(No Model.) 2 Sheets—Sheet 1.

J. K. WILDER.

FEED CUTTER.

No. 529,768. Patented Nov. 27, 1894.

Fig. 1.

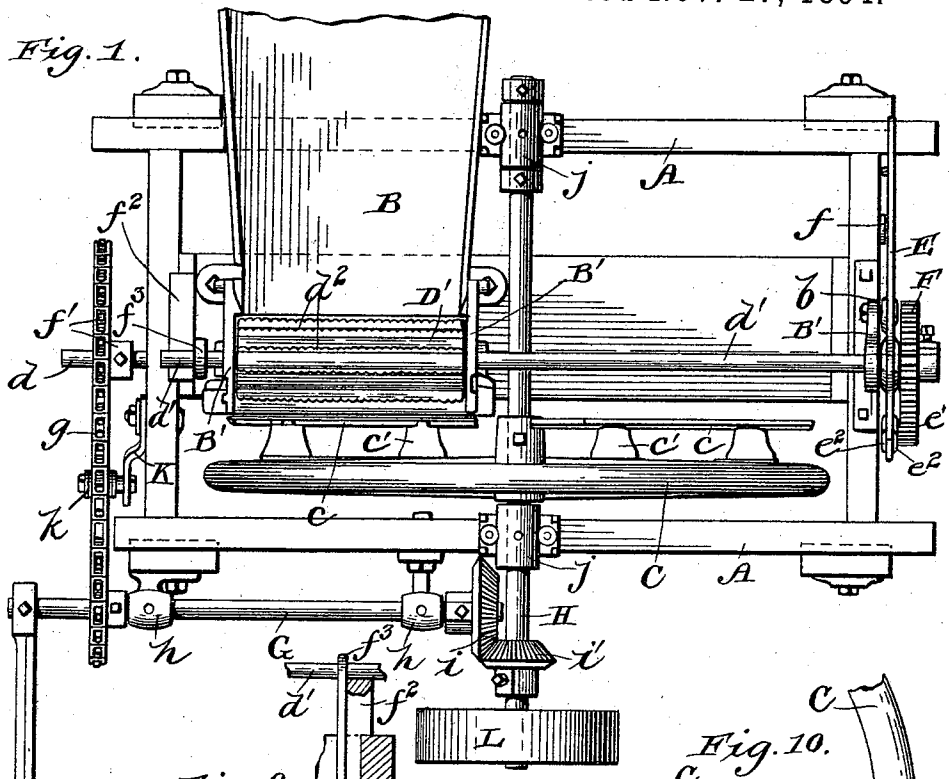


Fig. 9.

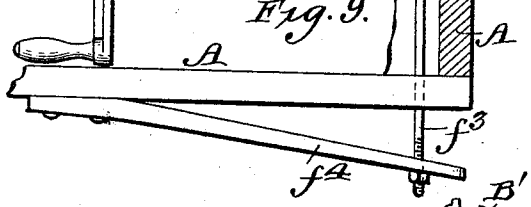


Fig. 10.

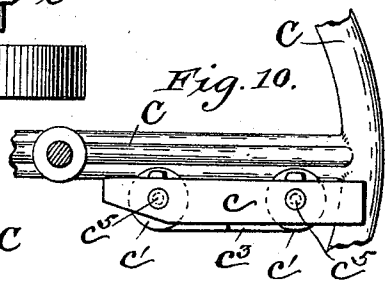
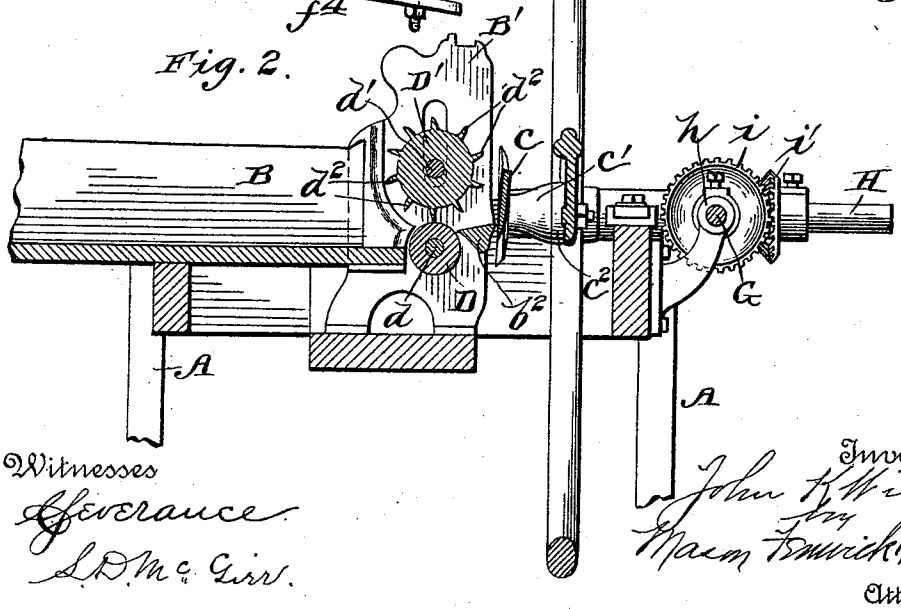


Fig. 2.



Witnesses
Severance
L. D. McGirr.

Inventor
John K. Wilder
by
Mann Fenwick & Rammer
Attorneys

(No Model.) 2 Sheets—Sheet 2.

J. K. WILDER.

FEED CUTTER.

No. 529,768. Patented Nov. 27, 1894.

Fig. 3.

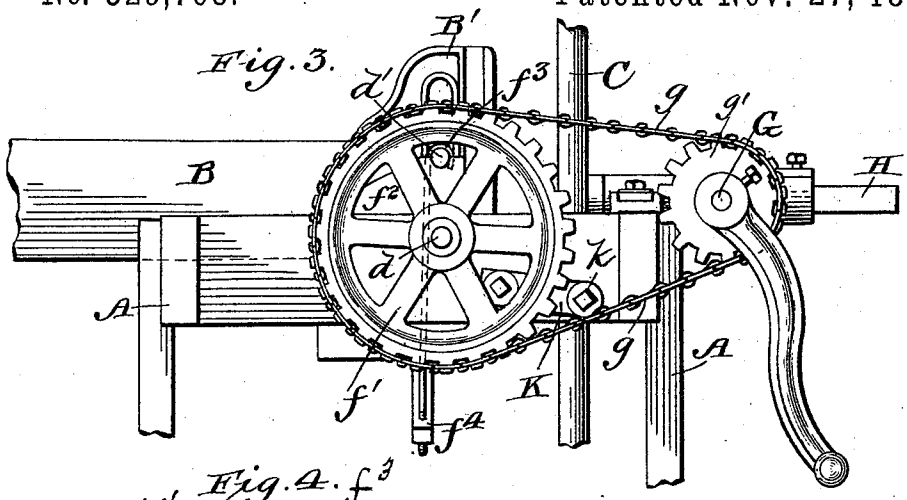


Fig. 4.

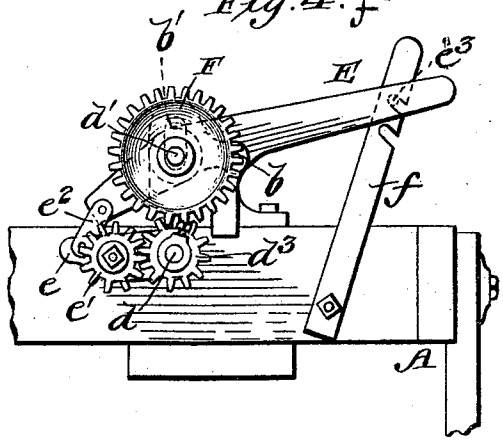


Fig. 5.

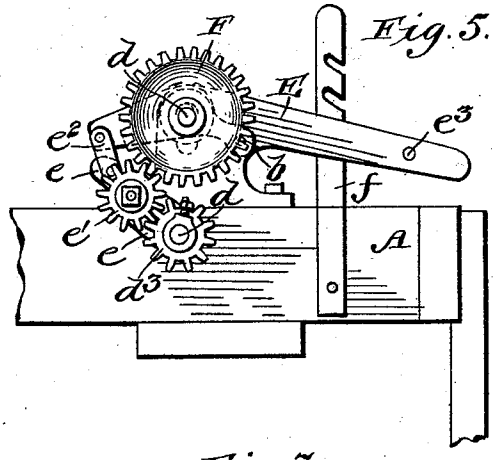


Fig. 6.

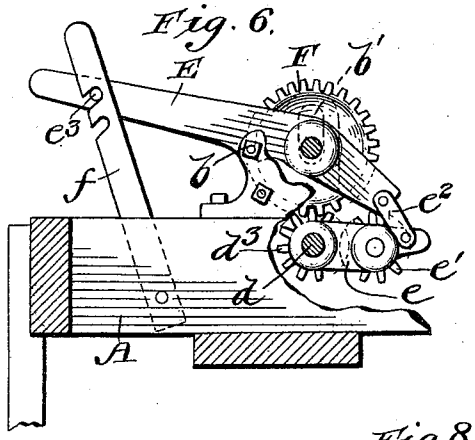


Fig. 7.

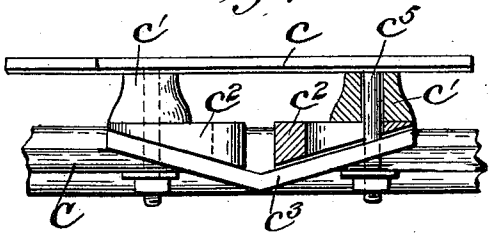
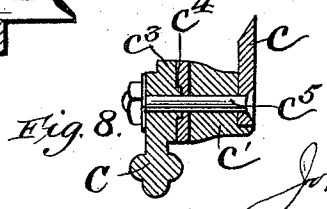


Fig. 8.



Witnesses
Severance.
L. D. McGirr

Inventor
John K. Wilder
by
Mason, Fenwick & Lawrence
Attorneys

UNITED STATES PATENT OFFICE.

JOHN K. WILDER, OF MONROE, MICHIGAN.

FEED-CUTTER.

SPECIFICATION forming part of Letters Patent No. 529,768, dated November 27, 1894.

Application filed June 29, 1894. Serial No. 516,240. (No model.)

To all whom it may concern:

Be it known that I, JOHN K. WILDER, a citizen of the United States, residing at Monroe, in the county of Monroe and State of Michigan, have invented certain new and useful Improvements in Feed-Cutters; and I do hereby declare the following to be full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in straw or feed cutters, and consists, first, of improved mechanism by which one of the feed rollers of the cutter may be either stopped or reversed without stopping or reversing the other parts of the cutter; second, it consists of improved feed rollers of different diameter and driven in a novel manner, whereby a relatively short cut of the straw or other substances is accomplished without using a driven sprocket wheel of an undesirably large diameter, and a driving sprocket wheel of too small a diameter, and thus compactness in the machine secured; third, it consists of adjustable wedge blocks in pairs, whereby the cutting blades can be moved in and out with relation to the cutting edge of the machine, and it further consists of certain other novel constructions and combinations of parts as will be hereinafter more fully described and claimed.

In the accompanying drawings, Figure 1. is a top plan view of the devices embodying my invention. Fig. 2. represents a detail vertical section through the feeding box, rolls, fly wheel and connecting mechanism. Fig. 3. represents a detail side elevation showing the sprocket wheels and chain for directly operating the lower feed roller. Fig. 4. represents a detail side elevation of the gear mechanism for reversing the movement of the feed rollers, as it appears when the rollers are feeding forward. Fig. 5. represents the same, as it appears when the rollers are reversed and feeding backward. Fig. 6. represents a detail side elevation of said roller operating gearing, showing the gear, journals and connecting link and arm on the opposite side from that shown in Figs. 4 and 5. Fig. 7. represents a detail plan view, partly in section, of the fly wheel and wedge blocks for adjusting the knives thereon. Fig. 8. represents a detail vertical section through a portion of said fly wheel, and one of the wedge blocks, and the knife attached thereto. Fig. 9. is a partial elevation and partial sectional view showing the spring rod, and Fig. 10. is a detail view showing the cutting blade in elevation.

It is important in feed cutters to have a large upper feed roller in order that the material supplied from the feed box shall be properly forced toward the cutters, and it is equally important to employ with such larger upper feed roller, a relatively smaller feed roller, in order to secure a short cut of the material as it passes under the cutter blades. To employ feed rollers of different diameter, and at the same time keep the machine small and compact and not have the driven sprocket wheel very large and the driving sprocket wheel too small, require that the other gearing employed in connection with the sprocket wheels and chain shall be peculiarly constructed, and to this end the following construction is preferably adopted:

A in the drawings, represents the supporting frame of the cutter; B, the feed box; C, the fly wheel carrying the adjustable cutting knives *c;* D, the small feed roller and D′ the large gripping feed roller.

The frame A is of any ordinary construction and supports the horizontal feed box B whose inner end is secured between standards B′ which are mounted on said frame. Said standards also support the feed rollers D and D′; the shafts *d*, *d′* of said rollers passing through said standards, and one end of the lower shaft being journaled therein and the upper shaft simply passing through vertical slots cut in said standards, so that the roller carried by it is capable of vertical movement when necessary. The roller D is, preferably, plain surfaced, and may be about one half the diameter of the roller D′; and the roller D′ is, preferably, provided with longitudinal flanges or ribs d^2 having toothed or scalloped edges which grip and feed the straw and hay forward between said rollers.

The longer or lower shaft *d* is journaled at its outer end in the frame A, and is provided at this end with a small spur wheel d^3; and

the upper shaft d' is also provided at its outer end with a gear wheel F, about twice the size of the spur wheel d^3, and is passed through a slot b' of one of the standards B' and is journaled in a lever E, which lever is pivoted to said standard B' at b. An arm e is loosely connected by one of its ends to the lower shaft d, and on its other end carries a spur wheel e' of about equal diameter to the spur wheel d^3, said spur wheel meshing with the spur wheel d^3 and, as occasion requires, with the gear wheel F. The outer end of the arm e is connected to the outer end of the lever E by a short link e^2, and at the opposite end of the lever E, is provided a pin or stud e^3 which is adapted to engage a pivoted notched bar f, and thus be held in a raised or lowered position. It will be understood that the spur wheel d^3 by being, say, about one half the size of the gear wheel F will cause said gear F to move, say, about half as fast as the spur wheel d^3, and that consequently the upper roller D', which is connected to said gear F, will move about, say, half as fast as the lower roller D which is driven by the spur wheel d^3, and thus the requisite compensation will be made for the difference in the diameters or peripheral surfaces of the rollers. It will be seen that when the lever E is in its raised position, as shown in Fig. 4., the spur wheel d^3 will be brought into engagement with the gear wheel F, and thus both of the rollers will be caused to feed forward the material, but when the lever is depressed, the gear wheel F will be raised and thrown out of mesh with the gear d^3, and the upper roller will cease to revolve. Upon a further depression of the lever E into the position shown in Fig. 5, the shaft d' is raised to the top of the slot b' in the standard B', and the gear e', which is in mesh with the gear d^3, and revolving in the opposite direction therefrom, will be brought into mesh with the gear wheel F, and thus the movement of the roller reversed or said roller caused to move backward. The inner end of the shaft d carries a large sprocket wheel f', and the inner end of the shaft d' rests upon an adjustable block f^2, and is kept thereon by means of a hook f^3 having a pendent shank which is secured to a spring rod f^4, and thus, while shaft d' is properly supported and controlled, it is allowed to rise vertically under a spring pressure, as the straw or hay is fed between the rollers, and thus the straw or hay will always be firmly gripped and forced forward by said rollers.

The sprocket wheel f' is connected to a power shaft G by means of an endless sprocket chain g which passes around said sprocket wheel f', and also around a smaller sprocket wheel g', mounted rigidly on said power shaft. The power shaft G is supported on the frame A by bracket bearings h, and may be provided at its outer end with a hand crank, and at its inner end with a bevel gear wheel i, which is of much smaller diameter than the driven sprocket wheel f', and meshes with a bevel wheel i' which is of smaller diameter than the wheel i, and is mounted on the fly wheel shaft H. The shaft H is journaled in the bearings j upon the top of the frame A, and carries a pulley L on its end, and also the fly wheel C, upon the arms of which, the cutting knives c are mounted. The cutting knives are, preferably, two in number, as a larger number is found to operate with too much friction at the point of cutting, and also because the fly wheel, after making one cut, has not time with more than two knives employed, to acquire momentum sufficient to effect the next cut without shock or pause. The employment of only two cutting knives is rendered practicable from the fact, as hereinbefore explained, of the desired short cut of the straw or feed being secured by the peculiar construction of the feed rollers; instead of using a greater number of knives as usual, to effect this result. The knives are adjustable upon the spokes of the fly wheel by means of independent supporting blocks c' and separated slotted wedges c^2, the latter resting upon the oppositely inclined faces of wedge supports c^3, which are cast integral with the spokes. The under sides of the wedges are grooved so as to fit over guiding ridges c^4 formed on the upper faces of the wedge supports. The knives are ordinary single edged blades, and are secured upon the blocks c' by bolts c^5 which pass through said knives, blocks c', wedges c^2 and wedge supports c^3, and are secured by nuts. To move the knives inward and outward with respect to the cutting bar b^2, all that is necessary, is to loosen the nuts on the bolts, and slide the wedges either up or down on the inclined faces of the supports c^3, and then tighten up the nuts. The object of having the knives adjustable inward and outward, is to regulate the same, relatively to the cutting bar b^2, so that a perfect cut will always be made at that point.

The chain g is held taut by means of a roller k mounted upon a pivoted adjustable bar K, and adapted to bear upon the inner side of the said chain and force it outward, thus taking up the slack. This bar is adjusted by loosening the nut confining it on its pivot and then tightening up the nut again when the bar has been moved to the desired position.

The inner sharp edges of the knives, near the center of the wheel, are cut away diagonally so that the cut made at this point will be a slicing cut which is very desirable as the leverage near the center of the fly wheel is very slight and the cutting at this point would otherwise be accompanied with great resistance. Instead of applying the power by means of the hand crank, a belt pulley as L may be applied to one or the other of the shafts G or H. I have shown it applied to the shaft H. This belt wheel is connected with any suitable source of power. The

straw is pushed from the box B into the rollers D, D′, and the latter feed it upon the cutting bar b^2 when the rapidly moving knives make the desired cut. If the rollers become clogged or any foreign substance gets into them, the roller D′ can be instantly stopped without stopping the remainder of the machine, by partially depressing the lever E which causes the gear wheel F to disengage from the spur wheel d^3, and at the same time raises the roller D′ so that its toothed flanges or ridges disengage from the obstruction. If this is not sufficient to dislodge the obstruction, the lever E is further depressed and the roller D′ caused to revolve backward which will dislodge the obstruction and force it back into the feed box.

I wish it to be understood, that while I regard the relative proportions set forth for the construction of the feed rollers, and the sprocket, spur and bevel gear wheels, as the most practical that could be adopted for small feed cutters, yet I do not confine myself to these particular relative proportions, as the same may be varied as to their different relative proportions, and still produce improved results over constructions heretofore devised. I also wish it to be understood that the means I have adopted for reversing the feed, as well as stopping the feed entirely, are not necessarily confined to feed rollers of different diameters, or with differential peripheral surfaces, and gearing for rotating these rollers with differential speeds, as such means may be used with other kinds of feed rollers, driven by other kinds of gearing, without departing from my invention.

What I claim as my invention is—

1. A feed cutter feed mechanism comprising a pair of rolls whose peripheries are revolved at different speeds, the lower feed roller being supported in a suitable frame and having on the outer end of its shaft a gear, which, with the roller and the shaft, remains at all times in the same position, and the upper feed roller and shaft being suitably mounted and guided at its ends on said frame and having a gear on the outer end of its shaft which, with the roller and shaft is movable up and down and is adapted to be revolved either forward or backward, and an adjusting lever, means for holding it in a fixed position, said lever having the outer end of the shaft rotatably connected to it, and an intermediate adjustable gear suitably located and supported in relation to the gears of the two feed rollers so as to be always engaged with the gear of the lower feed roller, and is connected to the lever so as to be operated by it to effect either the forward or backward feed of the machine.

2. In a feed cutter, the combination of a suitable supporting frame and feed box, feed rollers, one of said rollers being capable of vertical movement and having a gear wheel mounted on its shaft, a pivoted lever carrying one end of said shaft and adapted to move the same vertically, a pivoted arm, a link connecting said arm to said lever two pinion gears one of said gears mounted on said pivoted arm, and adapted respectively to engage the gear wheel on the shaft according to the position of the pivoted lever and the gear wheel on said shaft and thereby turn the roller having the gear wheel either backward or forward, a fly wheel provided with cutting knives, and means for actuating said rollers and fly wheel, substantially as described.

3. A feed cutter comprising a differentiating feed, and reversing mechanism and having a balance wheel, cutting knives mounted thereon, a pair of independent wedges c^2 provided with longitudinal slots, reversely inclined supports c^3, a pair of blocks c' and bolts c^5, whereby the knives can be adjusted inward and outward without interference with the cutting bar of the machine, substantially as described.

4. In a feed cutter the combination with a suitable supporting frame and feed box, of an operating shaft d' carrying an upper ribbed feed roller at one of its ends and provided with a gear wheel F, a shaft d carrying a feed roller of less diameter than that of the upper feed roller and provided at one of its ends with a spur gear wheel d^3, a pivoted lever adapted to move the shaft d' vertically and carrying at its outer end a link e^2, a link e loosely mounted on shaft d, connected to the link e^2 and carrying the spur gear wheel e', a balance wheel carrying cutting blades, and means for operating the feed rollers and the balance wheel simultaneously, whereby a short cut can be made and one of the rollers can be stopped entirely or reversed without interfering with the driving mechanism of the machine, substantially as described.

5. In a feed cutter the combination with a suitable supporting frame and feed box, of an upper feed roller mounted on a shaft, said shaft carrying a gear wheel at its outer end, a lower roller and shaft the latter carrying a gear wheel at its outer end which is adapted to mesh with the gear on the upper shaft whereby the rollers are revolved at different speeds, a balance wheel, cutting knives mounted thereon, a pair of independent wedges c^2 provided with longitudinal slots, reversely inclined supports c^3, a pair of blocks c' and bolts c^5, whereby the knives can be adjusted inward and outward with respect to the cutting bar of the machine, substantially as described.

6. In a feed cutter the combination of an upper feed roller mounted on a shaft, said shaft carrying a gear wheel at its outer end, a lower feed roller and shaft, the latter carrying at its outer end a fixed gear wheel which is adapted to mesh with the gear on the upper shaft by having the latter brought into mesh with it, a pivoted lever secured to the upper shaft and adapted to adjust an interposed

gear, an interposed gear which is at all times in permanent mesh with the gear on the lower shaft, means for supporting the interposed gear, and means for connecting it with the operating lever, the construction and operation being such, that the upper shaft and the gear carried thereby and the interposed gear are raised and lowered by the operating lever, while the gear on the lower shaft always remains fixed.

In testimony whereof I hereunto affix my signature in presence of two witnesses.

JOHN K. WILDER.

Witnesses:
GEO. M. LANDON,
H. A. LOCKWOOD.