Sheet 1-2 Sheet.

I. Lancaster.

Harvester.

No. 75773. Patented Mar. 24, 1868.

Fig: 6.

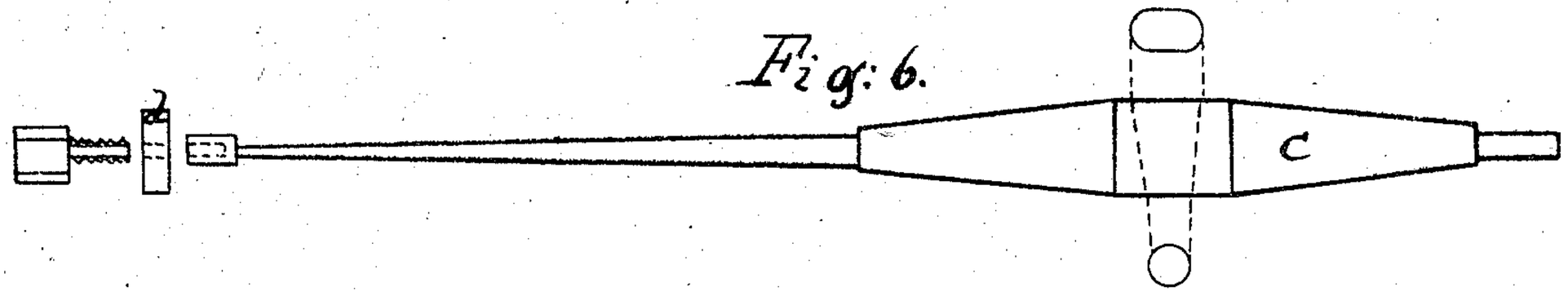
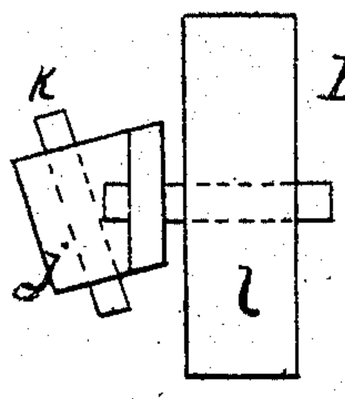


Fig: 5



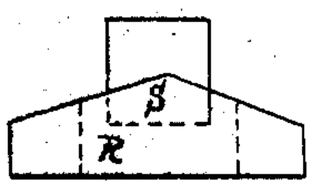
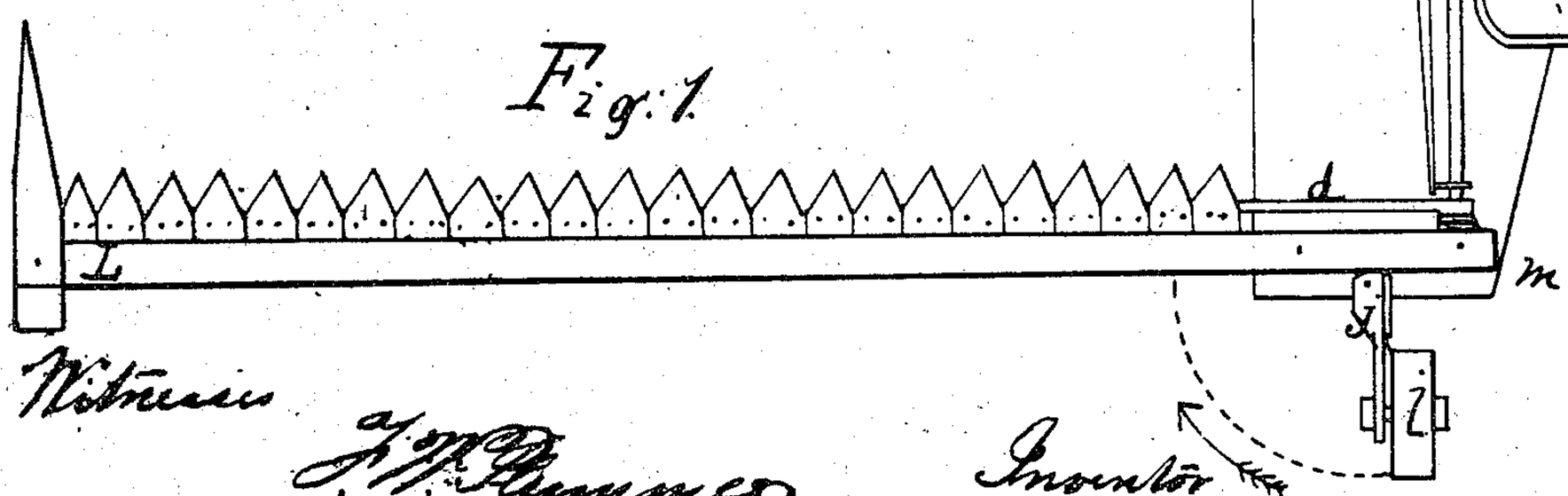


Fig: 4.

Fig: 3.

Fig: 1.



Witnesses

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Sheet 2--2 Sheets.

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Fig: 7.

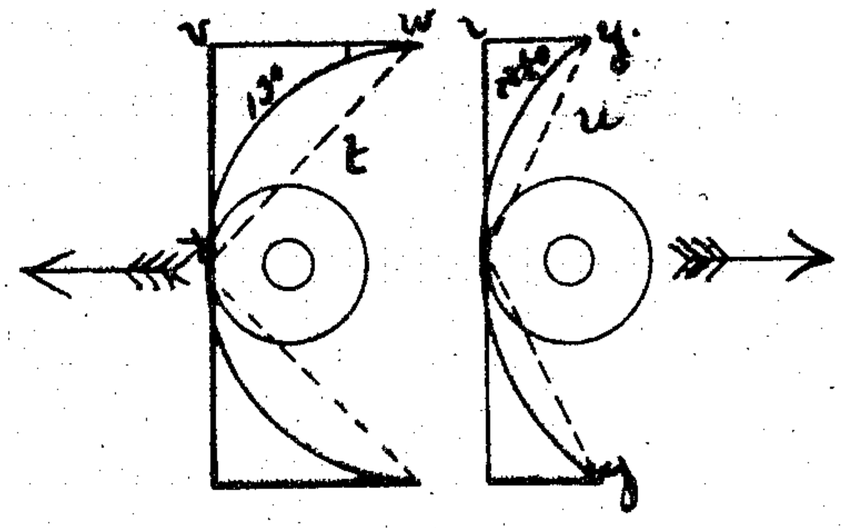


Fig: 2

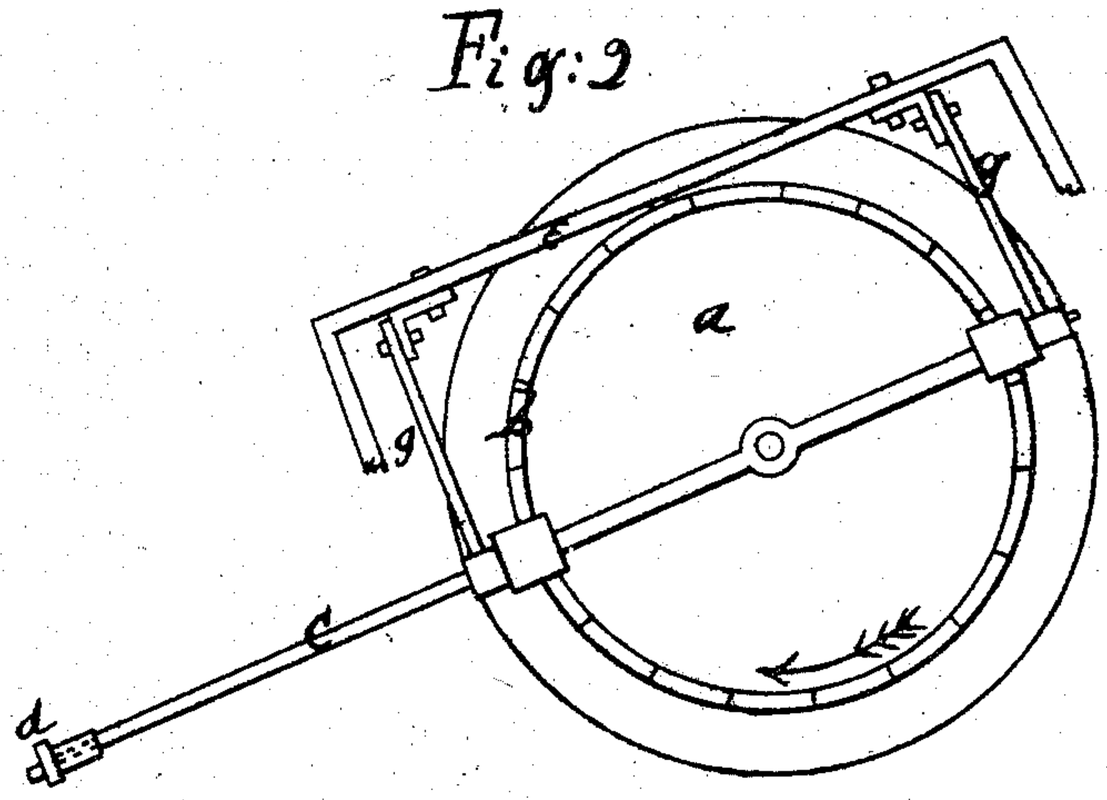
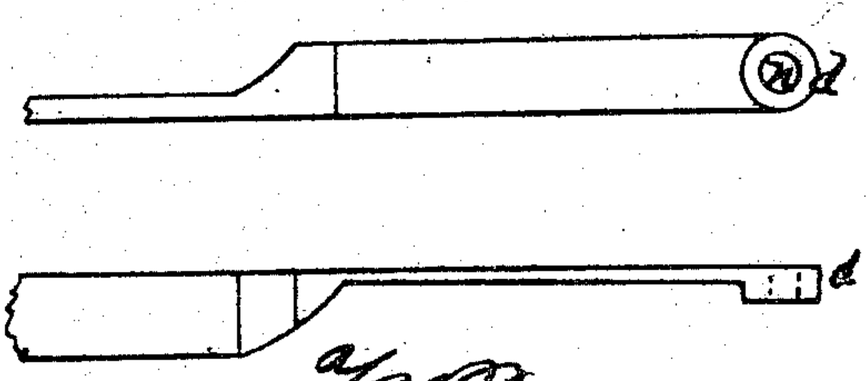


Fig: 8.



Witnesses
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ISRAEL LANCASTER, OF BALTIMORE, MARYLAND.

Letters Patent No. 75,773, *dated March* 24, 1868.

IMPROVEMENT IN HARVESTERS.

The Schedule referred to in these Letters Patent and making part of the same.

TO ALL WHOM IT MAY CONCERN:

Be it known that I, ISRAEL LANCASTER, of Baltimore, in the county of Baltimore, and State of Maryland, have invented new and useful Improvements on Reaping-Machines; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a view of the machine seen from above.

Figure 2 is an elevation, showing the working-side of the driving-wheel, the edge of the reciprocating lever, and the radial arms supporting it.

Figure 3 shows the outline and construction of the cam-sections.

Figure 4 shows three views of the fulcrum-block.

Figure 5 shows the caster-wheel attachment.

Figure 6 is a side view of the reciprocating lever.

Figure 7 is explanatory of the construction of the cam-sections.

Figure 8 is a side and edge view of the end of the knife-bar, where it is attached to the lever.

The working parts of this machine consist of a driving-wheel, *a*, figs. 1 and 2, provided with a cam-circle, *b*, which actuates a reciprocating lever, *c*, thus communicating motion to the knife-bar *d*. This method of operation is not claimed by me as part of my invention.

e, fig. 1, is a bar, placed parallel to the lever *c*, and about twelve inches above it. It is fastened to the machine-frame at *f f*. This bar supports two arms, which hold the lever *c* in a straight line between the shaft of the driving-wheel and the knife-bar. These arms are shown at fig. 2, at *g g*. They have an eye at one end, through which passes the lever, and are pivoted to a support from the bar *e* at the other end. As the wheel *a* revolves in the direction of the arrow, the action of the cams has a tendency to turn the lever with them. This movement is prevented by the arms *g g* with but little friction, while at the same time they permit the lever to oscillate in a plane, cutting the knife-bar and driving-wheel shaft, and parallel to them.

At *h*, fig. 1, is seen the driver's seat. *i* is the caster-wheel for mowing grass. *j* is the shank, holding the wheel to the machine, with a movable joint at *k*. The pin of the joint at *k* is not set vertically, but inclined in a vertical plane parallel to the cutter-bar. This construction is seen at fig. 5. The object of this device is to raise the cutter-bar and back part of the machine, where the caster-wheel is fastened from four to six inches from the ground, when turning the corners in a grass-field.

When the caster-wheel follows the dotted line in the direction of the arrow, fig. 1, it must go down at the same time from the action of the oblique joint *k*. This raises the part of the machine spoken of above. The driver's seat and caster-wheel are so placed as that, when in the act of cutting, the part L of the machine shall be the heaviest, and thus remain on the ground while working, but, in turning at the corners, the caster-wheel changes the centre of gravity to a point nearer L, and the part M then becomes the heaviest, and L is raised until M touches the ground. This automatic movement of the cutting-bar prevents the knives clogging in the cut grass in turning.

At fig. 8 is seen the end of the knife-bar, in two views. It is hammered thin, for six or eight inches between the first knife-section and the end of the lever, so that it will spring enough to accommodate the movement of the end of the lever out of a parallel path. This is but little, as the stroke is not more than three inches in a radius of three feet. The end of the knife-bar has an eye, N, through which passes a bolt, which is firmly screwed to the end of the lever *c*. This makes a joint in which there can be no wear whatever.

At O O, fig. 1, are seen two nuts, screwing on the driving-wheel shaft. The fulcrum-block R rests against the inner one of these nuts. This block is seen at fig. 4. It is made of cast iron, with a lip projecting from its upper part, which rests on the top of the lever *c*. This lip prevents the block from turning with the shaft *p*, always keeping the part S S at right angles to the lever *c*. The lever oscillates on this part S S of the block R as a fulcrum. The eye in the lever *c*, figs. 2 and 6, is round on the edge next the fulcrum-block, but is oblong on the other edge. The edge next the block closely fits the shaft, thus preventing any endwise movement, while

the oblong character of the eye at the back allows the lever to oscillate freely. The eye closely fits the shaft both front and back, in a direction at right angles to the lever, thus preventing any tendency to rotate on its axis.

There are three causes which, in my opinion, have always prevented the practical operation of this kind of movement, when applied to harvesters. They are as follows: first, absolute waste of power in the construction of the cams; second, use of power in moving the great weight in the reciprocating-lever; third, use of power in overcoming the inertia of the lever at each extremity of the stroke while it is at the dead-point.

If the cams are made as at *t*, fig. 7, the average of the moving surface would be the diagonal of a square, and, as the only power economized is that which moves the lever in the direction of the arrows, it is plain that fifty per cent., or one half, of the entire power is wasted. One half of the power urges the lever on the line *v w*, which is economized; the other half of the power urges the lever on the line *v x*, which is wasted. If the cams are made as at *u*, fig. 7, but one quarter of the power is wasted.

It is evident that with any given distance between the points of the cam, as *y y*, the less the depth of the cam, or *y z*, the more the power is economized. I construct the cams with the depth, or *y z*, about one fifth of the distance from point to point, or *y y*, and, with the anti-friction arms *g g*, fig. 2, I estimate that only twenty per cent. of the power is wasted by the difficulty of the cam construction.

To overcome the second absorption of power, I construct the lever out of steel, by forging, making it thin and wide near the shaft, and tapering it to the knife-bar. I am thus enabled to get the required strength within a weight of twenty-five pounds.

To overcome the third difficulty, I apply a spring to the lever, which operates from each extremity of the stroke towards the centre. The power employed to move this spring each way from the centre is returned on the back stroke, and the spring can be made sufficiently strong to overcome the entire inertia of the lever, making the movement almost equivalent to a movement in a continuous straight line.

I consider this spring-device as important. Its application in practice is attended with the best results. The spring is seen at 1, fig. 1. It is securely fastened to the frame at one of its ends, and attached to the lever *c* at its other end. It is evident that it can be attached to the lever at almost any other place, or to the knife-bar, with the same result. I make the spring out of hammered iron or steel.

What I claim as my invention, and desire to secure by Letters Patent, is the following:

In combination with a flexible knife-bar, between the point of attachment to the reciprocating lever and the first knife-section, a rigid attachment of the knife-bar to the end of the reciprocating lever, forming a joint, immovable in any direction.

ISRAEL LANCASTER.

Witnesses:

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