolt passes, by the tightening of which the collar is in effect shrunken so tightly upon the gas-pipe as to become as one piece with it. The upper end of the brace is provided with an eye through which the bolt referred to also passes, thus securing the brace in place. The shaft B′ being free to rock in its supports, the braced reel-post may be rocked forward and backward at will. The base of the braced reel-post being supported to the harvester-frame at distant points, no lateral movement is possible. This rigidity (preventing lateral movement of the frame) must be borne well in mind, as it is an essential one of the elements

of a combination to be hereinafter described. On this post the reel-shaft bracket is mounted.

The post B^2 may, as shown in dotted lines in Fig. 3, be made so high that the reel-bearing bracket may slide directly upon it; yet I prefer another form which I will now describe. The post B^2 being tubular and being yoked to the other parts, as described, the bore is left unobstructed by bolts or other parts. In this somewhat loosely slides another pipe, C, which, with the part B^2, forms a telescoping reel-post. To this last pipe, at its upper end, is secured the bracket D by means of the bolts *d*, *d'*, and d^2, the bracket being so shaped that it saddles onto the pipe properly. Crossing the pipe substantially parallel with the cutting apparatus is the sleeve formed by coring out the cast-metal bracket D. This sleeve is slitted its entire length at its rear side, and has the two lugs d^4, through which bolts pass. Through this sleeve passes the gas-pipe D' and is there firmly clamped by the tightening of the bolts d^4. The gas-pipe D' forms a bearing for the reel-shaft, which is thus supported at a right angle to the reel-post. By the telescoping of the pipe C with that B^2 the reel, thus supported, may be adjusted to any desired height.

The means for retaining the reel-supporting bracket in any desired position consists of a ratcheted bar, *c*, hinged on a projecting end of the bolt d^2, and dropping alongside of the pipe C, a little distance therefrom, which passes through a slot, b^5, made in a projecting flange of the ring or collar. (Shown in Fig. 9.) This slot is so made that the notched bar *c* may move freely in it; but its front wall or margin, b^6, is so shaped that the teeth of the notched bar, when thrown against it, may engage.

c' is a spring coiled around the bolt d^2, beside the bar, its longer end engaging the latter and its shorter one resting suitably against the bracket D, as seen in Fig. 6, the said spring being thus adapted to swing the bar *c* forward, so as to engage b^6.

To $c^\times$, (see Figs. 6 and 7) I pivot one end of the link c^2, which is made of such form as to surround the sleeve d^3, its internal length being such that it may have a slight longitudinal movement, and its width being just sufficient to receive the sleeve and move freely thereon. The other end of the link $c^\times$ is secured so as to be substantially concentric with the sleeve d^3.

E' is a lever of the first order, pivoted at E, its rear end within easy reach of the driver. At its front end the lever is provided with an eye, through which the reel-shaft passes.

E^2 is a brace secured to E', from preference near its fulcrum, diverging thence forward and outward to near the grain end of the reel-shaft F, and there terminates in an eye surrounding the latter. Upon the grain end of the reel-shaft is the reel-spider $G^\times$, secured thereto. Upon the stubble end of the reel-shaft is pinned or keyed a gear for giving it motion. The ends E' and E^2 are thus confined in place at either end of the gas-pipe D. Thus the sleeve D' and the lever E' form the base and perpendicular and the brace E^2 the hypotenuse of a right-angle triangle, the whole forming a braced frame of great stiffness.

e is a latch-lever pivoted to the end of the reel-lever and connecting it with the latch-rod c^2. To raise the reel, the free end of the lever E' is pressed down, and the reel-bearing and reel correspondingly raised, the ratchet-bar yielding against the pressure of the spring *c'* to pass the stop b^6. In depressing the reel, pressure upon the latch-lever draws the bar *c* out of engagement with the said stop, and the reel may fall. In producing these movements the angle of the lever in relation to the reel-post changes, and in making this change the end of the latch-rod c^2, where hooked into the link $c^\times$, simply slides around on the arc of the latter, thus not varying the effective length, which, if done, would make the latching devices inoperative. The fulcrum of lever E' is upon and near the apex of another braced bar, G, which performs two important functions—namely, that of a fulcrum adjustable forward and back and a post of the reel-retaining mechanism. This bar G is pivoted at one side of the seat-board A^1. The brace G' is bolted to the top of the bar, and is pivoted at the bottom to the other side of the seat-board. The bolt *g* passing through the seat-board forms the pivot for both the post G and its brace. Thus a third right-angled triangle is formed, the seat-board being the base, the bar or post G the perpendicular, and the brace G' the hypotenuse. The pivot-bolt *g* is parallel with the rock-shaft B', and forms the pivot of the reel-post. Mounted upon this the reel-lever may raise and lower the reel, and also move it forward and backward.

The locking mechanism for retaining the reel in any forward or rearward position will be most easily understood by referring to Figs. 1 and 4, where the lever is shown as not jointed directly to the apex of the braced post G, but to the top of a flat bar of iron, H, lying beside the bar G, so narrowed and bent at *h* as to pass directly through the slot *g'* in H, and receive a pin to prevent it from escaping. The bar H is also provided with a slot, h^3, through which the bolt g^2 passes. This bolt is so shouldered that it may draw E^2 and E' tightly together and yet leave H free to slide.

I is a curved locking-plate, notched upon its upper margin concentric with the pivot *g*, and of such radius as to permit the horizontal bend *h* of the lever H to engage any one of the notches when the said bar is at its lowermost position. When locked, as shown in Fig. 1, the bar G, and hence the lever E' and reel-support, will be incapable of any forward or backward movement. If the lever E' is raised, the foot *h* of the bar H will be withdrawn from the notches in the locking-plate, and the whole reel-sustaining mechanism may be moved forward or back.

Two locking devices have been described,

one controlled by the lever *e* and the other by the bar H, both so connected with the lever E′ as to be controlled by the driver.

The pressure of the grain and extraneous objects—as, for instance, the limbs of trees—will tend to produce a movement of the reel-supporting bracket D around C. The object of the frames formed by the braced posts is to prevent such movement. Any tendency on the part of the reel to swing backward or forward must also tend to swing the braced lever E′, the bracing of which is formed in part by the sleeve D′ on the bracket D. Any tendency of the reel-shaft to swing forward or backward will be resisted by the braced bar G. If an attempt be made to swing the outer end of the reel-shaft forward, as indicated by the arrow 1 in Fig. 1, the stress will be imparted to the braced bar G, and tend to rock it over in the direction indicated by arrow 2 in the same figure. Such movement is, however, resisted by the firm footing of the said bar G.

By the combination of the braced reel-post, the braced lever E′, and the braced bar G, said bar and lever being connected by a pivot, and said bar and said post being pivotally secured to the harvester-frame, as described, a reel-support is made that in practice possesses lightness, strength, and scope of adjustment not before attained. The pivot of the reel-post is located so low on the machine that the reel, even when in its lowermost position, has ample movement forward and back, which would not be the case if it were pivoted upon the seat-board. I locate the rock-shaft B′ in such a position on the frame-work that it shall cross the axis of the drum A^5. This rock-shaft forms the journal on which rotate the gear-wheel J and pinion J′, which are formed in one piece. The shaft of the drum projects through the front elevator-board of the harvester, and is supported in a bearing in the bracket B, and upon its end, in proper position to engage the bevel-gear J, is the pinion J^2.

In such a position as to be properly engaged by the gear J′, I place the gear K, chambered out, as shown in the sectional view, Fig. 3, so as to form a journal to rest in a suitable cup-shaped step, which is formed in the casting L, (shown in Fig. 13,) which is bolted to the rock-shaft B′. This step serves also as an oil-reservoir. The journal formed on the wheel K is cored through, so that oil may be introduced into the cup.

To prevent the gear K from disengaging from that of J′, I provide the bracket K^2, which I secure at the junction of and between the rock-shaft B′ and the post B^2, with a crotch that shall rest above the shoulder *j* of the gear K, and straddle the smaller part of the hub. The uppermost part of the hub of the gear K is cored with a square socket, and into this loosely fits the foot of the square shaft M. The purpose of fitting it loosely into the gear is to make such connection operate to a slight extent as a universal joint, so that any slight inaccuracy in placing the cup or socket L on the rock-shaft B′ will not be felt in throwing the shaft M out of line. The shaft M is otherwise supported by passing through the eye of the bevel-pinion N, which eye is squared to fit it somewhat loosely. The hub of the pinion N is smoothed to form a journal, to move in a short vertical sleeve, D^2, a part of the bracket D. The pinion is so located as to properly mesh with the gear O, keyed to the reel-shaft. As the reel-bracket is made to raise and fall, the pinion but slides along the shaft without affecting the relation of the gears. In the adjustment backward and forward of the reel the reel-post swings about the axis of the rock-shaft B′, and the gear K being journaled on a bearing secured to the same, and the gear J being concentric with the said movement of the reel-post, will but carry the gear K in part around the gear J′, and that without affecting its mesh with the latter, the only effect being to hasten or retard the motion of the reel imperceptibly, however.

It is plain that the braced reel-post, lever, and bars may be made of cast metal of any desired shape to give sufficient strength. If the base and perpendicular of each triangle were made very strong and firmly united, as shown, for example, in Fig. 14, the hypotenuse of the triangle might be dispensed with. If made, however, as shown in the preceding figures, great strength and lightness are attained.

If it is wished, chains instead of gears may be used for driving; yet the latter seem better in practice.

In this invention, I depend upon the reel-post to sustain the reel and to keep it horizontal, and upon the braced reel-lever, fulcrumed upon a support properly braced or otherwise prevented from lateral movement, retain the reel-shaft parallel with the cutting apparatus, and I wish to distinguish this invention from that class in which the parallelism is retained by means of frame-like or braced reel-lever fulcrumed on a frame pivoted to the seat-board, and this regardless of a mere prop or its equivalent to sustain the weight only.

I am aware that a horizontal lever supporting a reel shaft has been provided with a lateral brace, and also that a post-supporting lever has been provided with a lateral brace, and these features separately considered I do not claim.

I believe myself to be the first to combine a reel-post which is laterally braced and arranged to give entire support to the reel-shaft bearing to maintain said shaft in a horizontal position, a laterally-braced lever and a laterally-braced standard to support said lever. Under my organization the reel-post receives the entire weight of the reel and serves alone to maintain the reel-shaft in a horizontal position, or, in other words, to prevent the sagging of the reel. The braced standard effectually prevents lateral motion of the lever, and the

latter, with the assistance of its lateral brace connecting with the reel-bearing at two points, effectually prevents the reel-shaft from being thrown horizontally out of line in consequence of the resistance which the grain offers to the rotation of the reel.

Those familiar with the practical operations in the field are aware that heavy grain offers great resistance to the rotation of the reel, and that this resistance in connection with the weight of the reel, which is carried in an overhung position, commonly causes the reel to sag and tip downward out of its position. By my peculiar combination of parts this displacement of the reel is effectually prevented, the three members of the organization co-operating and affording a mutual support in such manner that the reel is held firmly in position. It will be perceived that the reel-post, its horizontal supporting-shaft, and its lateral brace rigidly connected to each other constitute, jointly, an angular frame with a broad base, that the reel-adjusting lever and its base constitute in effect a second angular frame, and that the lever-supporting standard and its brace form, jointly, a third angular frame. While it is preferred for various reasons to form each of these frames with separate parts rigidly united, as shown, it is manifest that, if preferred, they may be made each in one piece.

What I claim is—

1. In a reel sustaining and adjusting mechanism, the reel-sustaining post and the diagonal brace connected thereto, in combination with the standard G and its diagonal brace, and the reel-adjusting lever E′, jointed to the reel-bearing and to the standard and provided with a diagonal brace, whereby the post is enabled to prevent the sagging of the reel, and the lever enabled to prevent the reel from swinging horizontally.

2. The horizontal rock-shaft mounted in bearings on the frame, in combination with the reel-supporting standard and the brace secured rigidly to the shaft and to each other, substantially as described.

3. The reel-sustaining post B^2 and its diagonal brace, both hinged to the frame to swing forward and backward, in combination with the vertically-adjustable reel-bearing sustained by said post, the standard G and its brace, both pivoted to the frame in rear of the post and its brace, the horizontal hand-lever E′, sustained by the standard and connected with the reel-shaft, and the brace E^2, extending from said lever to the reel-shaft at a distance from the post B^2.

4. In a harvester, the main standard pivoted to swing forward and backward and the reel supported thereon, in combination with the rear standard, G, also pivoted to swing forward and backward, the notched plate I, the locking device H, mounted on the standard G and engaging the plate I to hold the standard in position, and a hand-lever, E′, jointed to the reel-support and to the locking-slide H, as described, whereby the lever is adapted to lock and unlock the standard by which it is carried.

5. In a reel-adjusting mechanism, the pivoted standard G, its locking-plate H, and notched plate I, in combination with the reel-adjusting lever E′, pivoted to the plate H.

6. The combination of the reel, the rock-shaft B′, the braced reel-post B^2, secured to said rock-shaft, drum-shaft A^5, bracket B, secured to the harvester-frame and provided with the bearings for said shaft and said rock-shaft, the gear-wheel J, journaled on the rock-shaft, the pinion J^2, mounted on the said shaft A^5, and means, substantially as described, for transmitting motion from the said gear-wheel J to the reel, substantially as set forth.

7. The rock-shaft B′, the swinging reel-post connected to the rock-shaft, the gear-wheel J, and pinion J′, rotating on said rock-shaft, the bearing-plate L, secured to the rock-shaft, and the pinion K, journaled on said bearing, whereby the said pinions are retained in their proper positions relative to each other and to the reel-post, all combined and arranged substantially as described.

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