(No Model.) 2 Sheets—Sheet 1.

E. W. ROSS.

FEED CUTTER.

No. 417,743. Patented Dec. 24, 1889.

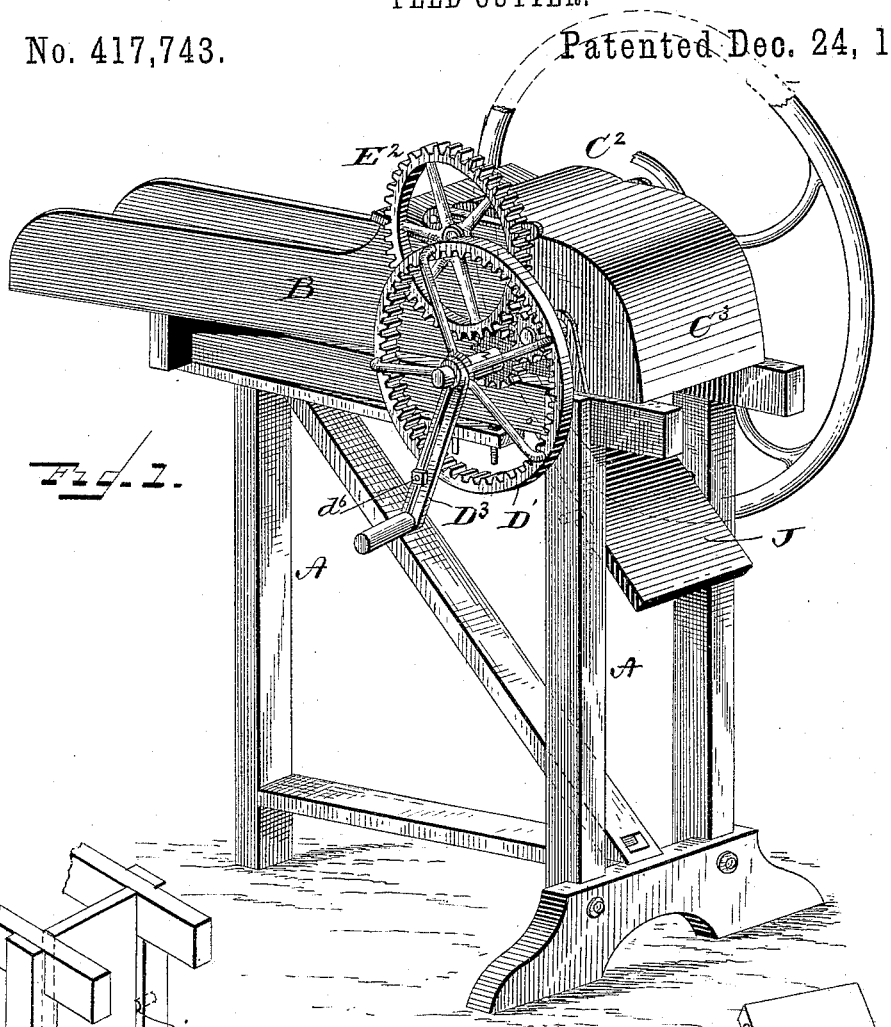


Fig. 1.

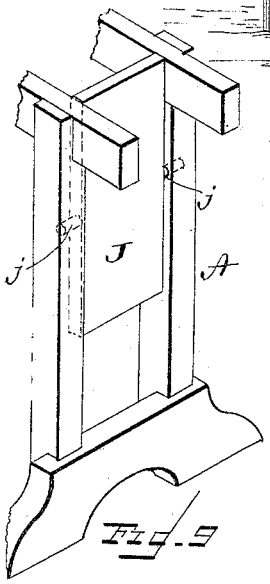
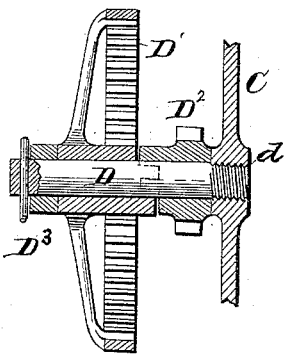


Fig. 9.

Fig. 6.



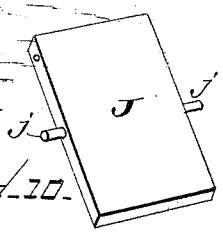


Fig. 10.

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(No Model.) 2 Sheets—Sheet 2.

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FEED CUTTER.

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Fig. 2.

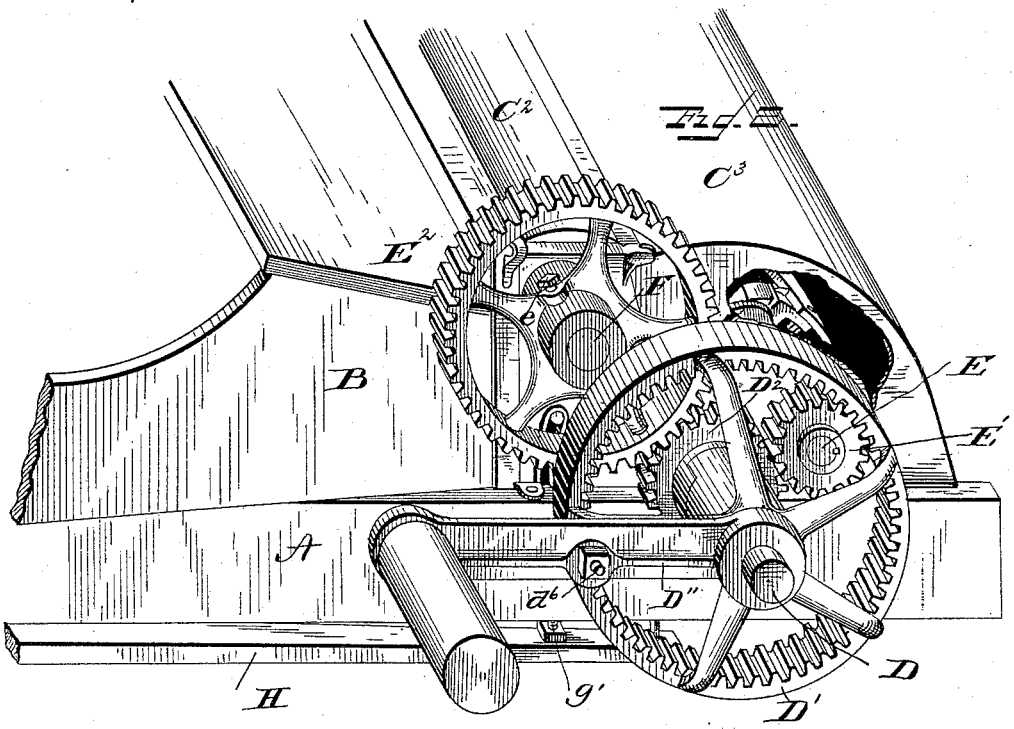

Fig. 8

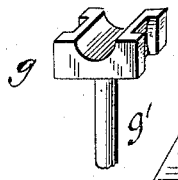

Fig. 7.

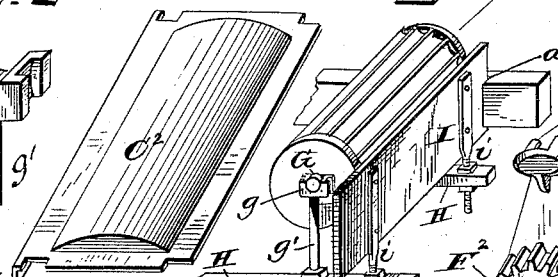

Fig. 4.

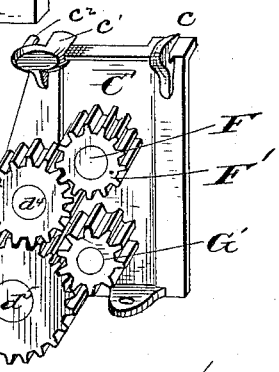

Fig. 3.

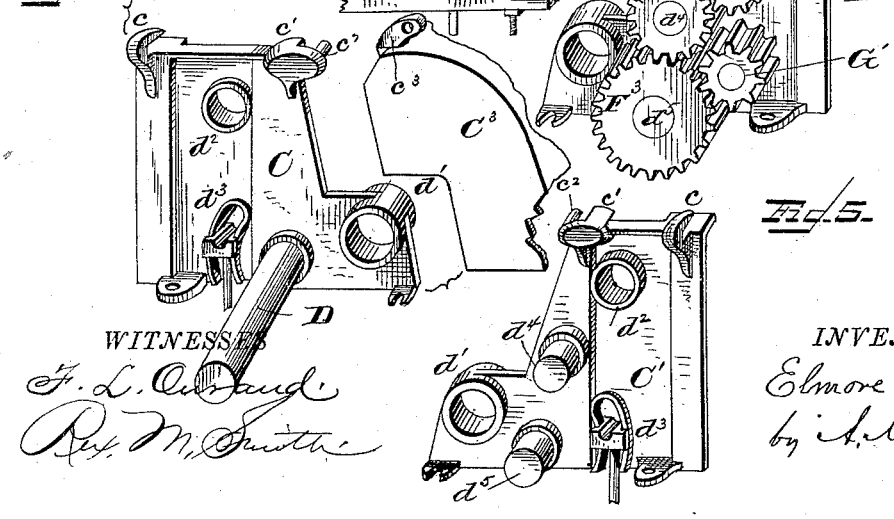

Fig. 5.

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UNITED STATES PATENT OFFICE.

ELMORE W. ROSS, OF SPRINGFIELD, OHIO.

FEED-CUTTER.

SPECIFICATION forming part of Letters Patent No. 417,743, dated December 24, 1889.

Application filed January 17, 1888. Serial No. 260,991. (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 the arrangement of gearing for operating the cutting-cylinder and feed-rolls, whereby it is brought into compact shape and rendered more solid and durable than in the ordinary arrangement thereof; to the construction and arrangement of the supports for the gearing and the cap and knife-hood covering the upper feed-roll and the cutting-cylinder; to the arrangement of the dust board or fender; to the movable feed-roll, and to certain details of construction and arrangement of parts, all as hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a perspective view of a cutting-machine with my improvements applied. Fig. 2 is an enlarged perspective view of a portion of the machine, showing the gears for actuating the cutting-cylinder and upper feed-roll, with the "hood" partly broken away to show the cutting-cylinder. Fig. 3 is a perspective view of one of the end gear-plates and of the feed-roll cap or cover and one end of the hood detached, with one of the yielding feed-roller journal-boxes in position. Fig. 4 is a perspective view of the opposite end gear-plate with the gears in place. Fig. 5 is a perspective view of the last-named gear-plate with the gears removed. Fig. 6 represents a section taken through a portion of one of the gear-plates, main driving gear, and pinion, and showing the stud-shaft supporting said gear and pinion. Fig. 7 is a perspective view showing the yielding feed-roll and dust guard or fender and supports therefor; and Figs. 8, 9, and 10 show other parts of the machine in detail, as hereinafter explained.

The machine shown is of the type or class known as a "cylinder-machine," and being, aside from the features which will be specifically pointed out, of a well-known construction, it will not be described in detail any further than is necessary to an understanding of my improvement.

A indicates the frame, and B the feed box or tray, which may be of any usual construction. At the discharge end of the feed-tray, adjoining the side boards, are two gear-plates C C′—one upon either side—C indicating the one upon the side next to the operator and C′ that upon the opposite side. These plates or gear-standards are provided with suitable flanges or feet, through which they are fastened to the upper longitudinal frame-bars, and are further provided at their upper ends each with hook-shaped lugs c c', with which the notched ends of a cap-plate C^2, forming a cover to the upper feed-roll, engage for holding the latter securely in place, said cap-plate serving to unite and steady the upper ends of the gear-plates. The lugs c' c' are also provided with inwardly-projecting pins or studs c^2, which serve as pivots to the hinges uniting the hood C^3, covering the cutting-cylinder to said plates. The hood is provided at its upper end with perforated lugs or ears c^3, with which the pins c^2 engage for uniting the hood to the gear-plates C and C′. The pins may be on the hood and the perforated ears on the gear-plates, if preferred.

The plate or casting C is provided with a screw-threaded perforation d, into which the threaded end of a stud-shaft D is screwed for firmly uniting it to said plate, which is further provided with sleeve-bearings d' and d^2 for the cutting-cylinder and upper feed-roll shafts, and at d^3 with a curved slot for the sliding box or block in which the shaft of the lower or yielding feed-roll has its bearing. The casting C′ has also sleeve-bearings d' d^2 and a curved slot d^3, corresponding to those in the plate C, for the opposite ends of the same shafts. The plate C′ is further provided with short studs d^4 and d^5, for a purpose which will appear.

The stud-shaft D has mounted loosely upon it at its inner end, and with its hub abutting against the gear-plate C, a pinion D^2, the outer end of the hub of which is clutch-faced, and is engaged by a correspondingly clutch-faced end of the hub of the main driving gear-wheel D′, also mounted loosely on the stud-shaft D and held in place thereon, clutched to the wheel D^2 by the perforated inner end of the crank-arm, and a pin or key where a crank is used, or by a washer and pin or key where

other power than a hand-crank is used. The gear-wheel D′ consists of an internally-toothed rim on the outer ends of suitable "dished" arms, as shown, and has the crank arm or handle D^3, which also turns freely on the stud D, connected to said rim by a bolt d^6. The cutting-cylinder shaft E has its bearings in the sleeves d' d', and is provided on its end adjacent to the gear-wheel D′ with a spur-gear or pinion E′, which engages with and is driven by said internally-geared wheel, the arrangement shown being such as to give to the knives of the cutting-cylinder an "up cut." The pinion D^2 on the shaft D engages with and drives a gear-wheel E^2, fast on the shaft of the upper or fixed feed-roll, and the gear D^2 and E^2, being both externally toothed, the feed-roll shaft will be rotated in an opposite direction to that given to the cutting-cylinder, that being the direction required for the upper feed-roll. The gear E^2 is secured to the shaft F of the stationary feed-roll by a set-screw *e*, which permits said gear to be readily removed, and the pinion or gear D^2 being also made removable from the stud-shaft said gears may be readily replaced by other intermeshing gears of different relative diameters for changing the speed of the feed-roll and the consequent feed thereof.

The opposite end of the shaft F to that carrying the gear E^2 has a pinion F′ fast on it, which engages an idle or intermediate gear F^3, mounted on the stud d^4, and which in turn engages a second intermediate gear F^3, mounted on the stud d^5, the axial center of which (extended) is the center of the arc in which the slots d^3 are formed.

G is the shaft of the lower or yielding feed-roll, said shaft being mounted in grooved boxes or blocks *g*, adapted to slide up and down on the side walls of the curved slots d^3, to allow said feed-roll to yield to adapt itself to the varying bulk or thickness of the material being operated upon. The shaft G has a pinion G′, fast upon it for driving the yielding feed-roll, said pinion engaging and being driven by the intermediate gear F^3, and as the shaft of said feed-roll moves up or down in the slots d^3, which are concentric with the shaft or stud of gear F^3, the pinion G′, fast on said shaft, will move or vibrate partially around said gear F, remaining always in gear therewith. This gives a solid and durable support to the gears connecting the pinion on the stationary feed-roll shaft with that on the shaft of the yielding feed-roll, very greatly superior to that afforded by the jointed links ordinarily employed for connecting said shafts and intermediate gears. The bearing-blocks *g g* are supported in the slots d^3 by upright rods g' g', which at their lower ends are suitably secured in spring-bars H H, which are similar in form and arrangement to those in common use for properly upholding the lower yielding feed-roll.

Some difficulty has been experienced in these machines from the fact that the rapidly-revolving cutters do not always instantly free themselves from the cut material, which frequently clings to them for a considerable portion of the revolution, sometimes interfering with the operation of feeding and making the operation disagreeable to the attendant. To obviate this, a stationary dust board or fender has been used back of the yielding feed-roll; but as said roll yielded the guard or fender, remaining stationary, was found to interfere with the feed of the material. To remedy this, I attach the fender (indicated at I) by uprights *i i* to the ends of the spring-bars H in such manner that as the roller yields the fender or guard I will also yield and maintain its relation to said feed-roller. The guard I moves up and down in ways or grooves in the side longitudinal bars of the frame, one of said grooves being shown at *a*, Fig. 7, and has its movements steadied thereby. By this construction the fender is kept at all times in proper relation to the feed-roll and is prevented from interfering with the feed of the material to the cutters.

J indicates the feed-discharge board or chute, which, instead of being rigidly secured between the end uprights of the frame A under the cutting-cylinder, as is usual, is provided at its sides or edges with pivot-pins *j j*, which enter perforations or sockets in the adjacent sides of the end upright frame-timbers, as shown in Figs. 1, 9, and 10. The chute occupies the usual position when the machine is set up; but when the frame is taken apart, to pack it for transportation, the chute can be folded between the uprights to lie parallel therewith, as shown in Fig. 9, thereby greatly economizing space. By the arrangement of the gears D′, E′, D^2, and E^2, as described, they are not only brought into compact shape for operating the cutting-cylinder and upper feed-roll, rotating them in opposite directions, but a change of feed can be quickly and easily effected by the substitution for gears D^2 and E^2 of others of different relative diameters, as explained.

Parts of the machine not specifically described may be constructed and arranged in any usual or preferred manner.

Having now described my invention, I claim as new—

1. In a feed-cutter, the combination, with an upward-cutting knife, cylinder and shaft therefor, the pinion E′ on said shaft, the stud-shaft D, the pinion D^2 thereon, the main driving internal gear D′, provided with a crank and clutched to the pinion D^2, and in mesh with gear E′, the gear E^2 on the fixed feed-roll shaft for rotating said shafts in opposite directions, and the yielding feed-roll shaft geared to said fixed feed-roll shaft, substantially as described.

2. The gear-plate C, provided with the fixed stud-shaft D, sleeve-bearings d' and d^2, and curved slot d^3, and the gear-plate C′, having corresponding sleeve-bearings and curved slot, and stud-shafts d^4 and d^5 for the

support of and in combination with the gears supported thereon, substantially as described.

3. The combination of the side plates C and C′ and the fixed top plate or cap C^2, provided one with hook-shaped projections and the other with the recessed ends, with which said projections engage for uniting the cover rigidly to the side plates, substantially as described.

4. The gear-plates C and C′, provided with the lugs or ears c' and pins c^2, cast thereon, in combination with the hood C^3, hinged thereto, substantially as described.

5. The combination, with the yielding feed-roll, of a yielding dust guard or fender, operating substantially as described.

6. The combination, with a yielding feed-roll, of a spring for upholding said roll and a movable roller fender or guard supported by said spring, substantially as described.

7. The combination, with a yielding feed-roll and a guard or fender therefor moving simultaneously with said feed-roll, 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.