Nov. 13, 1934. E. J. FINEGAN 1,980,193

CHIP CUTTER

Filed April 29, 1932

Fig. 1.

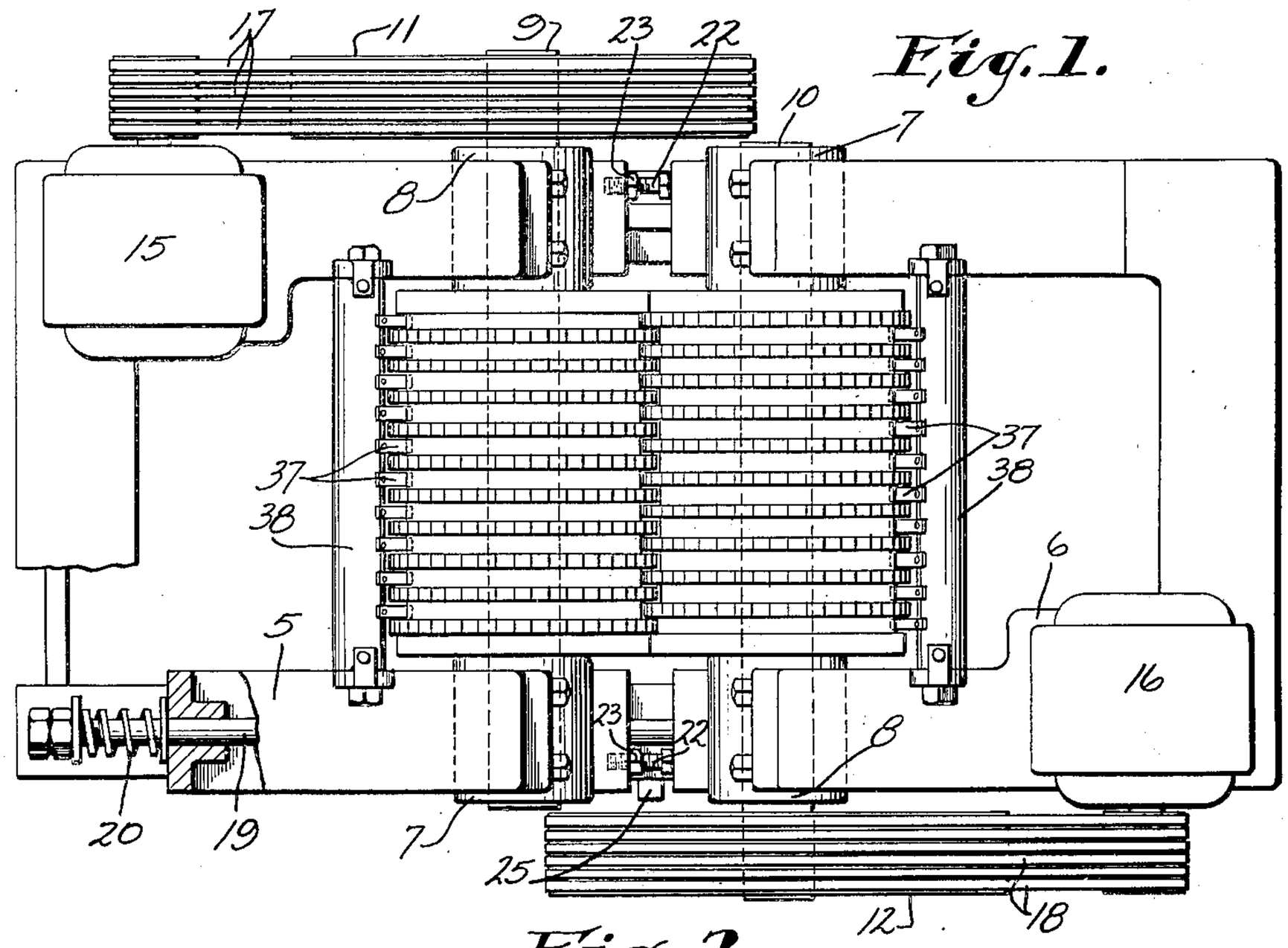


Fig. 2.

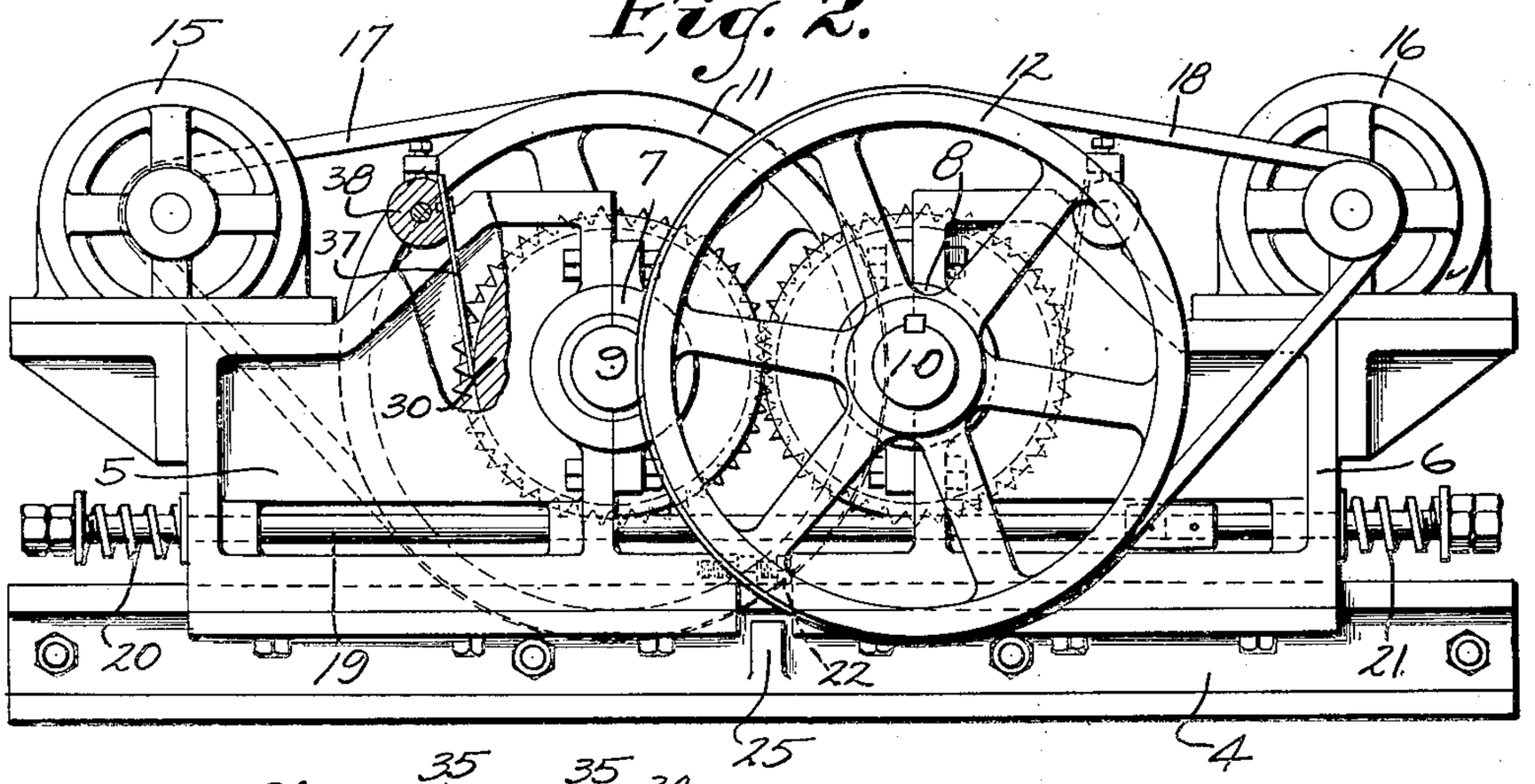
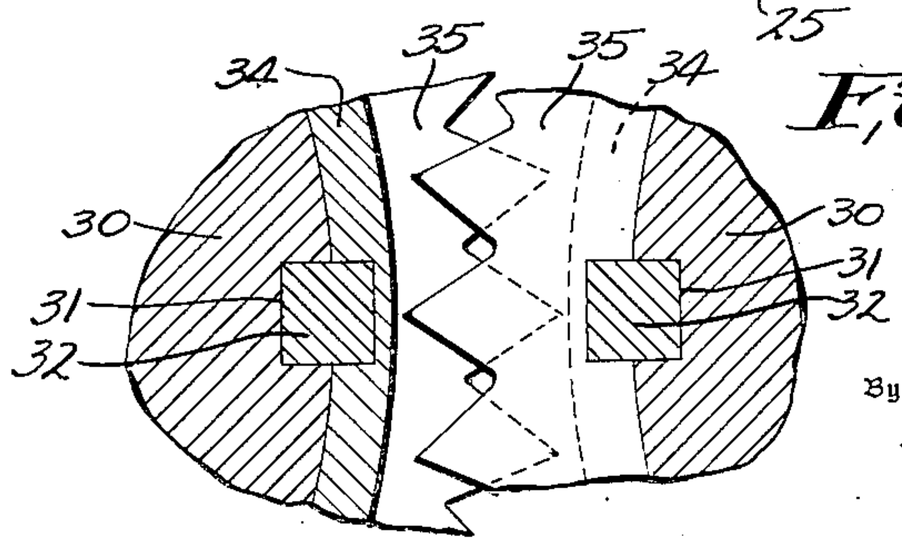


Fig. 3.



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CHIP CUTTER

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7 Claims. (Cl. 83—75)

This invention relates to improvements in chip cutters.

It is the primary object of the invention to provide a novel and improved chip cutter which will operate more effectively than existing devices for breaking and separating the fibers of wood chips to facilitate the entry of digesting liquids used in the manufacture of pulp.

It is a further object of the invention to provide a novel and improved mechanical organization in which few parts are required, said parts being adapted for economical manufacture, repair, replacement and maintenance.

It is a further object of the invention to provide a novel and improved mechanical assembly of the component elements of the machine whereby the individual crushing rolls are free to yield with respect to each other without destroying the driving connection therebetween and without departing to any great degree from a predetermined center line or line of bite.

In the drawing:

Figure 1 is a plan view of the device embodying the invention.

Figure 2 is a side elevation of the device with a portion broken away to expose a stripping finger employed in connection with each of the rolls.

Figure 3 is an enlarged detail view showing in fragmentary longitudinal section the construction of the rolls and the manner in which they interact.

Like parts are identified by the same reference characters throughout the several views.

Slidably movable to and from each other on a bed frame 4 are sub-frames or carriages 5 and 6, each of which is provided at 7 and 8 with bearings for the respective roll shafts 9 and 10.

The roll shafts are extended at opposite sides of the machine to receive pulleys 11 and 12 respectively, each of the pulleys preferably having multiple grooves. The pulleys are separately driven by individual motors 15 and 16 to which they are individually connected by belts 17 and 18.

The two carriages or sub-frames 5 and 6 are connected at each side of the machine by tension bolts 19 suitably headed at both ends and provided with compression springs 20 and 21 engaging the outside portions of the respective carriages, whereby resiliently to oppose the separation of the carriages or sub-frames.

The extent to which the carriages or sub-frames may approach each other is defined by set screws 22 threadedly engaged with one of the carriages and provided with lock nuts 23 to maintain them in adjustment. The heads of the set screws will be engaged by the other carriage to define the minimum separation of the carriages.

It will be observed that the carriages or sub-frames 5 and 6 float freely on the base frame 4, each of them being free to move in either direction on the bed. They are, however, roughly centered on the bed frame by means of a centering lug illustrated at 25 which prevents either carriage from moving across the center line to the portion of the bed frame occupied by the other carriage. The carriages are maintained in their proper position relatively to each other, however, by the set screw 22, tension rods 19, springs 20 and 21, quite independently of the centering lug.

Each of the shafts 9 and 10 carries a cylinder 30. The respective cylinders are each provided with one or more longitudinal keyways 31 containing keys 32. Upon each cylinder is assembled a set of replaceable rings of alternately varying form. Plain annuli such as that shown at 34 alternate with toothed annuli such as that shown at 35, the arrangement being such that the toothed annuli of the respective cylinders are staggered to register with plain annuli of the opposite cylinders. Thus, the teeth of annuli 35 overlap each other as clearly shown in Fig. 3, whereby very effectively to bend, crush and distort chips fed between the cylinders.

In addition to the bending and crushing action produced by the staggered and overlapping teeth of annuli 35, there is also a crushing or cutting action of the teeth upon chips confined against the opposed cylindrical surface of the associated plain annulus 34. As shown in Fig. 3, each tooth in the course of its rotation on one of the drums or cylinders 30 approaches very closely to the cylindrical surfaces of the opposite annulus 34 on the other drum. Any portion of a chip caught beneath one of these teeth is practically severed, and this action of the teeth is more effective in opening up the fibers for the digesting action of pulp liquors than is the more usual action produced by the mere alternating and overlapping teeth.

In the event that the teeth require sharpening or replacement it is a simple matter, because of the construction herein disclosed, to remove either one of the complete roll assemblies from the machine and to strip off and replace any desired number of the rings 34 or 35.

In view of the rolls between the teeth of rings 35 and the cylindrical surfaces of rings 34, there is some tendency for chips to become lodged between the consecutive spaced rings 35 of any given row. To remove chips which adhere to the

rolls, I prefer to employ stripping fingers such as those shown at 37. These may conveniently be mounted on a bracket made of a flattened cross shaft at 38. Preferably, one of the fingers will contact the surface of each ring 34 between the toothed rings 35 at either side thereof.

I claim:

1. In a chip cutter, the combination with a pair of co-acting rolls and a bed frame, of sub-frames individually supporting the respective rolls and floatingly mounted for sliding movement to and from each other on the bed frame, means distinct from said bed frame opposing the separation of said sub-frames independently of their position on said bed frame, and means on the respective sub-frames for individually driving the respective rolls.

2. In a chip cutter, the combination with a pair of co-acting rolls and a bed frame, of unitary sub-frames individually supporting the respective rolls and floatingly mounted for sliding movement to and from each other on the bed frame, means independent of said bed frame opposing the separation of said sub-frames, and means on the respective sub-frames for individually driving the respective rolls, means for limiting the approach of the sub-frames toward each other, and means for limiting the movement of each sub-frame on the bed frame toward the portion of the bed frame normally occupied by the other sub-frame.

3. In a chip cutter, the combination with a bed frame, of a plurality of sub-frames slidably mounted on the bed frame for movement to and from each other, resilient tension means connecting the sub-frames with each other, independently of said bed frame whereby to oppose their relative separation, a stop on said bed frame positioned between said sub-frames for limiting the movement of each sub-frame toward the normal position of the other chip cutting rolls individually supported by the respective sub-frames and provided with individual driving means on said sub-frames, and staggered overlapping teeth on each of said rolls interacting with untoothed portions of the companion roll.

4. In a chip cutter, the combination with a bed frame, of a pair of sub-frames slidable respectively on said bed frame, a stop on said bed frame positioned between the sub-frames for limiting the movement of each sub-frame toward the normal position of the other, a stop on one of said sub-frames engageable with the other sub-frame for limiting the approach of the sub-frames toward each other, and resilient tension means connecting the sub-frames independently of the bed frame.

5. In a chip cutter, the combination with a bed frame, of a pair of sub-frames slidable respectively on said bed frame, a stop on said bed frame positioned between the sub-frames for limiting the movement of each sub-frame toward the normal position of the other, a stop on one of said sub-frames engageable with the other sub-frame for limiting the approach of the sub-frames toward each other, resilient tension means connecting the sub-frames independently of the bed frame, chip cutting rolls each supported by a sub-frame, and individual driving means for each roll and supported by the bed frame.

6. In a chip cutter, the combination with a bed frame, of a pair of sub-frames slidable respectively on said bed frame, a stop on one of said sub-frames engageable with the other sub-frame for limiting the approach of said sub-frames toward each other, and resilient tension means connecting the sub-frames independently of the bed frame.

7. In a chip cutter, the combination with a bed frame, of a pair of sub-frames slidable respectively on said bed frame, a stop on said bed frame positioned between the sub-frames for limiting the movement of each sub-frame toward the normal position of the other, and resilient tension means connecting the sub-frames independently of the bed frame.

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