No. 637,534. Patented Nov. 21, 1899.

R. S. SWARTHOUT.

COMBINED CORN HUSKER AND FODDER SHREDDER.

(Application filed Feb. 24, 1898.)

(No Model.)

Fig. 1.

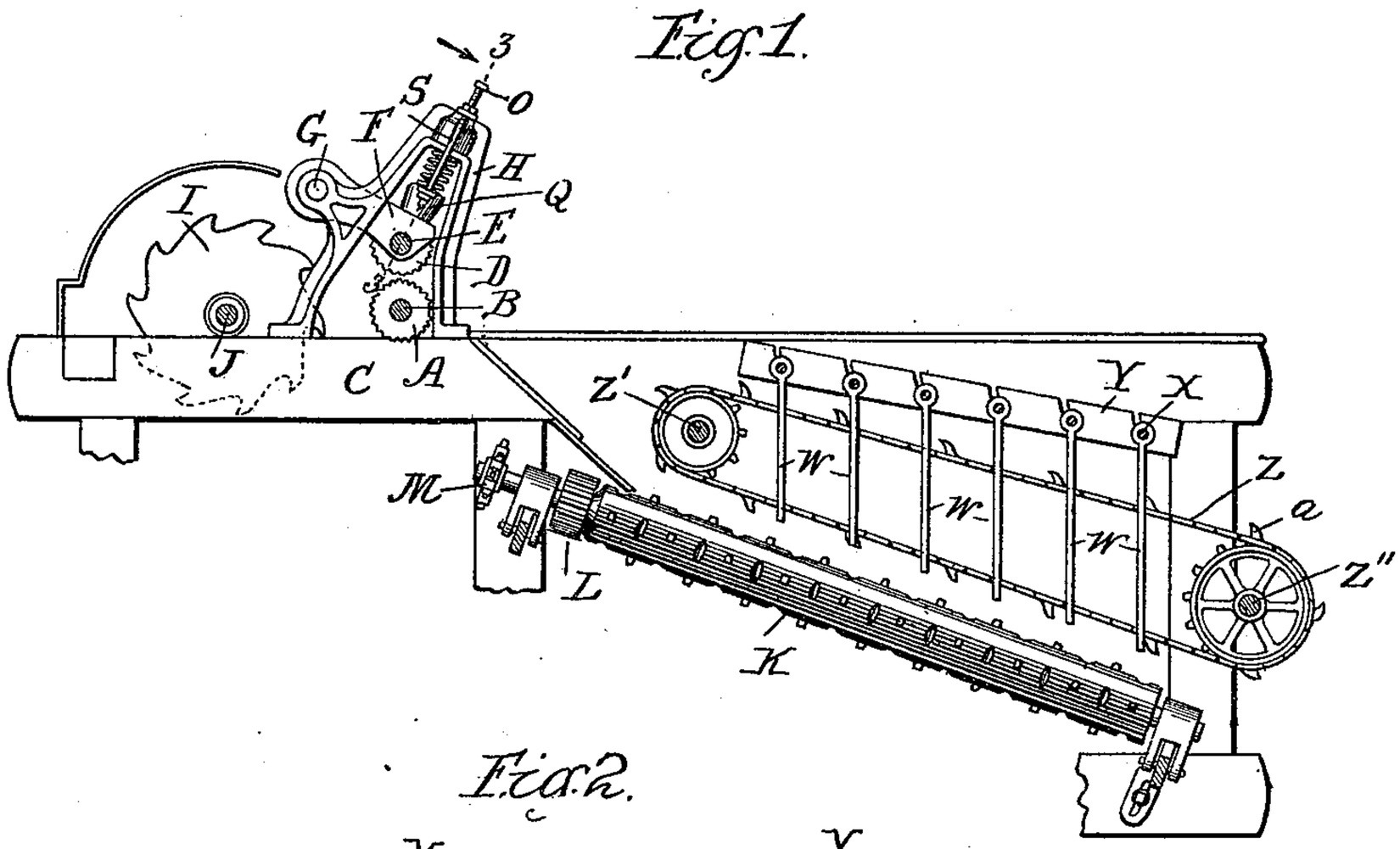


Fig. 2.

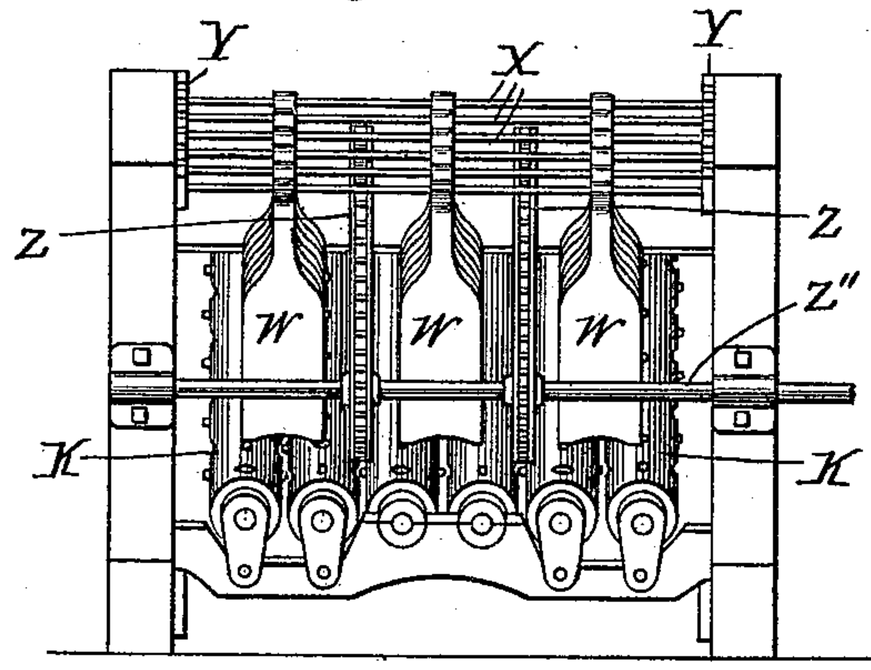


Fig. 3.

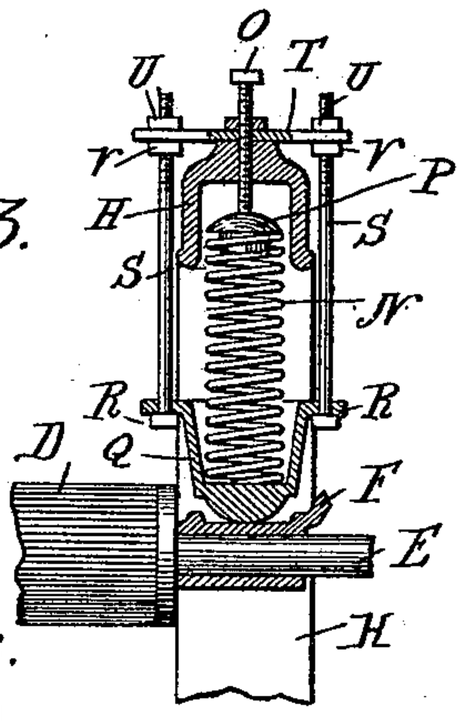
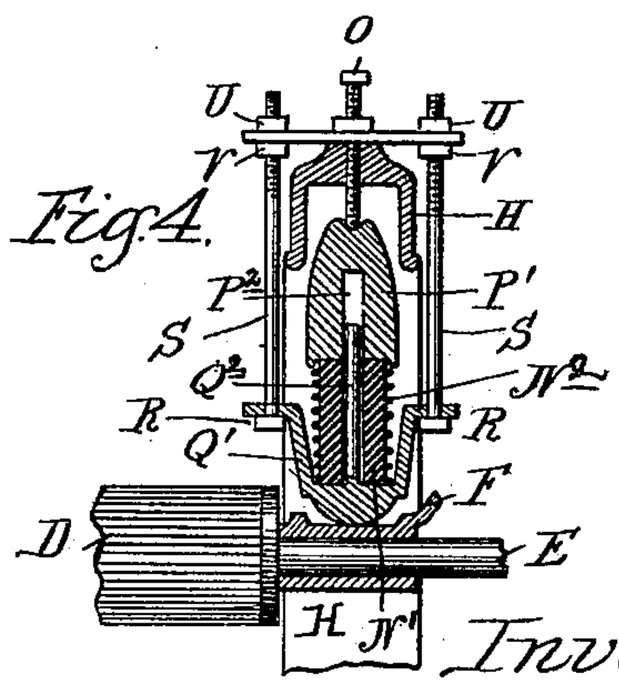


Fig. 4.



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UNITED STATES PATENT OFFICE.

RALPH S. SWARTHOUT, OF WILLIAMSTON, MICHIGAN, ASSIGNOR TO THE KEYSTONE MANUFACTURING COMPANY, OF ROCK FALLS, ILLINOIS.

COMBINED CORN-HUSKER AND FODDER-SHREDDER.

SPECIFICATION forming part of Letters Patent No. 637,534, dated November 21, 1899.

Application filed February 24, 1898. Serial No. 671,427. (No model.)

To all whom it may concern:

Be it known that I, RALPH S. SWARTHOUT, a citizen of the United States, residing at Williamston, in the county of Ingham, in the State of Michigan, have invented certain new and useful Improvements in a Combined Corn-Husker and Fodder-Shredder, of which the following is a description, reference being had to the accompanying drawings, forming part of this specification.

My improvements relate to machines of the general nature of those shown and described in United States Letters Patent Nos. 506,642 and 546,550, heretofore granted to George W. Packer, on October 10, 1893, and September 17, 1895, respectively, to which patents reference may be had for a more detailed description of the general construction and operation than will be necessary here for an explanation of my improvements.

The novelty of my present invention will be hereinafter set forth, and particularly pointed out in the claims.

In the accompanying drawings, Figure 1 is a longitudinal sectional detail of so much of a machine of the character described as is necessary to show my improvements; Fig. 2, an elevation of the rear or right-hand end of the parts shown in Fig. 1; Fig. 3, a transverse sectional detail approximately on the line 3 3 of Fig. 1, illustrating my improvements relating to the pressure devices for the upper snapper-roller; and Fig. 4, a view corresponding to Fig. 3, but illustrating a modification in the spring.

The same letters of reference are used to indicate corresponding parts in all the views.

Referring to Fig. 1, A represents the lower feed and snapper roller, whose spindle B is journaled in fixed bearings (not shown) upon the frame C of the machine.

D is the upper feed and snapper roller, whose spindle E is mounted at its opposite ends in arms F, hung at their upper forward ends upon a rod or shaft G, supported at its opposite ends in the arch-brackets H, secured at their lower ends to the frame C of the machine at the opposite ends of the rollers A D. The rollers A D are driven by suitable gearing, which will permit movement of the roller D toward and from the roller A without interfering with the driving connection, as usual, and as shown and explained in the patents before mentioned.

I is the shredding-cylinder, the opposite ends of whose spindle or journals J are mounted in fixed bearings upon the frame C.

K are the husking-rollers, of which in the present instance three pairs are shown, as seen in Fig. 2. The projecting spindles of these rollers at their opposite ends are suitably journaled in supports upon the framework of the machine, and at the upper forward ends of the rollers are geared together by pinions L. The upper end of the spindle of one of the rollers is provided with a sprocket-wheel M, over which passes a sprocket-chain from a suitably-located driving-sprocket, by means of which the rollers of the several pairs are driven.

The construction so far described is old and not of my invention.

The first improvement relates to the means for applying and regulating pressure to the snapper-roller D. As above explained, this snapper-roller is mounted in arms F, loosely hung at their forward ends upon the rod or shaft G, so that the roller D is free to move toward and from the roller A, and to hold it in working relation to the roller A it has heretofore been the practice to place coiled springs above the rear ends of the arms F, to press the latter and the roller D downward, such springs being confined between the arms F and the upper ends of the arch-brackets H within the latter. It has also been the practice to provide an adjusting-screw, passed through the upper end of each bracket and engaging at its lower end a follower, resting upon the upper end of the coiled spring, by means of which the tension of the spring and the consequent pressure of the upper roller against the lower was regulated as desired. With these provisions, however, it was possible only to increase or decrease the tension of the spring and consequent pressure of the upper roller against the lower by adjusting the screws in one direction or the other. These provisions respecting the adjustments of the upper roller did not satisfactorily meet the requirements of practical use for the reason that under some conditions of use it is desir-

able to allow the two rollers to separate freely for a limited distance without the resistance of the springs at all. When the fodder supplied to the machine is damp or wet, it is desirable to have the snapper-rollers set closer together than when the fodder is dry, since when the fodder is dry the stalks are harder and more brittle, and if the rolls are set too closely together they will break the stalks in two, instead of simply snapping off the ears of corn and feeding the stalks forward to the shredding-cylinder, as intended. With the provision heretofore made for adjustment of the upper roller the practice was to tighten up the adjusting-screws when the fodder was damp and to loosen them when it was dry; but this loosening of the adjusting-screws served merely to lessen the tension of the springs and not to relieve the upper roller of their pressure entirely, even when it was in lowermost position, and the desired initial separation of the rolls for operation upon the dry fodder, as before explained, would be resisted by the decreased tension of the springs.

My improvement consists in the provision of means whereby, in addition to regulating the tension of the springs as heretofore, the upper roll may be readily relieved entirely of its pressure to permit a limited initial separation of the rolls without any resistance by the springs, for the purpose above explained. To this end I have devised the construction and arrangement of parts shown in Figs. 1, 3, and 4.

In Fig. 3, N represents the usual coiled spring interposed between the upper end of the arch-bracket H and the arm F, carrying one end of the upper roller D, and O the usual adjusting-screw threaded through the upper end of the bracket H and bearing at its lower end upon a follower P, resting upon the upper end of the spring N. If the lower end of the spring N rested directly upon the arm F carrying the end roller D, the construction and arrangement of the parts would not be materially different from those heretofore employed and above described. In the present instance, however, the lower end of the spring N does not bear directly upon the arm F, but is seated in a cup-shaped cross-head Q, whose lower end rests upon the upper side of the arm F, and which is provided with oppositely-projecting ears R R, through which are passed upward rods S S, whose threaded upper ends pass through holes in the opposite ends of a cross-head T, seated upon the upper end of the bracket H. The lower ends of the rods S S are provided with heads beneath the ears R R of the lower cross-head Q, and their threaded upper ends are provided with nuts U V upon opposite sides of the upper cross-head T. Under this construction and arrangement of the parts it will be seen that by adjusting the nuts U V upon the upper ends of the rods S in such a way as to draw said rods upward the lower cross-heads Q may be withdrawn from contact with the arms F, carrying the roller D, and the latter permitted an initial upward movement to the desired degree without any resistance from the springs N. This adjustment may be effected independently of or in connection with an adjustment of the screws O, so that the tension of the springs N may be either increased or be unchanged, as may be desired. When the permanent adjustment for a given class of work has been effected in this manner, the further automatic adjustment of the rolls D, under the inequalities of the stuff passed between the rolls, will be permitted by upward movement of the cross-heads Q upon the rods S S and against the resistance of the springs N, as will be readily understood. When it is desired to readjust the parts for work upon damp stock, the nuts U V will be loosened and the springs permitted to force the cross-heads Q downward into contact with the arms F, the nuts *v* be then screwed upward against the under sides of the upper cross-head T to lock the rods S S thereto, and the tension of the springs N increased, if desired, by screwing downward the screws O. In this manner and by these means the upper snapper-roller may be quickly adjusted for work upon stock in different conditions.

In Fig. 4 I have shown a modified form of spring in place of the coiled spring N of Fig. 3, and a suitable modification of the parts to conform them to such spring. In Fig. 4 the spring N′ consists of a rubber cylinder interposed between the cross-head Q′ and the follower P′, upon whose upper end the adjusting-screw O bears. The cross-head Q′ is provided with a vertically-extending rod or spindle Q^2, which passes through a central opening in the cylindrical spring N′ and at its upper end projects into a central hole P^2 in the follower P′, the form of the latter being suitably modified from that shown in Fig. 3 to thus accommodate the upper end of the rod Q^2. The cylindrical rubber spring N′ is preferably wrapped with a coiled-wire spring N^2, which serves to preserve the shape of the spring N under pressure and materially add to its durability. This cylindrical rubber spring may be employed to advantage as a substitute for the coiled spring even under the construction and arrangement of parts heretofore employed—*i. e.*, not embodying my improvements explained in connection with Fig. 3. In such event the upper cross-head T, rods S S, and nuts U V would be dispensed with and the lower cross-head Q be modified so as to form simply a seat for the lower end of the rubber spring resting upon the arm F, as will be readily understood. As before explained, the roller D is mounted at its opposite ends in two similar arms F, hung upon the rod or shaft G. I preferably employ a spring N and its associated devices at each end of the roller. It is not always necessary to employ a spring at each end of the roller, however, as explained in Patent No. 506,642, heretofore mentioned, and my

invention therefore contemplates the use of the improvements which I have described either at one or both ends of the roller.

The remaining feature of my invention relates to novel means for properly guiding the ears of corn in their descent over the husking-rollers and holding them in proper relation to the rollers to insure the removal of their husks. A variety of means has heretofore been employed for this purpose, two different samples of which are shown in the two patents referred to. The novel means devised by me consists in rows of paddles W, suspended above the respective pairs of husking-rollers K, as shown in Figs. 1 and 2. These paddles may be suspended at their upper ends in any suitable manner to permit their lower ends to swing longitudinally of the husking-rollers as the ears of corn pass downward over the rollers K and contact with the lower ends of the paddles. In the present instance the paddles are provided at their upper ends with transverse holes, through which are passed rods X. Each rod carries as many paddles as there are pairs of husking-rollers, (in the present instance 3,) and at their opposite ends the rods are seated and supported in notches in inclined bars Y, secured to the side frames of the machine. This construction and arrangement permits the ready assemblage or removal of the paddles.

The lower ends of the paddles are preferably slightly rounded out or concaved to accommodate them to the ears of corn and are suspended at such distance above the husking-rollers K as to be struck by any ears of corn descending in irregular order along the rollers. If one ear is lying upon the top of another, such upper ear will contact with the ends of the paddles and its descent be retarded by them until it will drop behind the ear which was beneath it and be properly engaged by the rollers and its husk removed. So any ears standing upon end or in other irregular position will be engaged by the paddles and straightened out and brought into proper position along the rollers.

In the present instance the machine is shown provided with two endless sprocket-chains Z Z, traveling between the rows of paddles W, such chains being supported at their upper forward ends upon sprocket-wheels upon a shaft Z′ and at their lower rear ends sprocket-wheels upon a shaft Z″, one or the other of these shafts having suitable connection with the driving mechanism of the machine. The chains Z are provided at suitable intervals with projecting teeth or fingers *a*, and they serve to clear the husking-rollers of any stalks that may fall upon them at their upper ends and prevent such stalks interfering with the proper descent of the ears of corn along the rollers.

Having thus fully described my invention, I claim—

1. In a machine of the character described, the combination of the rollers A D, the movable support F for the end of the roller D, the bracket H, the upper and lower cross-heads T Q, the former seated on the bracket H and the latter bearing against the support F, the rods S S connecting the two cross-heads and having the nuts U V upon their threaded upper ends, a spring interposed between the lower cross-head Q and the upper end of the bracket H, and the adjusting-screw O coöperating with the spring, substantially as described.

2. The combination of the rollers A D, the movable support F for the end of the roller D, the bracket H, the cross-head T seated on said bracket, the lower cross-head Q′ bearing against the support F and provided with the vertical rod or spindle Q^2, the cylindrical rubber spring N′ resting on the cross-head Q′ and encircling the rod Q^2, the follower P′ seated upon the upper end of the spring N′ and provided with the internal bore P^2 to accommodate the end of the rod Q^2, the adjusting-screw O engaging the upper end of the follower P′, and the rods S S connecting the cross-heads Q′ T and provided with the nuts U V coöperating with the latter cross-head, substantially as described.

3. In a machine of the character described, the combination of a roller A, a roller D, a movable bearing for each end of the roller D, a fixed bracket for each bearing, fixed rods supported by and depending from said brackets, a cross-head for each bracket mounted to slide on said rods and acting on said bearings, means on said rods for limiting the downward movement of said cross-heads, an adjusting-screw in each bracket, and a spring between said adjusting-screws and said cross-heads, substantially as and for the purpose set forth.

4. In a machine of the character described, the combination of a roller A, a roller D, a movable bearing for each end of said roller D, a fixed bracket for each bearing, fixed rods supported by and depending from said brackets, a cross-head for each bracket mounted to slide on said rods and acting on said movable bearings, means on said rods for limiting the downward movement of said cross-heads, an adjusting-screw in each bracket, a cylindrical rubber spring and an encircling coil-spring between each adjusting-screw and cross-head, substantially as and for the purpose set forth.

5. The combination of the rollers A D, the movable support F for the end of the roller D, the bracket H, the cylindrical rubber spring N′ interposed between the bracket H and support F, the seat Q′ for the lower end of the spring N′, interposed between the latter and the support F and provided with the rod Q^2 extending upward through the center of the spring N′, the follower P′ seated upon the upper end of the spring N′ and provided with the central bore P^2 to accommodate the end of the rod Q^2, and the adjusting-screw O passed through the bracket H and engaging the upper end of the follower P′, substantially as described.

6. In a machine of the character described, the combination with a plurality of pairs of husking-rollers K, of longitudinal bars Y above said rollers having notches in their upper edges, a series of rods removably seated in said notches and extending transversely above the rollers K, and paddles W suspended from the rods X, in longitudinal rows above the respective pairs of rollers K, substantially as described.

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