(No Model.) 3 Sheets—Sheet 1.

E. W. ROSS.

FEED CUTTER.

No. 439,429. Patented Oct. 28, 1890.

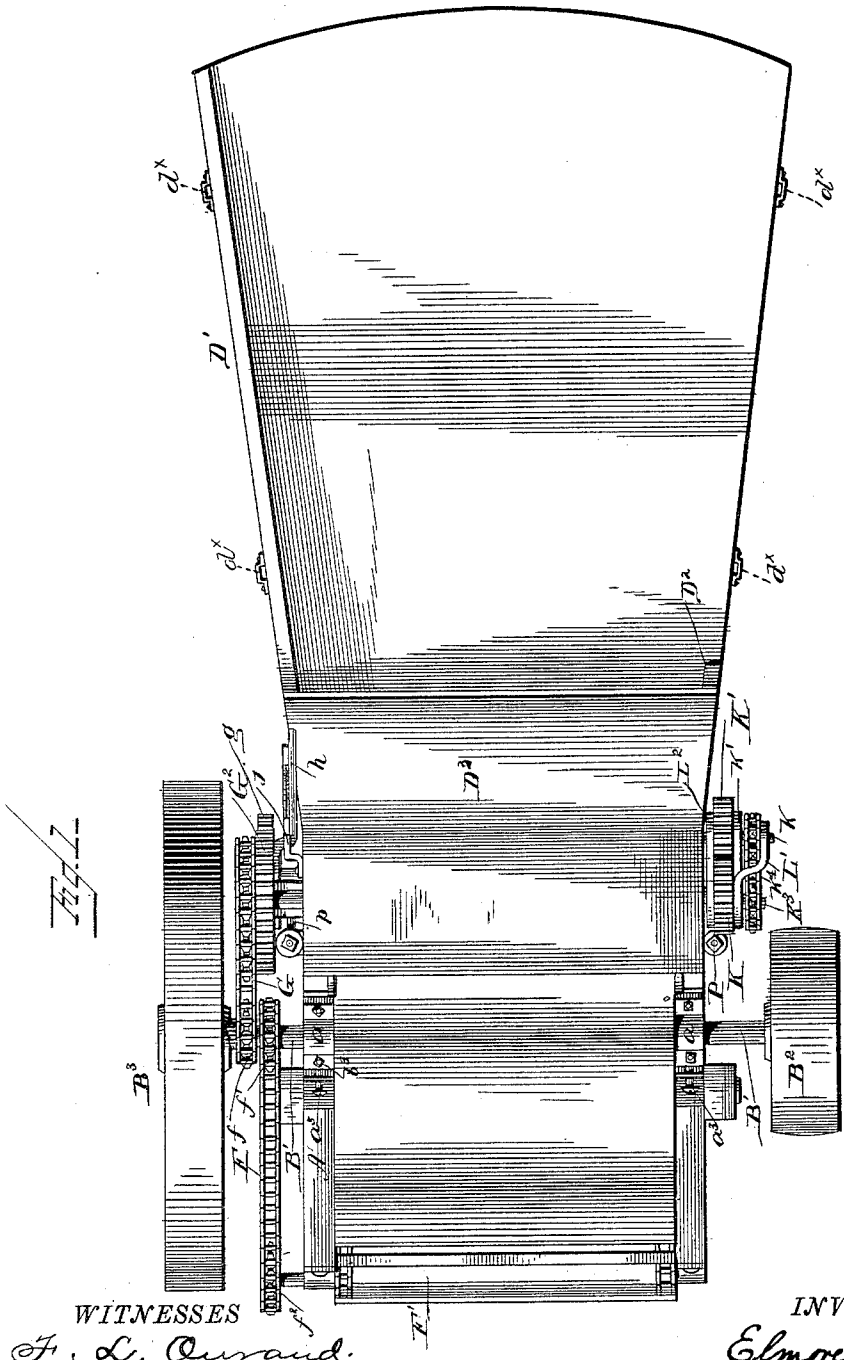


Fig. 1.

WITNESSES

F. L. Ourand.

Rex M. Smith

INVENTOR

Elmore W. Ross,

by A. M. Smith,

Attorney.

THE NORRIS PETERS CO., PHOTO-LITHO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

ELMORE W. ROSS, OF SPRINGFIELD, OHIO.

FEED-CUTTER.

SPECIFICATION forming part of Letters Patent No. 439,429, dated October 28, 1890.

Application filed January 17, 1888. Serial No. 260,994. (No model.)

To all whom it may concern:

Be it known that I, ELMORE W. ROSS, of Springfield, county of Clark, and State of Ohio, have invented a new and useful Improvement in Feed-Cutters, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, making part of this specification.

My invention relates to a novel construction of the feed box or table, to a ball-bearing for the yielding feed-roll shaft and to the manner of adjusting the same, to the manner of attaching the band and fly wheels to the cutting-cylinder shaft, whereby they are made interchangeable, and to the means for adjusting said shaft, to the means for stopping and reversing the direction of rotation of the feed-rolls, to the construction and arrangement of the shredder-knives, and to certain other details of construction and arrangement, all as hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a plan or top view, and Fig. 2 a side elevation, with some parts partly broken away, of a machine with my improvements applied. Fig. 3 is a side elevation showing the connections between the cutter-shaft and the fixed feed-roll and discharge-carrier; Figs. 4 and 4^a, detail views of one of the adjustable boxes in which the cutter-shaft is mounted. Fig. 5 shows the ball-bearing for the yielding feed-roll shaft and its supporting and adjusting devices in detail. Fig. 6 is a plan view of the cutting-cylinder with the shredder-knives applied. Fig. 6^a shows in transverse section a portion of the cylinder with one of the shredder-knives in elevation; Fig. 6^b, a plan view of one of the cam-blocks for adjusting the knife-bars. Figs. 7, 8, and 9 show in side elevation the means for stopping and for reversing the direction of rotation of the feed-rolls; Fig. 9^a, a perspective view of the lever-plate for making said adjustments with the gears removed. Fig. 10 is a perspective view of the gears connecting the fixed and yielding feed-rolls and for permitting the adjustment of the latter. Fig. 10^a shows two of the hangers for said gears in section and the shaft suspended thereby. Fig. 11 shows in perspective the cutter-shaft and the band and fly wheels, said wheels being shown in section and the fly-wheel partly broken away; and Figs. 12 and 12^a, a rear elevation of and a transverse vertical section through the feed-rolls and stationary knife-holder and knife.

The machine-frame is of the usual upright rectangular form, and, together with other parts of the machine the construction of which is well known, will not be described in detail herein further than is necessary to an understanding of what is herein claimed.

A indicates the frame; B, the cutting-cylinder; C C′, the feed-rolls, said parts, with the feed box or tray, being arranged in the usual relation to each other.

The feed-box D, instead of having, as usual, two long side boards extending the whole length of the table or bottom of the tray, has only one such long side board D′, and the side board D^2 upon the other side of the tray is shortened to extend only about as far forward as the top board D^3 of the hopper of the machine. By this construction the feeding of the machine is greatly facilitated, as the attendant not only does not have to lift the material so high to get it on the table, but he does not have to reach over a side board to feed the material to the rolls. Either side may have the long side board applied, as may suit the convenience of the operator, and said board serves to prevent the escape of the material and to guide it to the rolls, the operator standing upon the opposite side to supply the table and feed it to the rolls. If desired, the long side board D′ may be made detachable and transferable from one side to the other, pendent bars or pins and angular straps $d^\times$ to receive said pendent pins being shown to facilitate such transfer.

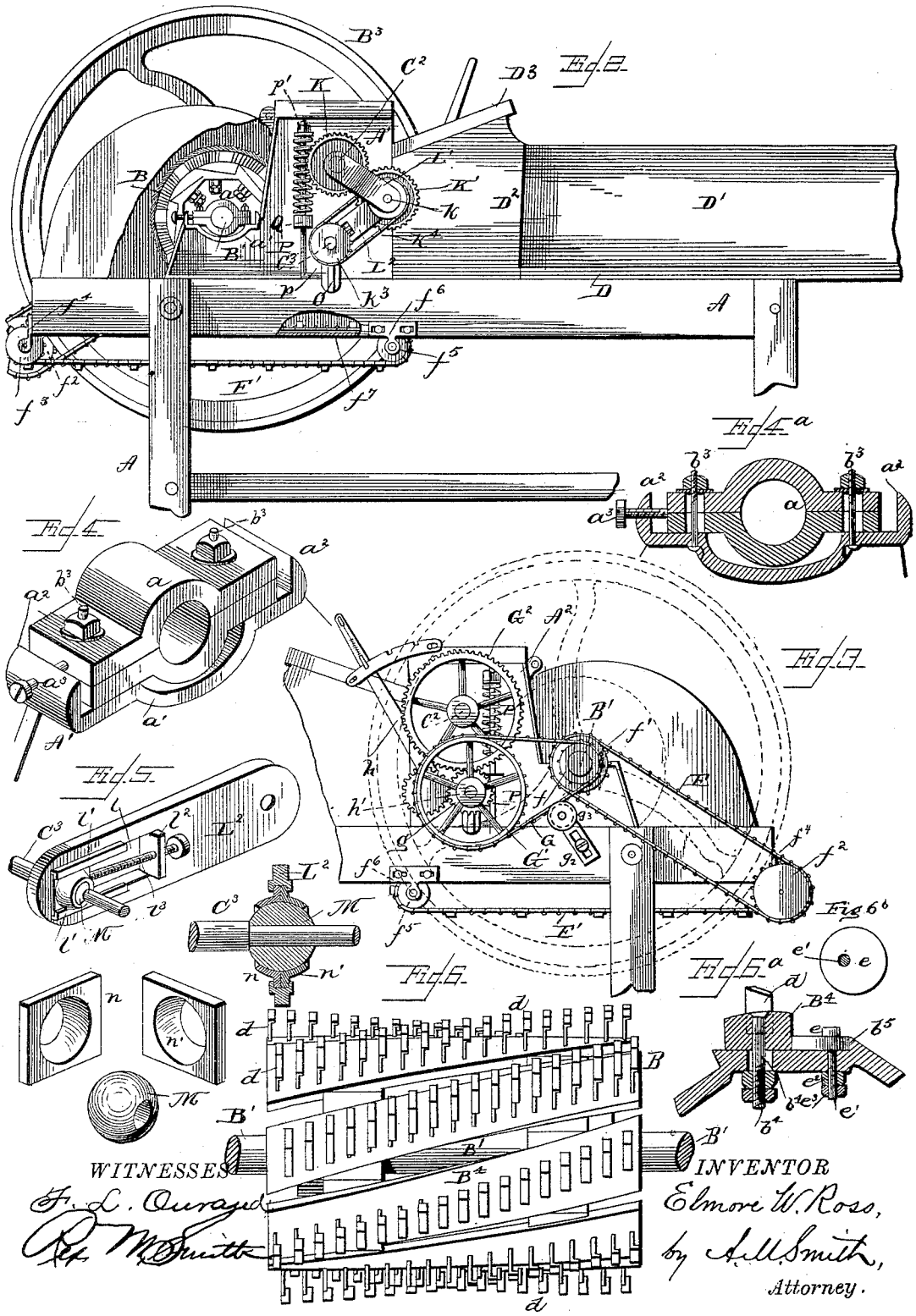
The cylinder-shaft (indicated at B′) is shown with splines or feathers b b' on its ends, and the band-wheel B^2 and fly-wheel B^3 have each a groove formed in the inner end of the wall of the central perforation, as shown in Fig. 11, to adapt them to fit and engage said splines or feathers, and set-screws b^2 to secure them to the shaft when so engaged. By this construction I am enabled to remove the band and fly wheels quickly and to transpose them, respectively, from one end of the shaft to the other, according to which it may be more convenient to apply the band or driving power to. A set-screw alone has to fasten the wheel and a key is difficult to remove.

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Fig. 7.

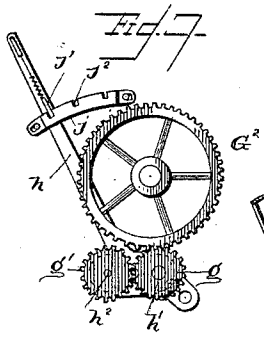


Fig. 8.

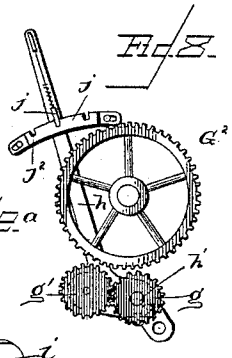


Fig. 9.

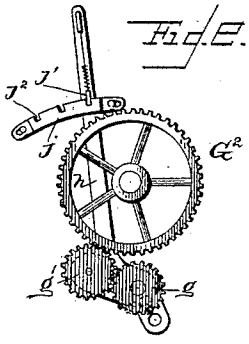


Fig. 9a.

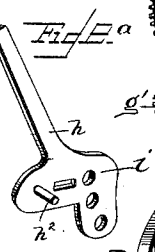


Fig. 10.

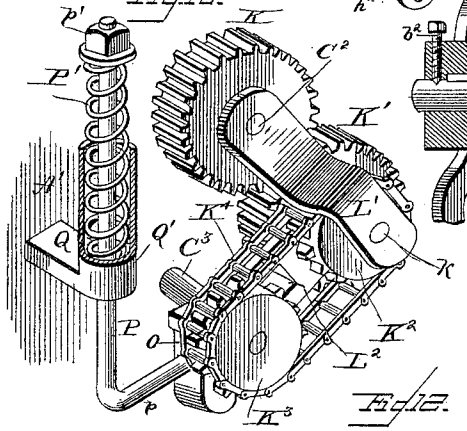


Fig. 11.

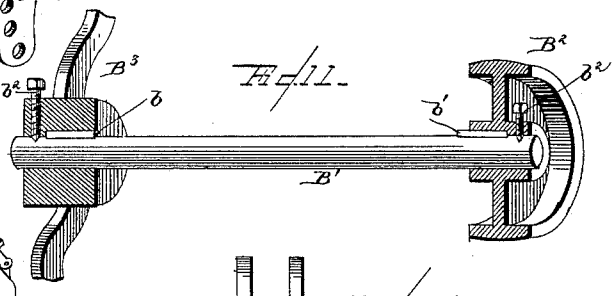


Fig. 10a.

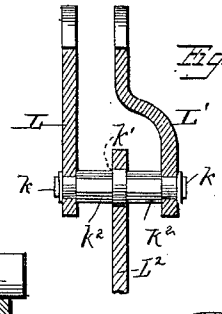


Fig. 12.

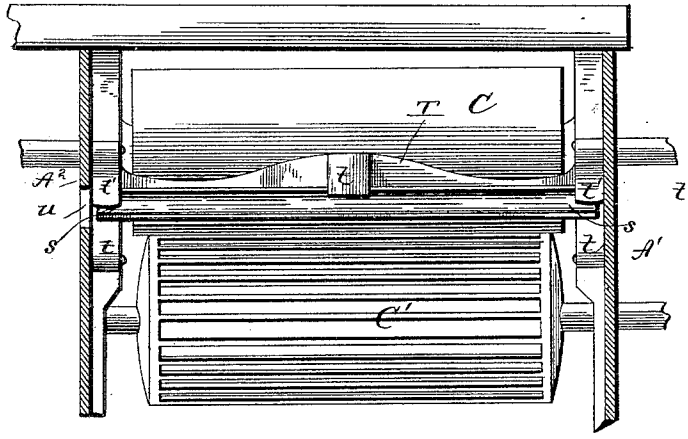
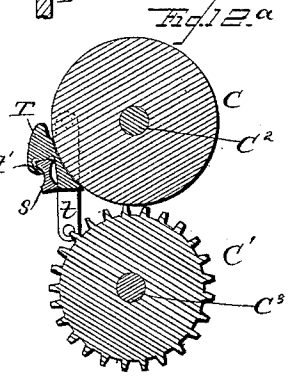


Fig. 12a.



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The lever h is provided with a fixed stud-shaft h^2, on which is mounted a second pinion g' in mesh with the pinion g. The stud-shaft h' is screwed into any one of a series of perforations i in the lever h, arranged at different distances from the shaft of the gear G^2, and said stud-shaft may be transferred from one to another of said perforations to adapt it to receive pinions g of different diameters for varying the speed of the gear G^2, actuating the feed-rolls.

The lever h is slotted to permit its adjustment on its supporting bolt or pin for setting the lever properly and for taking up slack in the drive-chain G, and its upper end is engaged with a segmental rack-bar j by means of a spring-actuated latch j', which can be withdrawn from the rack by means of a thumb-lever and connecting-link under any suitable arrangement.

The rack-bar j has its ends slotted to permit its adjustment to conform to that of lever-plate h, and is secured to the cover of the feed-roll and feed-hopper or other suitable support by set-screws or pins. It is provided with three notches j^2 for holding the lever in any one of the three positions shown. The first in Fig. 7, with the gear g in gear with the gear G^2 for operating the feed-rolls to feed the cutters; the second in Fig. 8, with the pinion g thrown out of gear with wheel G^2 for stopping the feed, and the third in Fig. 9, with the pinion g' thrown into gear with the wheel G^2 for reversing the direction of rotation of the feed-wheels and throwing back or outward from the rolls anything that may be between them. This is an important feature, as the attendant is not only enabled to stop the feed quickly in case any foreign matter gets between the rolls, such as would be liable to injure or break the cutters, but where it would be difficult or perhaps impossible to withdraw such foreign matter by hand by reversing the feed, as described, and without stopping or changing the direction of rotation of the cutting-cylinder, such matter will be automatically fed out from between the rolls. Where it is not desired to reverse the feed, the gear g' may be omitted.

The feed-roll shaft C^2 at the opposite end to that carrying the gear G^2 has a spur-gear K fast on it, and pendent from it, on opposite sides of said gear, two plates or straps L and L′, the latter curved outward, as shown, to adapt the straps to receive two gears K′ and K^2 between their lower ends, as shown. These gears are mounted on a short shaft k, journaled at its ends in the outer or lower ends in the strap-plates L and L′. The shaft k, in addition to its end journals, has a central rounded journal portion k', on which a bar L^2 is pivotally suspended, and between the journals the shaft k has portions k^2, polygonal or in other suitable form, in cross-section adapting it to be engaged and driven by the gear K′, and to engage and drive the gear K^2 for transmitting the motion of gear K′, which is driven by the gear K, to the gear K^2. The plate or bar L^2, pivoted on the journal portion k' of the shaft k, has its outer or swinging end slotted at l, and is provided at the outer end of the slot with grooved flanges l', forming ways for an adjustable box M, in which the end of the shaft C^3 of the yielding feed-roll is journaled. The construction of this box is shown in the detail views, Fig. 5, and consists of a perforated ball M, in which the shaft has its bearing and which in turn is journaled in two rectangular plates $n\ n'$, having annular concavo-convex flanges, which receive and hold the ball M between them. The plates $n\ n'$ fit into the grooved ways l', as shown, and are adapted to slide therein. At the inner end of the slot l is a lip or flange l^2, which is provided with a screw-threaded perforation to receive a screw l^3, the outer end of which passes against the adjacent edge of the plates and by its adjustment serves to move the stud k back and thereby to take up any slack in the chain K^4. The ball M is thus made to form a pivotal support and bearing for the shaft C^3, which upon its end is provided with a sprocket-wheel K^3, connected by a driving-chain K^4 with and driven from the sprocket-wheel K^2. The yielding feed-roll shaft is upheld by boxes O, adapted to move in slots in the casing-plates $A'\ A^2$, and secured to arms p on the lower ends of rods P, which slide up and down in perforated ears Q on the side plate and through sleeves Q′ on the ears or brackets Q. The rod P is screw-threaded on its upper end to receive a nut p', beneath which is a washer, and under said washer is a spring P′, surrounding the rod and resting in the sleeves Q′ on the bracket Q. The springs uphold the rods P and boxes O, secured thereto, and the yielding feed-roll supported thereby with a tension or pressure regulated by the adjustment of the nuts p' in a manner that will be readily understood.

The stationary cutter-bar (indicated at s) is rectangular in form in cross-section, as shown in Fig. 12^a, and has its sides grooved longitudinally to adapt it to engage the holder T, which extends between the side plates A′ and A^2, and has perforated end flanges t, through which it is bolted to said plates. This holder has overhanging hook-shaped lips t', formed upon it, between which and the body of the holder the knife s is held, the hook-shaped ends of the pendent lips t' entering the groove in the outer face of the knife-bar s and holding the latter in place. Screws may be used for fastening the knife to the holder, if desired. By this construction I am enabled to use all four angles of the bars s for cutting-edges by withdrawing and turning the bar half-way around and end for end. It is inserted into the holder T through an open-

ing u in one of the side plates, thereby obviating the necessity of taking the machine apart for the purpose.

The operation of the parts described will be understood without further description.

Having now described my invention, I claim as new—

1. In a feed-cutter, the yielding feed-roll shaft, in combination with a pivotal bearing-box in which said shaft rotates, and an adjustable shell or case inclosing said box and having open sides to permit the vibration of the shaft and box, substantially as described.

2. The combination, in a feed-cutter, of a yielding feed-roll shaft, a universally-pivoted bearing for said shaft, an inclosing-case for said bearing having open sides, and a pivoted bar or hanger supporting and permitting the adjustment of said case, bearing, and shaft, substantially as described.

3. In a feed-cutter, the combination, in a feed mechanism, of two shafts C^3 and k, the sprocket-wheels thereon, and their connecting-chain, with a strap or hanger connecting said shafts, and provided with a pivoted bearing-box for one of said shafts and an inclosing-case for said box open at its sides to permit the vibration of said shaft and box, substantially as described.

4. The combination, with the fixed and yielding feed-roll shafts, of the intermediate shaft, a link connecting said intermediate shaft to the fixed feed-roll shaft, the spur-gears on said fixed feed-roll shaft and intermediate shaft, the link or strap connecting the yielding feed-roll shaft and said intermediate shaft and holding said shafts in proper working relation to each other, the sprocket-wheels on said intermediate and yielding feed-roll shafts, and the drive-chain connecting said sprocket-wheels, substantially as described.

5. The combination, with a gear-wheel for actuating the feed-rolls, of two gear-wheels or pinions g and g' and a vibrating plate or lever provided with studs h' and h^2, carrying said pinions, said lever having a fulcrum-point or pivotal support independent of the shafts or centers of said gears, substantially as described.

6. In a feed-cutter feed mechanism, the combination, with a plate or lever for starting and stopping the feed, of two stud-shafts located on opposite sides of a line drawn through the fulcrum of said plate or lever, and two intermeshing gears or pinions on said studs, substantially as described.

7. In a feed-cutter, the combination, in the feed-actuating mechanism thereof, of a plate or lever having a fulcrum or pivotal support independent of any gear-shaft or center, two stud-shafts on said lever located on opposite sides of a line drawn through said lever-fulcrum, one of which studs is adjustable on said lever for changing the size of its pinion, and intermeshing pinions on said stud-shafts, substantially as described.

8. In a feed mechanism for feed-cutters, the combination of a gear-wheel actuating the feed-rolls with two sprocket-wheels and their connecting driving-belt, a pinion interposed between said gear and sprockets, and a plate or lever for starting and stopping the feed, substantially as described.

9. The combination, in a feed mechanism for feed-cutters, of two sprocket-wheels, their connecting chain or belt, a pinion connected to one of said sprocket-wheels and adjustable therewith for throwing said pinion into and out of mesh, and a gear-wheel actuated by said pinion and sprocket-wheel, substantially as described.

10. The combination, in a feed mechanism for feed-cutters, of a drive belt or chain and two sprocket-wheels connected thereby, one of which is mounted on a plate or lever controlling the feeding and stopping of the feed of the machine, substantially as described.

11. In a mechanism for actuating the feed-rolls, the combination of two sprocket-wheels, a drive-chain connecting said wheels, two adjustable intermeshing gears connected therewith for throwing the feed-rolls out of gear and for reversing the direction of rotation thereof, and a driving-gear therefor, substantially as described.

12. The combination, in a feed mechanism for feed-cutters, of two sprocket-wheels, a drive-chain connecting said wheels, and a plate or lever supporting one of said sprocket-wheels, made adjustable relatively to its fulcrum or pivotal support, substantially as described.

13. The combination, in a feed mechanism, of two sprocket-wheels and their connecting-chain, a movable plate or lever carrying one of said sprocket-wheels, made adjustable on its fulcrum or pivotal support, and a tightener for taking up slack in the drive-chain, substantially as described.

14. The combination, with the main or cutter cylinder shaft and the sprocket-wheel thereon, of the lever-plate h, the sprocket-wheel G′, connected therewith and made removable for changing the feed, and the pinion connected to said sprocket-wheel G′, substantially as described.

15. The combination, in a feed-actuating mechanism, of the main cutter-cylinder shaft and the sprocket-wheel thereon, the vibrating lever h, the sprocket-wheel G′ on said lever, the changeable pinion g, connected with said sprocket-wheel, the stud-shaft h^2, and the gear-wheel thereon, also on said lever, and the drive-chain connecting the sprocket-wheels, substantially as described.

In testimony whereof I have hereunto set my hand this 10th day of December, A. D. 1887.

ELMORE W. ROSS.

Witnesses:
REX. SMITH,
EWELL A. DICK.