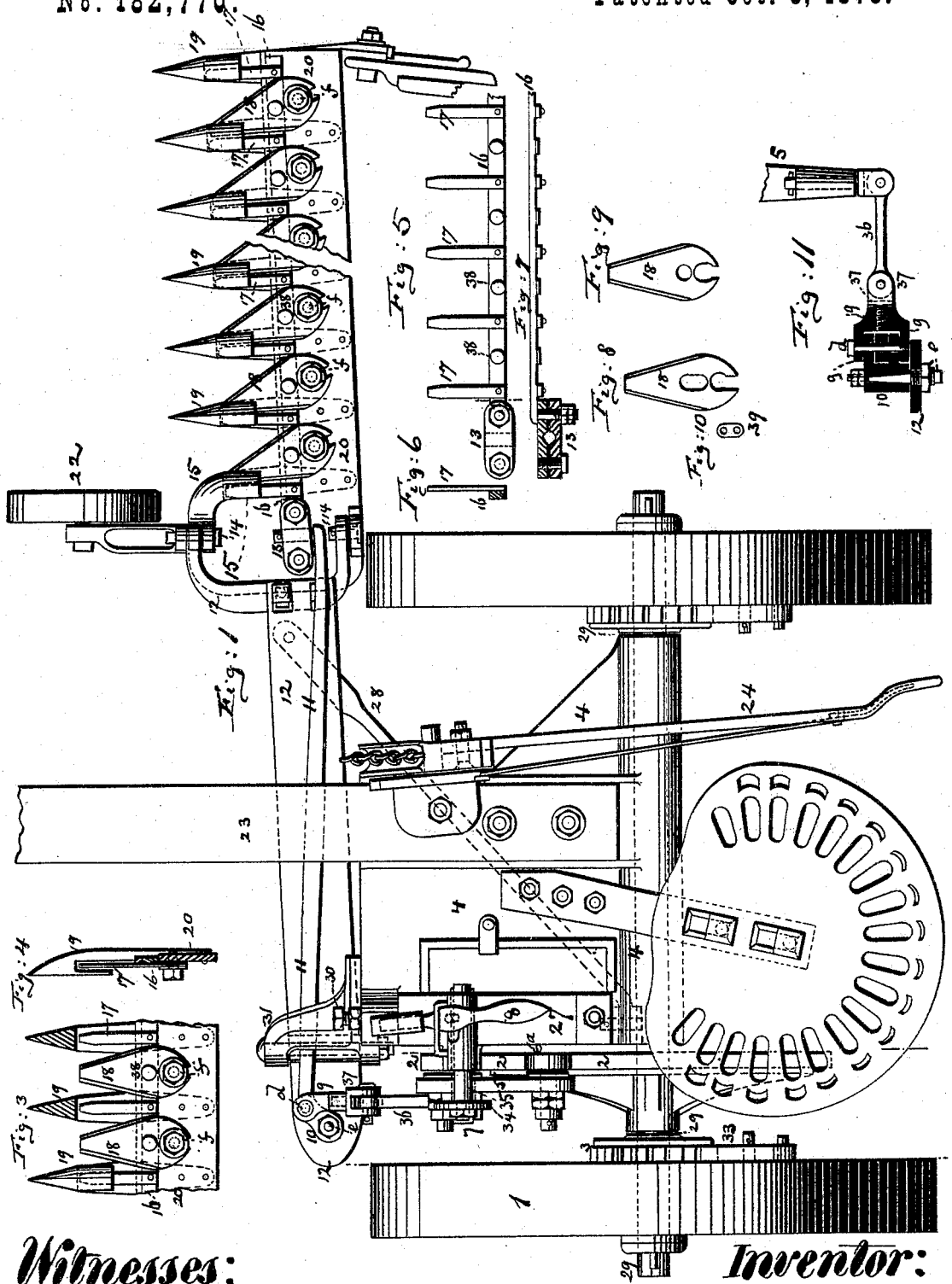
2 Sheets—Sheet 1.

H. PALMCRANTZ.

MOWERS.

No. 182,770. Patented Oct. 3, 1876.



Witnesses:

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Inventor:

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by his attorney

A. V. Briesen

2 Sheets—Sheet 2.

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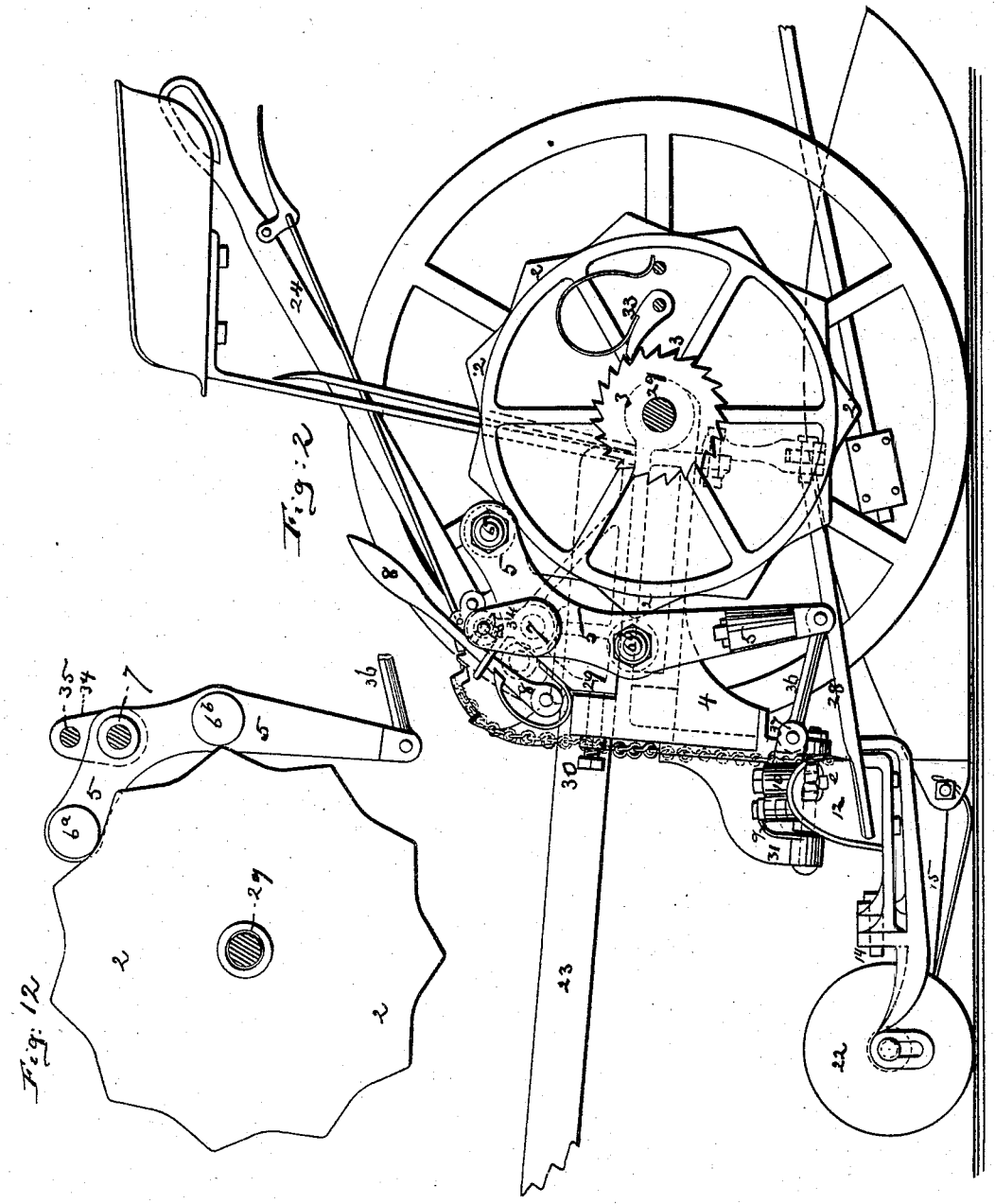

Fig: 2

Fig: 12

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UNITED STATES PATENT OFFICE.

HELGE PALMCRANTZ, OF STOCKHOLM, SWEDEN.

IMPROVEMENT IN MOWERS.

Specification forming part of Letters Patent No. **182,770**, dated October 3, 1876; application filed July 11, 1876.

To all whom it may concern:

Be it known that I, HELGE PALMCRANTZ, of Stockholm, the capital of the Kingdom of Sweden, have invented new and useful Improvements in Mowing and Reaping Machines, of which the following is a specification:

The object of this invention is to produce mowers and reapers superior to those hitherto known by improving the construction of the same.

The peculiarities of the new invention are not limited to the mowing mechanism itself, but are also to be found in the cutting apparatus. In both these respects the new features may be adapted with equal advantage in the construction of mowers as in that of reapers, and also in a combination of both. In the following specification the construction, however, has only been set forth with more particular regard to the mower.

In the accompanying drawing, Figure 1 is a plan of the machine. Fig. 2 is a side elevation of the same with the left wheel removed. Fig. 3 is a detail plan, and Fig. 4 a cross-section, of the cutting apparatus. Fig. 5 is a plan, Fig. 6 a cross-section, and Fig. 7 a front view, of the cutter-bar, with cleansing-prongs. Figs. 8 and 9 are detail top views of knives, showing modified forms thereof. Fig. 10 is a detail plan view of a doubly-perforated washer used on the knife. Fig. 11 is a side view, partly in section, of the coupling-rod, showing the manner in which it is joined to the crank-arm. Fig. 12 is a detail side view of the moving mechanism.

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

The general arrangements with regard to the driving-wheels, the pole, and the balancing of the machine are of substantially the ordinary construction. Between the left driving-wheel 1, which, by means of a pawl, 33, and a ratchet-wheel, 3, can be coupled to the main axle 29, and the frame, 4, in which the main axle moves freely, a cam-wheel, 2, having an undulating periphery, as shown in Fig. 12, has been firmly secured to the said axle 29, and, consequently, takes part in the rotation of the same when the machine is going forward. On the cam-wheel 2 a V-shaped driving-arm, 5, moves during the rotation. The object of this arm is to transform the rotation of the cam-wheel 2 into a rapid oscillating motion of said arm 5. The driving-arm 5 is, by a pin, 7, pivoted to the side of a pillow-block, 27, that rests on the frame 4. This pillow-block is by bolt fastened to the frame 4; but, when required, it can be set closer up to the main axle and the cam-wheel by means of an adjusting-screw, 30. The said pillow-block is provided with two bearings, situated one over the other. In the lowest of these the shaft 7 of the driving-arm rests, and in the upper one rests a guide-pin, 35, which is connected with the said shaft 7 by a joining-plate, 34. By means of a handle, 8, which is in connection with the guide-pin 35, the latter, and consequently also the driving-arm 5, with its parts, can be pushed aside to become disengaged from the cam-wheel. Thus the driver of the machine is enabled, in an easy and handy manner, to throw the cutting mechanism out of gear, and, consequently, render it inactive while the machine is going forward. When the machine is working the driving-arm is in contact with the edge of the cam-wheel by means of two friction-rollers, 6^a and 6^b, which are secured to the ends of the arm 5 equidistant from its pivot 7. The axles of the rollers 6^a and 6^b rest in sockets that are fitted in holes made for this purpose in the driving-arm. The said sockets are kept in their places by nuts. The distance between the friction-rollers is proportioned in such manner with reference to the undulations of the wheel 2 that whenever one of the said rollers is on the apex of an undulation the other is in the hollow, and vice versa, so that when one end of the arm 5 is pushed away from the axis of the wheel 2 the other end will move toward said axis. Consequently the lower end of the driving-arm obtains the oscillating backward and forward motion intended. This motion is thence communicated to an intermediate mechanism of the following description: To a downward extension of the driving-arm 5 is pivoted a coupling-rod, 36, which is joined to a screw-eye, 37, screwed into the hollow of a link, 9, that is pivoted by a bolt, *d*, to the crank 10. Said crank is hung in the end of the coupling-frame or floating-bar 12.

By thus joining the coupling-rod 36 with the crank 10 by a screw-joint it is possible to accurately adjust the position which the crank-arm is to occupy at its utmost limits of motion, so that the knives may be properly placed in the cutting apparatus. From the crank 10 a connecting-rod, 11, extends to and connects with the cutter-bar 16. The crank 10 is connected with the connecting-rod 11 by the same bolt *d* that joins it to the link 9, and in such manner that at its two extremes of motion the crank will form equal angles to the line drawn from the axis of the crank-pin to and through the rod 11. The consequence of this is that every full stroke of the coupling-rod 36 and of the crank 10 produces a backward and a forward motion of the cutter-bar, which is connected to the rod 11. The crank 10 has its fulcrum on an adjustable, conical pin, *e*, which is placed on the left end of the floating-bar or coupling-frame 12. As the pin *e* or crank 10 wears the pin is elevated, and a close fit thereby again obtained. The floating-bar 12 forms also a support for the cutting apparatus, and is suspended near the crank 10 by means of a bolt in a fork, 31, of the frame, whereby the turning of the bar 12 in a nearly vertical plane is rendered possible. The bar 12 is held properly in line by a brace, 28, which extends from the right side of the frame 4 diagonally toward the left end of the bar 12. The brace 28 is pivoted to the frame 4 in line with the pivot in the fork 31, so that it does not prevent the raising and lowering of the bar 12. The bar 12 is raised or lowered in the usual manner by means of a lever, 24, attached to the pole 23 or frame, and provided with a chain that runs over a quadrant and connects with the bar 12.

The cutting apparatus is at the left end, supported in a shoe, 15, which, by means of a joint, 14, is connected to the right end of the bar 12, and which in front is provided with a leading-wheel, 22. In this shoe the finger-bar 20 is fixed by means of rivets or screws, and on the said finger-bar the fingers or guards 19 are each of them separately riveted. The fingers are notched, as usual, so that the cutter-bar 16 can move to and fro. The backward and forward motion of the cutter-bar is produced by the connecting-rod 11, to which it is joined by the block 13. On the cutter-bar are riveted, at equal distances apart, as many cleansing-prongs 17 as there are fingers. The width of the cleansing-prongs is adjusted according to the motion of the cutter-bar, in such a manner that at the extremes of motion of the cutter-bar the edges of the cleansing-prongs will be in line with those of the fingers. The cutter-bar, between each pair of cleansing-prongs, carries a pin, 38, which fits in a corresponding hole of the knife 18. For the fastening of the knives 18 in the cutting apparatus, each of them is provided with two holes, the one which fits the pin 38 last mentioned being closer to the point of the knife, and the other one nearer the back end of the knife, toward which said second hole is open, as in Figs. 8 and 9. A pin, *f*, projects from the finger-bar through the said open hole of the knife. Owing to the oscillating movement of the knife the latter, fixed on one pin, must necessarily slide on the other. The sliding of the knife may, consequently, take place either on the pin 38, on the cutter-bar, or on the attachment-screw or pin *f* on the finger-bar. In the former case the hole of the knife, which corresponds to the pin 38, is of an oblong form, as in Fig. 8, but in this hole the pin 38 does not slide directly. The sliding takes place around a collar or washer, 39, which is placed into the slot of the knife. This collar 39 is provided with two holes, and may, consequently, when worn at one end, be turned about, and thus used twice; but when the knife is to slide on the pin *f* of the finger-bar the hole corresponding to the pin 38 is round, as in Fig. 9, and the other one oblong, by which the sliding of the knife on the attachment-screw *f* is rendered possible. By means of the screws or pins *f* that go through the holes at the back ends of the knives, these are fastened on the finger-bar. Each of the screws *f* accordingly forms a fulcrum for its respective knife.

When the sliding of the knife takes place at the pin 38 on the cutter-bar, the knife turns around a collar placed loosely on the attachment-screw *f*. On the other hand, when the knife slides at the attachment-screw the nucleus of the latter has a different diameter at the part closest to the screw-head to what it has at the remaining part, so that the former diameter corresponds to that of the hole, but the latter is less.

In order to prevent the screw-heads and the finger-bar from being worn, round washers, punched, of steel-plate, and hardened, have in either case been placed between the screw-heads and the knives on the one side, and between the knives and the finger-bar on the other side.

The knives being fastened in the manner now described, any of them may easily be removed separately, when required. For this purpose the attachment-screw *f* needs only to be screwed out a little, and the knife raised above the pin 38 on the cutter-bar, and if the attachment-screw *f* is provided with a collar, the latter pressed down, after which the knife can be drawn out with the greatest ease.

In order to make the foregoing description more plain, the following summary of the mode of operation is added: When the machine is going forward, the driving-wheels, by means of the pawls and ratchet-wheels, put the main axle, and, consequently, also the cam-wheel 2 secured on the same, into rotation. The driving-arm 5, which, by means of the friction-rollers, is in contact with the cam-wheel, is compelled, by the undulated periphery of the cam-wheel, to oscillate, whereby the lower part of the driving-arm is moved forward and backward. The said motion is trans-

mitted by the coupling-rod to the crank 10, which is thereby vibrated. In this backward and forward motion the end of the connecting-rod that is joined to the crank-arm also takes part. The other end of the connecting-rod, connected with the cutter-bar, moves in a straight line to and fro, owing to the guiding-grooves in which moves said cutter-bar.

Finally, the cutter-bar in this motion to and fro, not only puts all the knives simultaneously in an oscillating motion, the screws fixed in the finger-bar constituting fulcrums, but also keeps the cleansing-prongs going to and fro, and thus the fingers are constantly kept clean.

When any obstructions occur in the working the cutting apparatus can be raised by pressing down in the usual manner the lever at the right hand of the driver. For transport, the cutting apparatus can be turned up, and also folded over to the left, and laid on the pole.

Although in the foregoing description a mower has only been described, it is clear that the same features of invention are applicable also to reapers and to combined mowers and reapers.

It will be observed that the knives, by being fastened in the peculiar manner described, are not fixed at any one point, and slide as well as vibrate when moved. This gives a peculiar draw to the cut, especially toward the termination of each stroke, and materially increases the power of the machine.

I claim as my invention—

1. The pillow-block 27, provided with two bearings, and combined with the shaft 7, V-shaped driving-arm 5, and with the guide-pin 35 and handle 8, all arranged to operate substantially as herein shown and described.

2. The cutting apparatus, composed of the slotted fingers 19, reciprocating cleansing-prongs 17, and vibrating knives 18, all arranged for operation, substantially as specified.

3. The knife 18, made with a hole and with a slot to be connected to the reciprocating pin 38, and to the stationary pin *f*, and combined with the doubly-perforated collar 39, substantially as herein shown and described.

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