April 3, 1934. G. KNOWLES 1,953,536

FIBER COMBING MACHINE

Filed Dec. 26, 1931 2 Sheets-Sheet 1

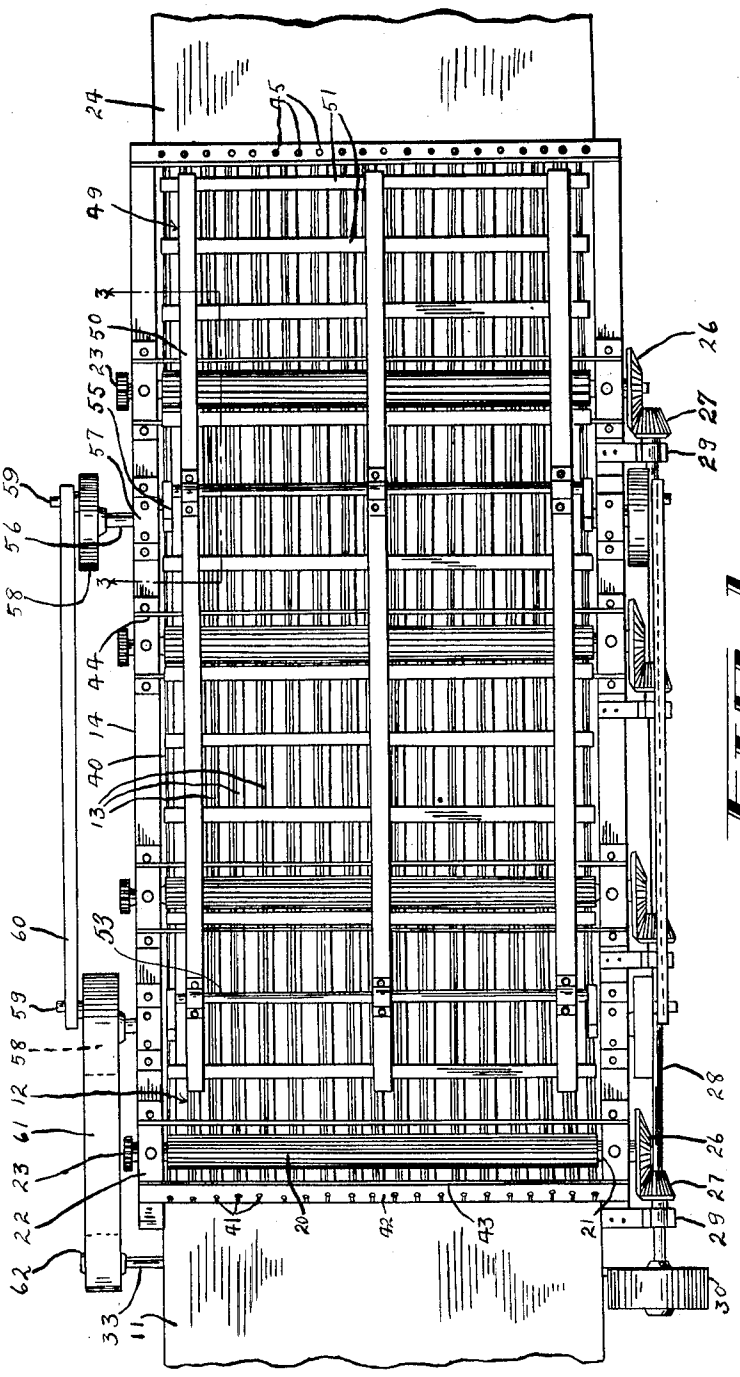


FIG. 1

INVENTOR
George Knowles
by Quinn & Corbett
his ATTORNEY

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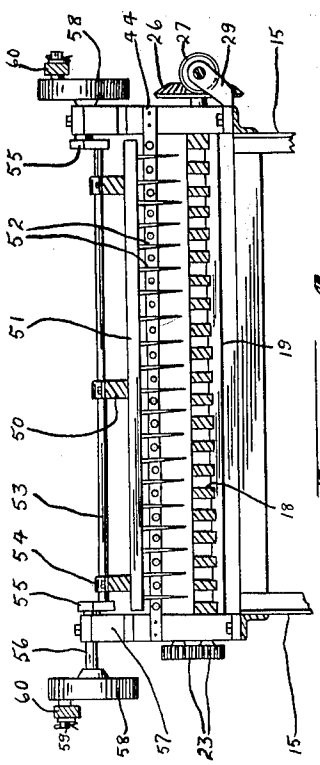


FIG. 4.

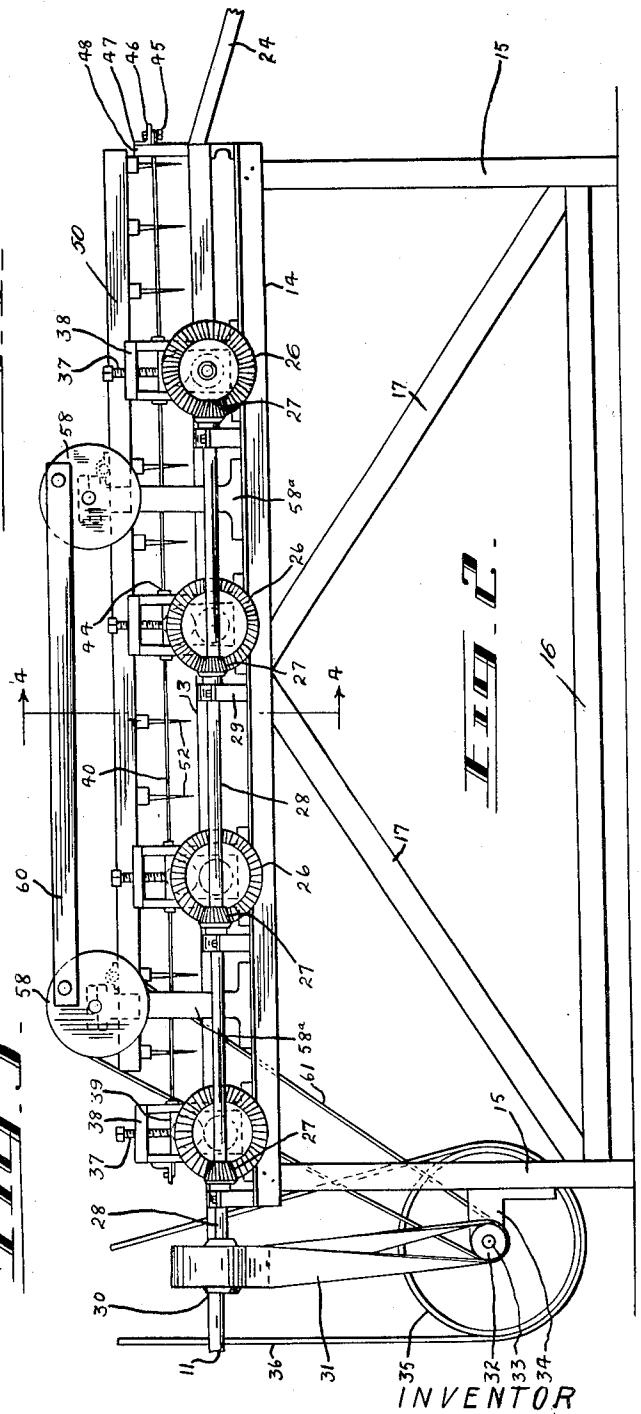


FIG. 2.

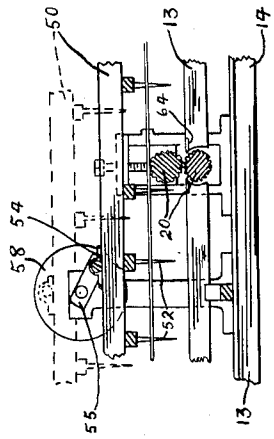


FIG. 3.

INVENTOR
George Knowles
by Irvine Hackett
his ATTORNEY

Patented Apr. 3, 1934

1,953,536

UNITED STATES PATENT OFFICE

1,953,536

FIBER COMBING MACHINE

George Knowles, Ottawa, Ontario, Canada

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2 Claims. (Cl. 19—115)

This present invention relates to certain new and useful improvements in a fiber combing machine.

The primary object of the invention resides in the provision of a fiber combing machine of generally improved and simplified construction and operation as well as increased efficiency.

The invention has for another object the provision of a fiber combing machine of the character stated which thoroughly combs and cleans the fiber without injury thereto.

The invention has for a further object the provision of a fiber combing machine of the character stated which thoroughly combs all chips and the like from the flax, hemp or other fibers while drawing the same through the machine between pairs of fluted rollers.

The invention has for a still further object the provision of a fiber combing machine of the character stated which alternately draws the stock between fluted rollers and combs the fiber in the direction of movement of the same through the machine, the combing mechanism operating at a speed different from the speed of movement of the fiber strands through the sets of rollers.

The invention has for a still further object the provision of a fiber combing machine of the character stated including a series of alternating stock gripping and drawing rollers and combing members operating between the sets of rollers and automatically cleaned or cleared from the fiber strands after each operation thereon to prevent the combing member from catching and tangling in the fiber strands.

The invention has for a still further object the provision of a fiber combing machine of the character stated in which the combing members operate over and through a longitudinally slotted table over which the stock is drawn by spaced sets of stock gripping and drawing rollers intersecting the table and extending transversely therethrough with the combing members all operating in unison between the pairs or sets of rollers and combing the fiber strands rapidly in the direction of movement of the strands longitudinally over the slotted table and the combing members cleared from engagement with the fiber strands after each operation thereon.

The invention has for a still further object the provision of a fiber combing machine of the character stated which is composed of the minimum number of parts of simple and inexpensive construction and arrangement and simple operation so that the machine may be manufactured at small cost with good profit, and may be maintained in proper condition and operated inexpensively, thus providing a commercially attractive proposition.

To the accomplishment of these and related objects as shall become apparent as the description proceeds, the invention resides in the construction, combination and arrangement of parts as shall be hereinafter more fully described, illustrated in the accompanying drawings and pointed out in the claims hereunto appended.

The invention will be best understood and can be more clearly described when reference is had to the drawings forming a part of this disclosure wherein like characters indicate like parts throughout the several views.

In the drawings:—

Figure 1 is a plan view of the improved fiber combing machine;

Figure 2 is a side elevation thereof;

Figure 3 is a fragmentary longitudinal vertical section, taken substantially on the plane of line 3—3 of Figure 1, looking in the direction indicated by the arrows; and

Figure 4 is a transverse vertical section through the machine, taken substantially on the plane of line 4—4 of Figure 2, looking in the direction indicated by the arrows.

Referring more in detail to the drawings, it is to be noted that the fiber stock passes into the machine from a feed table 11 at one end thereof and passes longitudinally over the table 12 which is composed of longitudinally spaced bars 13 which extend the full length of the machine within the machine frame 14, which latter is elevated by corner standards 15 suitably braced by lower longitudinal brace bars 16 and inclined converging brace bars 17. The bars 13 constituting the slotted table rest in notches 18 provided therefor in transverse supporting bars 19 carried in an appropriate manner by the machine frame 14.

Supported transversely over the slotted table 12 and spaced slightly above the same are a series of pairs of longitudinally fluted fiber gripping rollers 20. The shafts 21 for the rollers 20 are rotatably mounted in appropriate bearings 22 carried on the longitudinal side members of the machine frame 14 and are suitably geared together by a conventional gearing 23 for rotation in reverse direction to grip the fiber stock between the rollers of each pair 20 and advance the stock longitudinally over the slotted table 12 from the feed table 11 at the forward end of the machine to the slightly declined discharge table 24 at the opposite or rear end of

the machine, the three tables 11, 12 and 24 being on substantially the same level. One of the shafts 21 for each pair of rollers 20 has a bevel gear 26 provided thereon, engaged and driven by a bevel drive pinion 27 on a drive shaft 28 extended longitudinally of one side of the machine and rotatable in appropriate bearings 29 carried on the side of the machine frame 14. The shaft 28 has a belt wheel 30 thereon around which is engaged a drive belt 31 for driving or rotating the shaft 28, the belt 31 also operating around a belt wheel 32 on a shaft 33 supported in appropriate bearing brackets 34 on one end of the machine and preferably carried on one or more of the corner standards 15. The shaft 33 also has a belt wheel 35 thereon driven by a main power drive belt 36 for the machine.

The upper roller 20 of each pair of rollers is adjustable vertically toward and away from the co-operating lower roller 20 by means of set screws 37 adjustable through bearing guide frames 38 for the bearings 39 in which the ends of the upper roller 20 are supported. Thus, the tension of the pairs of rollers 20 or gripping action of the same on the fiber stock passing through the pairs of rollers 20 may be readily regulated as desired, by proper adjustment of the set screws 37.

Supported above the slotted table 12 and extending longitudinally thereover are the wires 40 which are parallel to one another with each wire located directly above and parallel with one of the bars 13 of the table 12, a wire 40 being provided above each of said bars 13. The wires 40 are strung above the upper rollers 20 with the forward ends of the wires 40 firmly fastened in equally spaced slots 41 provided therefor in the free longitudinal edges of the out-turned lower flange 42 of an angle bar 43 secured on the bearing guide frame 38. The wires 40 are extended through appropriate openings in transverse plates 44 carried on each of the remaining bearing guide frames 38 and the rear ends of the wires 40 are fastened to tensioning members 45 adjustable in the out-turned lower flange 46 on an angle iron supported transversely above the rear end of the machine frame 14 on appropriate upstanding supports 48. Thus, the wires 40 may be readily tensioned and held in tensioned or tightened condition.

Operating above the slotted table is a comb frame 49 including longitudinal frame bars 50 on the undersides of which are mounted the transverse comb bars 51 with tapered combing teeth 52 depending therefrom in spaced relation for operation between the wires 40 and also between the spaced longitudinal bars 13 of the slotted table 12. The comb bars 51 are arranged in sets for operation between the sets or pairs of rollers 20. The comb frame 49 is suspended on transverse shafts 53 rotatable in brackets 54 carried on the upper face of the longitudinal frame bars 50 of the comb frame 49. The opposite ends of the shafts 53 are rigid on crank arms 55 radiating from the inner ends of the combing mechanism operating shafts 56. These shafts 56 are rotatable in suitable bearings 57 carried on the upstanding bearing brackets 58*a* mounted on the opposite sides of the machine frame 14. The shafts 56 have mounted concentrically on their outer ends the wheels 58 with eccentric pins 59 projecting laterally from their outer faces, pitman rods 60 being employed on each side of the machine to connect the eccentric pins 59 located on that side of the machine. A belt 61 operates around one of the wheels 58 and around a belt wheel 62 carried on the shaft 33. Thus, the comb frame 49 is operated in a circle over the slotted table 12 with the teeth 52 carried by the comb bars 51 always directed downwardly for action on the fiber strands of the fiber stock carried longitudinally over the slotted table 12 by the pairs of rollers 20, the comb teeth 52 always acting in the same direction on the fibers and travelling with the same while engaged therewith, only at a speed which is preferably considerably greater than speed of travel of the fiber stock through the machine. It may also be stated at this time that the comb teeth 52 when in their uppermost position clear the wires 40 and when in their lowermost position extend downwardly a portion of the way through the slots between the bars 13 of the slotted table 12, thus effectively engaging in the fiber stock and thoroughly combing the fiber strands and causing chips and the like to be separated from the fiber strands and dropped through the slots between said bars 13. Owing to the lowermost rollers 20 intersecting or cutting through the table, the bars 13 are formed in longitudinal sections between the pairs of rollers 20 and the ends of the sections of the bars 13 are rounded or concave and have small transverse plates 64 imbedded in their upper corners and extended across the sections of the bars 13 on either side of the lower rollers 20.

As the construction of the device has thus been described in detail, brief reference is now had to its use and modus operandi: The fiber is fed into the machine by way of the feed table 11 and is gripped by the pairs of rollers 20 successively and drawn rearwardly thereby longitudinally over the slotted table 12, the stock having been first broken by appropriate means. The fibers move comparatively slowly over the slotted table 12 and below wires 40. During this movement of the fiber over the slotted table 12, the combing mechanism operates preferably at a considerably greater speed, causing the sets of comb teeth 52 to move downwardly and rearwardly between the wires 40 and for some distance between the bars 13 of the table 12, then rearwardly and upwardly, describing a semi-circle or arc in this movement, all of the comb teeth 52 operating in unison between the respective sets of rollers 20. As the comb teeth 52 continue their movement downwardly and forwardly to complete the second half of rotation of the shafts 53 and 56, the comb teeth 52 are raised above the wires 40, completely clearing the comb teeth 52 from engagement with the fiber strands. This second half of the movement of the comb teeth 52 describes a second semi-circle or arc opposed to the first arc, thereby causing the comb teeth 52 to describe a complete circle on each operation of the combing mechanism. This action of the comb teeth 52 on the fiber will serve to thoroughly comb the fiber strands and cause separation and falling of chips of the comb teeth 52 raising the fiber strands and downwardly through the slots between the spaced bars 13 of the table 12, without possibility of the comb teeth 52 raising the fiber strands above the wires 40 or breaking or otherwise injuring the fiber strands sufficient to lower the value thereof. After the fiber strands have been thoroughly combed and passed the last pair of rollers 20 and the last combing teeth 52, the fiber strands are discharged from the machine over the declined discharge table 24 at the rear end of the machine. It is also apparent that the speed of operation of the rollers 20 and also the rela-

tive speed of operation of the combing mechanism operating above the table 12 may be readily regulated, as desired.

From the foregoing description taken in connection with the accompanying drawings, it will be manifest that a fiber combing machine is provided that will fulfill all the necessary requirements of such a device, but as many changes could be made in the above description and many apparently widely different embodiments of my invention may be constructed within the scope of the appended claims without departing from the spirit or scope thereof, it is intended that all matters contained in the said accompanying specification and drawings, shall be interpreted as illustrative and not in a limitative or restrictive sense.

Having thus described the invention, what is claimed is:—

1. A fiber combing machine including a main table; supporting means for said main table; said main table being formed of sectional spaced parallel bars; transverse pairs of superposed fluted rollers intersecting said table and serving to draw over the table in the direction of the slots and bars of the table fibers fed onto said table at one end of the latter and discharged by said rollers from the other end of said table; sets of combing members operating in a circle over said table and in unison to comb the fibers in the direction of movement of the same over said table and between the pairs of rollers; said combing members operating in the longitudinal slots of said table; wires stretched over said table above the bars thereof and above said rollers; said wires extending longitudinally of the table and serving to clear all fibers from the combing members after each operation of said combing members on the fibers; a main operating shaft; driving connections between said main operating shaft and said rollers; the rollers of each pair being geared together for operation in opposite directions to draw the fibers between the rollers of each pair; and driving connections between said main driving shaft and the combing members to operate said combing members at a speed different from the speed of rotation of said rollers.

2. A fiber combing machine including a main frame; supporting means for said main frame; a table supported in said main frame and composed of spaced parallel longitudinal bars formed in longitudinal sections with said sections supported in said main frame; pairs of superposed transverse rollers rotatable in said main frame between the longitudinal sections of said bars of the table; said rollers being fluted longitudinally and serving to draw fibers longitudinally over said table from the feed end to the discharge end thereof; a feed table for the first mentioned table; a discharge table for the said first mentioned table; wires stretched longitudinally above said first mentioned table and over the bars of said first mentioned table in parallel relation to said bars; supporting means for said wires; a combing mechanism suspended on crank arms over said main table and operable in a circle over the same; said combing mechanism including transverse comb members with depending comb teeth for operation between said wires and in the slots provided between the longitudinal bars of said main table for combing the fiber passing thereover in the direction of movement of said fiber and at a speed differing from the speed of movement of said fibers over said table; a main drive shaft; driving connections between said main drive shaft and said rollers; and driving connections between said main drive shaft and said combing mechanism.

GEORGE KNOWLES. [L. S.]