

B. D. WHITNEY.
FEED ROLLER.

No. 459,325.

Patented Sept. 8, 1891.

Fig. 1.

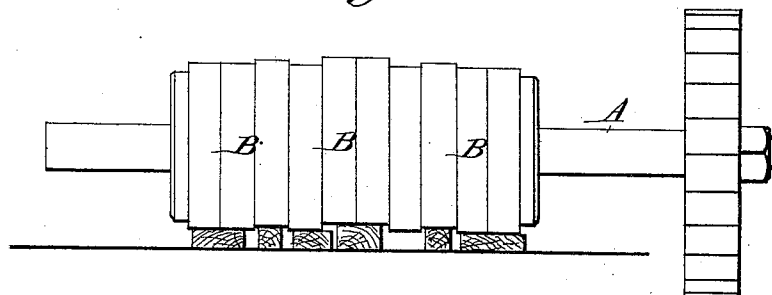


Fig. 2.

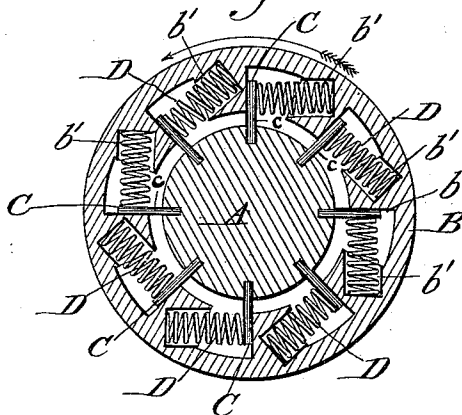
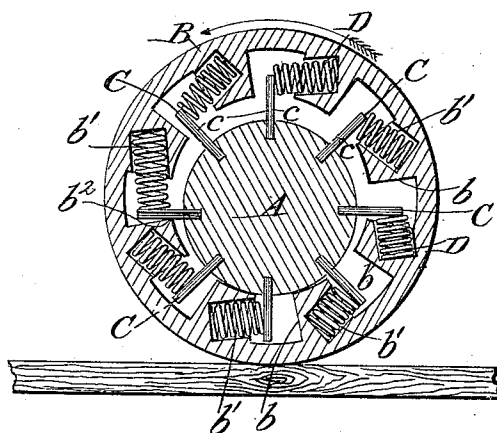


Fig. 3.



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Fig. 4.

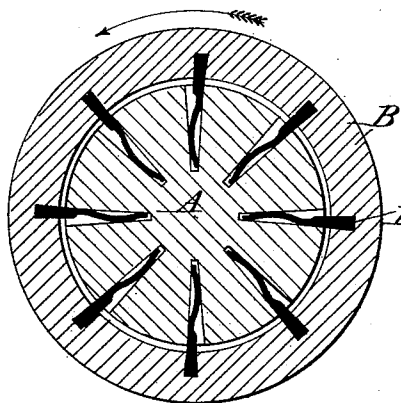


Fig. 5.

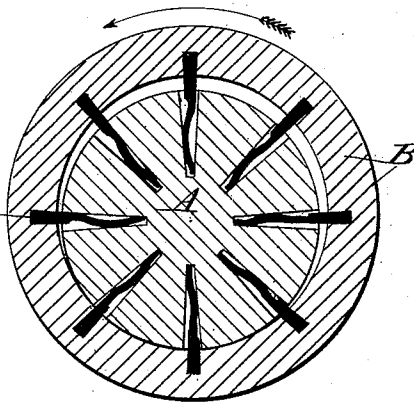


Fig. 6.

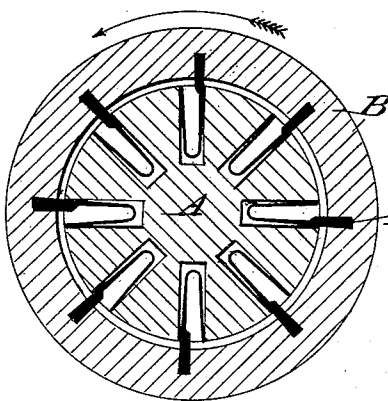
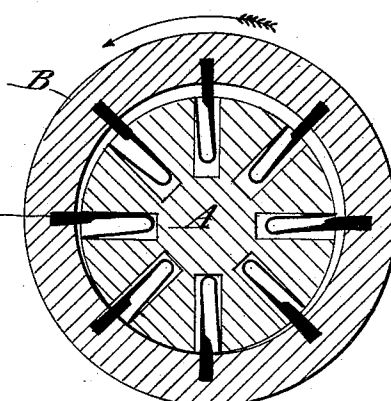


Fig. 7.



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UNITED STATES PATENT OFFICE.

BAXTER D. WHITNEY, OF WINCHENDON, MASSACHUSETTS.

FEED-ROLLER.

SPECIFICATION forming part of Letters Patent No. 459,325, dated September 8, 1891.

Application filed August 28, 1890. Serial No. 363,380. (No model.)

To all whom it may concern:

Be it known that I, BAXTER D. WHITNEY, a citizen of the United States, residing at Winchendon, in the county of Worcester and State of Massachusetts, have invented certain new and useful Improvements in Feed-Rollers; and I do hereby declare the following to be a 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 the construction of feed and pressure rollers for holding and carrying material in planing and other wood-cutting machines, cotton, wool, and rag pickers, &c.

Its purpose is to distribute and equalize pressure upon different portions of material of varying thickness or uneven surface, so that all parts may be more evenly pressed, firmly held, and steadily carried than can be done by ordinary rollers.

It consists in having the exterior shell or acting-surface of the roller in rings or comparatively short annular sections, which are so mounted upon a shaft that each section shall be capable of yielding independently thereon, while at the same time it is revolved by a positive and direct connection from the shaft in whatever position it may assume thereon and be brought to a correct position concentric to its axis of rotation when not deflected by external force, all substantially as hereinafter described and claimed.

Figure 1 of the drawings is designed to represent the exterior of a roller as acting upon pieces of unequal thickness. Fig. 2 is an enlarged sectional view at right angles to the axis of rotation, showing one form of construction with the exterior shell in its normal position concentric to the axis of rotation. Fig. 3 represents the same with exterior shell deflected or thrown out of its concentricity, as by contact with material beneath it. Figs. 4 and 5 and likewise Figs. 6 and 7 are views of sections corresponding to those of Figs. 2 and 3, each pair representing a modified form of internal construction, but all of similar principle, action, and effect.

The form shown in Figs. 2 and 3 being generally preferable to the others, I will describe that first. Its central shaft, which carries the

other parts, is designated by A. As applied for use, it is mounted in suitable journal-bearings and properly weighted to give requisite pressure for its work, and for feeding purposes it is made to revolve in the direction indicated by the arrows by any appropriate and well-known mechanism, which, being no part of my present invention, needs no specific description.

The central shaft A has a series of projecting blades or carriers, (designated by letter C.)

The annular sections or rings B of the shell are of somewhat larger internal diameter than the diameter of the shaft, so that there may be sufficient space between them and the shaft to permit the necessary deflection of the shell, and each section B having a series of internal chambers or pockets adapted to receive the carriers C of the central shaft. These carriers engage with the advance faces *b* of the chambers of the sections and impart direct and positive motion to them. These chambers are adapted to receive a series of springs D, one end of each of which is seated in the rear portion *b'* of each chamber, while the opposite end bears against the rear side *c* of the carrying-blades C. The action of the springs thus arranged is to bring the whole force of all the springs to press the engaging faces of the carriers and sections together and to hold the section to a position concentric to the central shaft. When the force of the springs is overcome by external pressure on the sections by contact with the feeding material, the sections will yield to an eccentric position, as shown in Fig. 3. This eccentric movement causes the contact between the carriers and ring to be broken, except at the side of the ring moving toward the material upon which the roll is acting, in which case the entire rotative force is concentrated and communicated to the ring at the point of positive contact of the carriers, which is on the side of the roller moving toward the material receiving its pressure, so that this rotative force is utilized as a pressure force upon the lumber or material acted upon, and the ring itself becomes a lever with its fulcrum bearing at such point of positive contact with the carrier or carriers as in rotation come nearest the radial plane of the roller parallel to the

surface of the material acted upon. This fulcrum-bearing, for instance, is indicated in Fig. 3 at b^2 , it being the point where a carrier is in bearing contact with the ring. Of course this point of contact is constantly changing, as the roll revolves. The applied power of this lever being the combined strength of the compressed springs which act with the more or less direct leverage due to their respective positions, the leverage being in proportion to the distance the seats in the ring for the several springs move, as compared to the vertical lift caused by the eccentric movement of the ring at its point of bearing upon the lumber or material acted upon, the combined strength of all the compressed springs acting with the leverage due their position presses upon the work and makes a most complete conservation of the moving force of the roll and the resilient energy of the several springs to effect the purpose designed.

The modifications represented by Figs. 4 and 5, also 6 and 7, are in principle, action, and effect substantially the same as those shown in Figs. 2 and 3. The carrying-faces of the shaft A in these modifications are arranged around its circumference. The springs, as indicated by reference-letters E, have the same relative position to the annular sections or rings B. They also act in the same circumferential direction—that is, they are compressed in the line of rotation—or the same as they do in Figs. 2 and 3; but the springs instead of being spiral, as in Figs. 2 and 3, are what may be called “plate-springs,” and are preferably firmly seated in the annular sections, but, if desired, may be seated in the shaft instead, and are of sufficient thickness near the section to withstand the driving force of the carriers of the driving-shaft A, which engage with them and give motion to the section.

The free end or resilient acting part of the spring is reduced to proper thickness and may be made of either of the forms shown in Figs. 4 and 5 or 6 and 7 or any other form suitable to allow the section to yield eccentrically to pressure of material of varying thickness in passing beneath it and to return the section to its normal position when such pressure is removed. This modification is especially desirable for feed-rolls requiring very short sections, as for cotton, wool, and rag pickers, and sections as short as one-fourth or even one-eighth of an inch can be made of this modification. These very short sections serve to hold some kinds of material much better than sections of greater length.

It may be observed as a distinctive feature of my invention that the action of the springs is not radial whatever position the shell may be in relation to the central driving-shaft, but circumferential and in a direction opposite to the rotation of the roll. The effect of this action of the springs in a direction opposite to that of rotation is to force the engag-

ing faces of the shaft and shell together at all times, so that motion will be imparted from the shaft to the shell as uniform as that of the central shaft itself. No part of the force of the springs being used to carry the feeding material forward and no spring or part of a spring acting in opposition to any other spring, the whole spring force is utilized to hold the material firmly in position to be acted upon.

Another feature worthy of notice is that the whole force of all the springs acts to press the engaging faces of shaft and section together, so as to give positive and steady motion to the sections, and all are arranged in the same transverse radial plane of the roll, each occupying comparatively little space lengthwise of the roll, thereby making the use of very short sections practicable. In practice rolls having a series of eight or more carriers and springs are conducive to uniformity of motion and preferable to a less number.

In rolls as heretofore made either those having the springs intervening between the driving-faces of the shaft and shell or in those where the action of the springs is merely radial and has no tendency to keep the engaging faces of shaft and shell in contact the motion of the shell will be necessarily uneven and remittent, which is very detrimental in work requiring uniformity of feeding movement.

Having thus described the construction and action of my improved roller, I claim as my invention and desire to secure by Letters Patent—

1. A surface-yielding roll composed of a central shaft having a series of projecting blades or carriers engaging positively with and giving motion to an exterior shell of annular sections or rings, in combination with a series of springs seated at the rear of said blades.

2. A surface-yielding roller consisting of a central supporting-shaft having a series of projecting blades or carriers surrounded by a shell of annular sections or rings, each of said sections containing a series of chambers having walls engaging with and receiving motion from the advance faces of said carriers, said chambers also containing a series of springs seated between the rear or reverse faces of said blades or carriers and the rear walls of the chambers.

3. A surface-yielding roller having annular sections, a central carrying-shaft, direct and unyielding connection in one direction therebetween, and springs to permit a lateral yielding or deflection of one or more sections to external pressure, said springs acting to bring the section to a bearing against said shaft connections, which form permanent stops and hold the annular sections in a normal position or practically concentric to the axis of revolution when sufficiently relieved from external pressure, substantially as set forth.

4. A surface-yielding roll having an exter-

nal shell of annular sections, a series of blades or carriers projecting from a central shaft, said blades or carriers engaging positively with said sections and having a fulcrum-contact on the driving-faces thereof during the deflection of the shell, and a series of springs, each of which has one end seated in the shell and the other end seated on that side of the carrier opposite to that which touches and acts on the shell, said springs acting in a direction contrary to that of rotation, substantially as described.

5. A surface-yielding roll consisting of a central shaft having carriers with rigid or unyielding surfaces engaging positively with and transmitting rotary motion to a system of annular sections which surround the shaft and form the exterior face of said roll, the sections of the system having corresponding surfaces engaging with those of the carriers, and a series of springs adapted to bring the section to a bearing upon the said carrier-surfaces or concentric to its axis of rotation, also to allow a deflection from such concentric position by a forward movement of a portion of the section or in the direction of its revolution and in that direction only.

6. A surface-yielding roller having a cen-

tral shaft and an annular shell with a series of springs interposed therebetween, each of said springs having one end seated in the shell and the other end seated against the shaft, all the seats in the shell being arranged to face in one direction and the seats at the shaft facing them in a reverse or opposite direction, and all of said springs acting in a circumferential direction.

7. A surface-yielding roller consisting of a central carrying-shaft surrounded by a shell of annular sections having faces engaging positively with the carrying-faces of the shaft, in combination with a series of springs that permit a lateral deflection of the shell by external pressure and return said sections against permanent stops at a concentric position when the pressure is removed, all arranged in the same transverse radial plane or circumferential line, which makes it practical to construct sections of very short lengths.

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

BAXTER D. WHITNEY.

Witnesses:

FRANK B. SPALTER,
E. P. DAMON.