J. F. BLACK.

Grain-Binder.

No. 18,231. Patented Sept. 22, 1857.

Fig. 2.

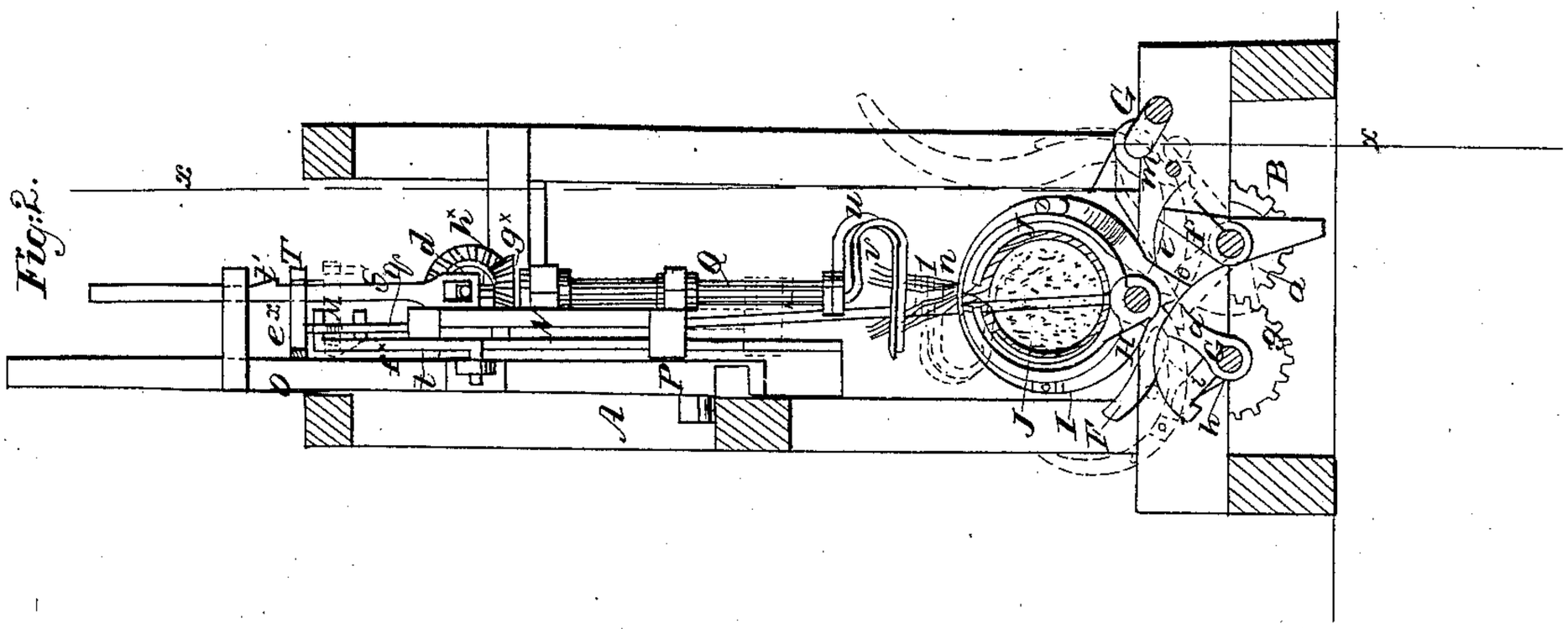


Fig. 1.

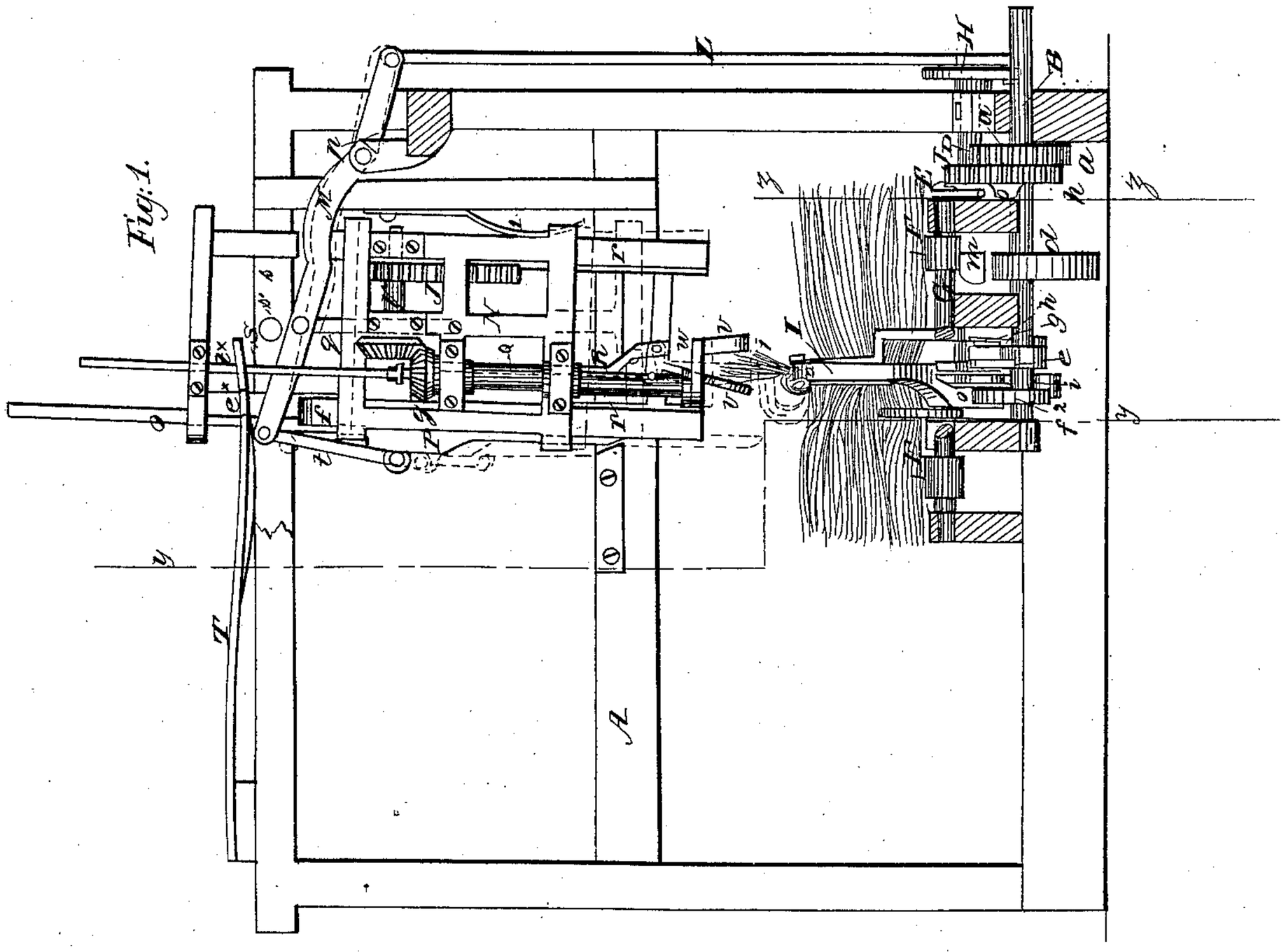
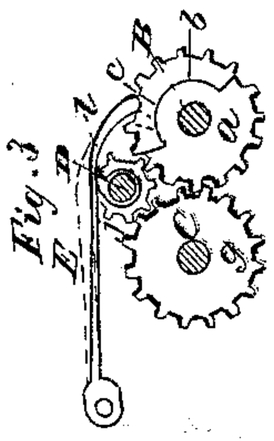


Fig. 3.



UNITED STATES PATENT OFFICE.

JOSEPH F. BLACK, OF LANCASTER, ILLINOIS.

IMPROVED MACHINE FOR BINDING GRAIN.

Specification forming part of Letters Patent No. 18,231, *dated September* 22, 1857.

To all whom it may concern:

Be it known that I, J. F. BLACK, of Lancaster, in the county of Cass and State of Illinois, have invented a new and useful Machine for Binding Grain into Sheaves; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the annexed drawings, making a part of this specification, in which—

Figure 1 is a side view of my improvement, the framing of the same being bisected, as indicated by the line *x x*, Fig. 2. Fig. 2 is a vertical section of the same, taken in the line *y y*, Fig. 1. Fig. 3 is a detached section of the gearing of the driving device, *z z*, Fig. 1, indicating the plane of section.

Similar letters of reference indicate corresponding parts in the several figures.

This invention consists in arranging a certain number of parts in a novel way, so that said parts will, when in operation and a requisite amount of grain presented to it, bind said grain into a sheaf in a perfect and expeditious manner, the device or machine requiring but a single attendant.

This machine is designed to be attached to a reaper or harvester, and to bind the grain into sheaves as fast as it is cut.

To enable those skilled in the art to fully understand and construct my invention, I will proceed to describe it.

A represents a rectangular frame, constructed of wood, and attached to the back part of a reaper in any convenient manner. B is the driving-shaft, which is placed longitudinally in the lower part of the frame. On this shaft there is placed a pinion, *a*, a part or semi pinion, *b*, with cam *c* attached to its inner side, a tappet, *d*, and two cams, *e f*. The pinion *a* gears into a corresponding pinion, *g*, on a shaft, C, which is also placed in the lower part of the frame A, parallel with shaft B. On the shaft C two cams, *h i*, are placed, these cams corresponding in form to the cams *e f;* but they are placed on their shaft in a position reverse to that of the cams *e f* on their shaft B—that is, the cams *e h* on the shafts B C face or are opposite each other, as also are the cams *f i*, and the cams that face each other are not similar in form, but those are that are placed diagonally with each other. For instance, the cams *e i* are of similar form, and the cams *f h* are of similar form. The cams *e i* are compound—that is to say, they are quadrants having a radial projection, $a^{\times}$, at one side, and these projections serve the office of cams as well as the quadrant portion, as will be hereinafter shown. The cams *f h* are simply bars of taper form, and are frequently termed tappets. D is a small shaft placed in the lower part of the frame A, and having a pinion, *j*, on it. The shaft D has a projection, *k*, formed on it, and a projection, *l*, on a spring, E, catches at certain times against said projection *k*, as will be presently shown. The pinion *j* is in line with the semi-pinion *b*. F F represent two curved arms, which are attached to a shaft, G, at the lower part of the frame A. The inner ends of one of these arms has a projection, *m*, attached at right angles to it. H is a shaft placed on the lower part of the frame. This shaft has four semicircular arms, I I J J, placed loosely upon it, said arms, when raised so that their outer ends will be in contact, forming two concentric circles, as shown in Fig. 2, the arms I I being somewhat larger than the arms J J. The outer ends of the arms I have springs *n* attached. These springs are merely flat plates of steel attached to the sides of the arms. Each arm has a projection, *o*, at its lower end. To the outer end of the shaft D a crank-pulley, K, is attached, and L is a connecting-rod, the lower end of which is attached to the pulley K, the upper end being attached to a lever, M, which has its fulcrum, at *p*, in the frame A. The lever M is connected, by a rod, *g*, with a frame, N, which is fitted to vertical guide-rods *r r*, said rods *r* being attached at the upper parts to a block, *s*, which is pivoted to the frame A, as shown at *s*. The outer end of the lever M is connected by a rod, *t*, with a vertical slide, O, which is placed by the side of one of the guide-rods *r*. The lower part of this slide has an inclined or wedge-shaped projection, P, attached to it, as shown clearly in Fig. 1. In the frame N a vertical shaft, Q, is placed, said shaft having a hook-shaped projection, *u*, at its lower end. A similar projection, *v*, is formed at the lower end of a bar, *w*, the upper end of which is pivoted in the shaft Q, as shown at $c^{\times}$, Fig. 1. The upper end of the bar *w* is pivoted to a vertical sliding bar, R, which is fitted in a longitudinal groove in shaft Q.

The upper end of the bar R passes through a loop at the lower end of a bar, S, and a pin, $d^{\times}$, passes through the upper end of bar R, securing it to bar S, the upper part of R being cylindrical, and allowed to turn freely in the loop. T is a spring, one end of which is attached to the frame A, and the other projects beyond the bar S. This spring also has a lever, $e^{\times}$, formed on it, and an incline plane, $f^{\times}$, is attached to one of the guide-rods r of the frame N. A bevel-wheel, $g^{\times}$, is placed on the upper end of the shaft Q, and this wheel gears into a corresponding wheel, $h^{\times}$, on one end of a horizontal shaft, U, in the frame N. The shaft U has a pinion, $i^{\times}$, on its opposite end, the pinion $i^{\times}$ gearing into a rack, $j^{\times}$, attached to one of the guide-rods r of the frame N.

The operation is as follows: The attendant is seated in the lower part of the frame A, convenient to the arms I I J J. The attendant places the ends of a band of straw, 1, between the springs n and the ends of the arms I, said arms, as well as the arms J J, being in an open or distended state. A quantity of grain is passed from the platform of the reaper by any proper mechanical means, or by hand, and placed within or between the inner arms J J and upon the bands, the ends of which are secured at the ends of the arms I I.

It will be understood that motion is given the shaft B in any proper manner from the driving-wheel of the reaper, and just at the time the grain is deposited between the arms. The cams e i strike simultaneously the projections o at the lower parts of the arms, the radial projections $a^{\times}$ of said cams acting against the projections o of the arms I I, and the quadrant portions against the projections o of the arms J J. The arms I I J J will be closed, their upper ends coming in contact with each other, (see Fig. 2,) and drawing the grain into a bundle or sheaf. Just as the ends of the arms I I J J come in contact, the cam c raises the spring E, and the projection l on the spring is thrown free from the projection k on the shaft D. Said shaft being now at liberty to turn, the front pinion b gears into it, and the shaft D is rotated, the crank-pulley K operating the rod L, which forces down the frame N. As the frame N descends, the ends of the straw band 1 are caught between the two hooks u v, which are in fact clamps. The ends of the bands are caught in consequence of the movement of the hook v, which, as the frame N descends, is forced against the hook u. In consequence of the rod S being retained by the spring T, a projection, t', on the rod S being over the spring, as the hooks u v grasp the ends of the straw band, they are then rotated, and the end of the band is twisted, the hooks being rotated in consequence of the gearing $g^{\times}$, $h^{\times}$, and $i^{\times}$, the latter working into the rack $j^{\times}$. As the hooks u v descend, they are moved laterally, so that they will not come in contact with the arms, the hooks being moved at one side, in consequence of the depression of the inclined plane or wedge P by the lever M. A spring, 2, which bears against one of the guide-rods r, throws the rods at one side, the cross-piece s, it being understood, working on the pivot s'. The arms I I, when the band 1 is grasped, drop back or are forced back by the cams f h, the radial projections $a^{\times}$ having passed the projections o of said arms; and after the band is twisted, the frame N, having descended to its lowest point, commences to move upward, and the inclined plane P is forced upward, and moves the rods r r and frame N inward or back to a vertical position, and in so doing the ends of the hooks tuck or pass the twisted ends of the band underneath the band. (See Figs. 1 and 2.) At this movement the arms J J are distended by their own gravity. The quadrant portions of the cams e i having passed their projections o at their lower ends, the bend $e^{\times}$ is thrown free from the projection $t^{\times}$ on the rod S by the inclined plane $f^{\times}$, and the hooks open, and the tappet d on the shaft B strikes the projection m at the lower end of one of the arms F on shaft G, and both arms will be thrown upward and the bound sheaf cast upon the ground. At this time the frame N will be at its culminating point, and both pairs of arms, I I J J, ready to receive a fresh quantity of grain for the succeeding operation.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

The combination of the arms I I J J and hooks or clamps u v, constructed and arranged to operate conjointly, as and for the purpose set forth.

Witnesses: JOSEPH F. BLACK.
GEORGE A. BEARD,
J. F. BERGEN.