

Nov. 30, 1954

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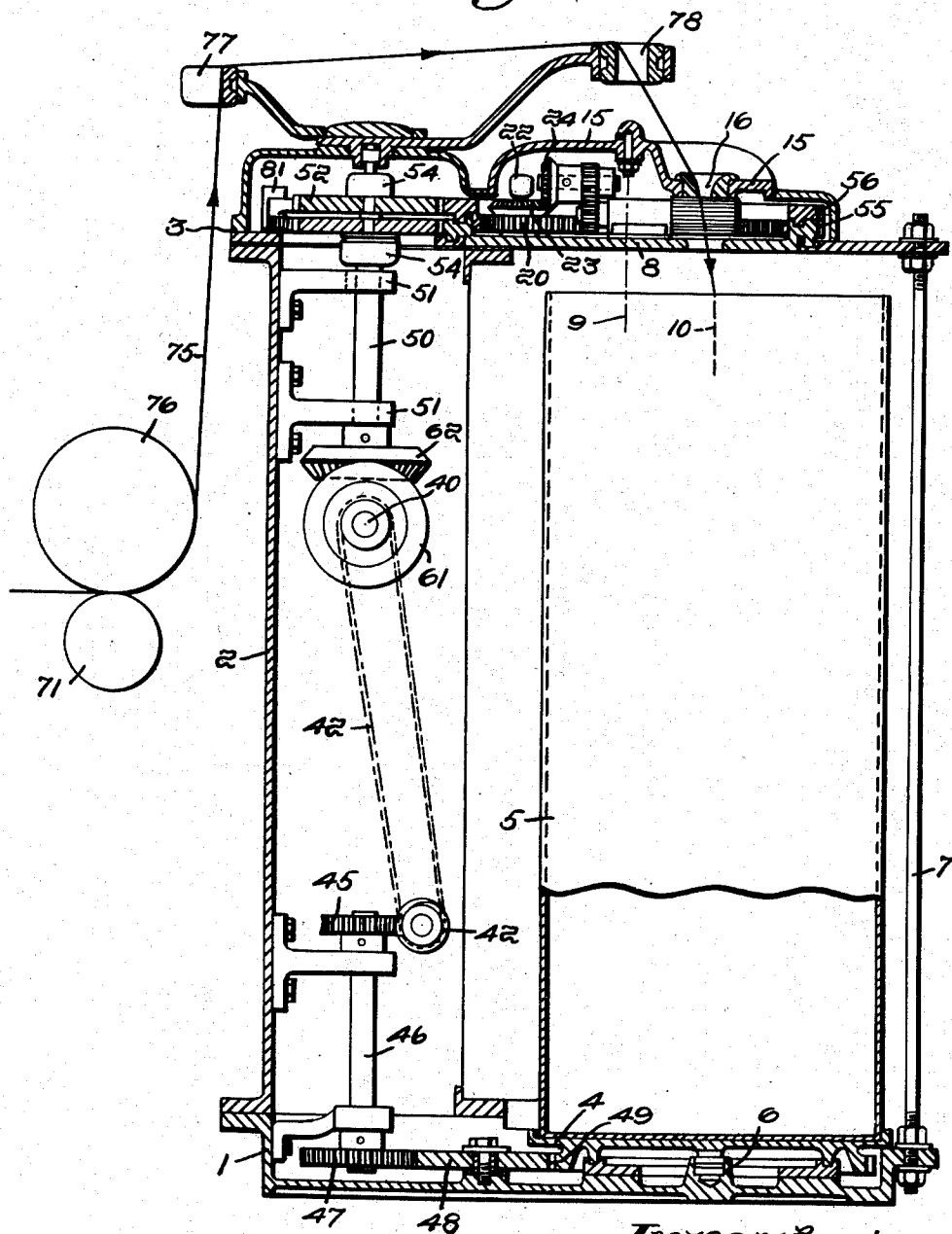
2,695,429

SLIVER COILER

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Fig. 1.



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Fig. 2.

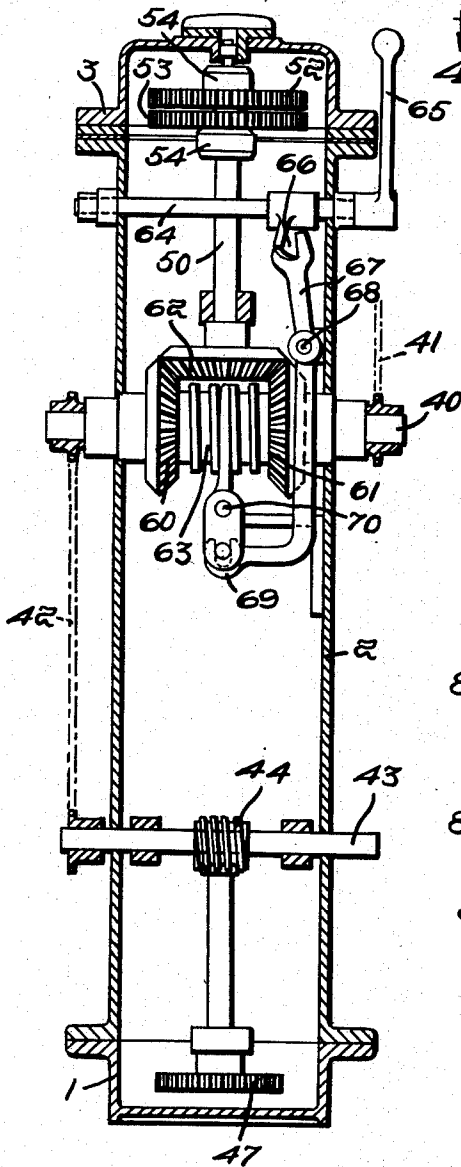


Fig. 3.

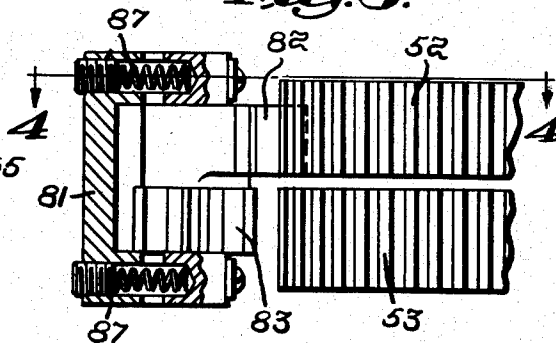
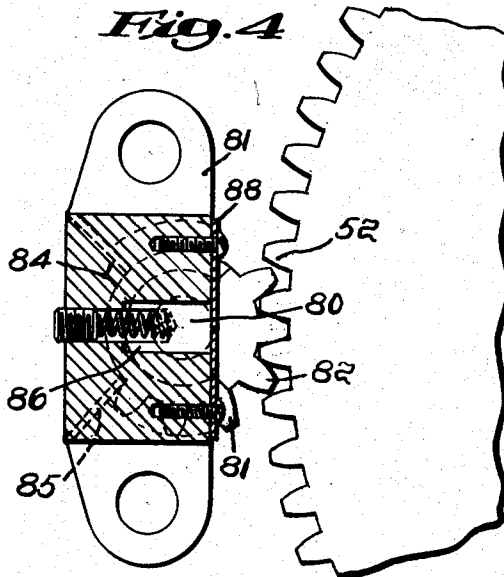


Fig. 4.



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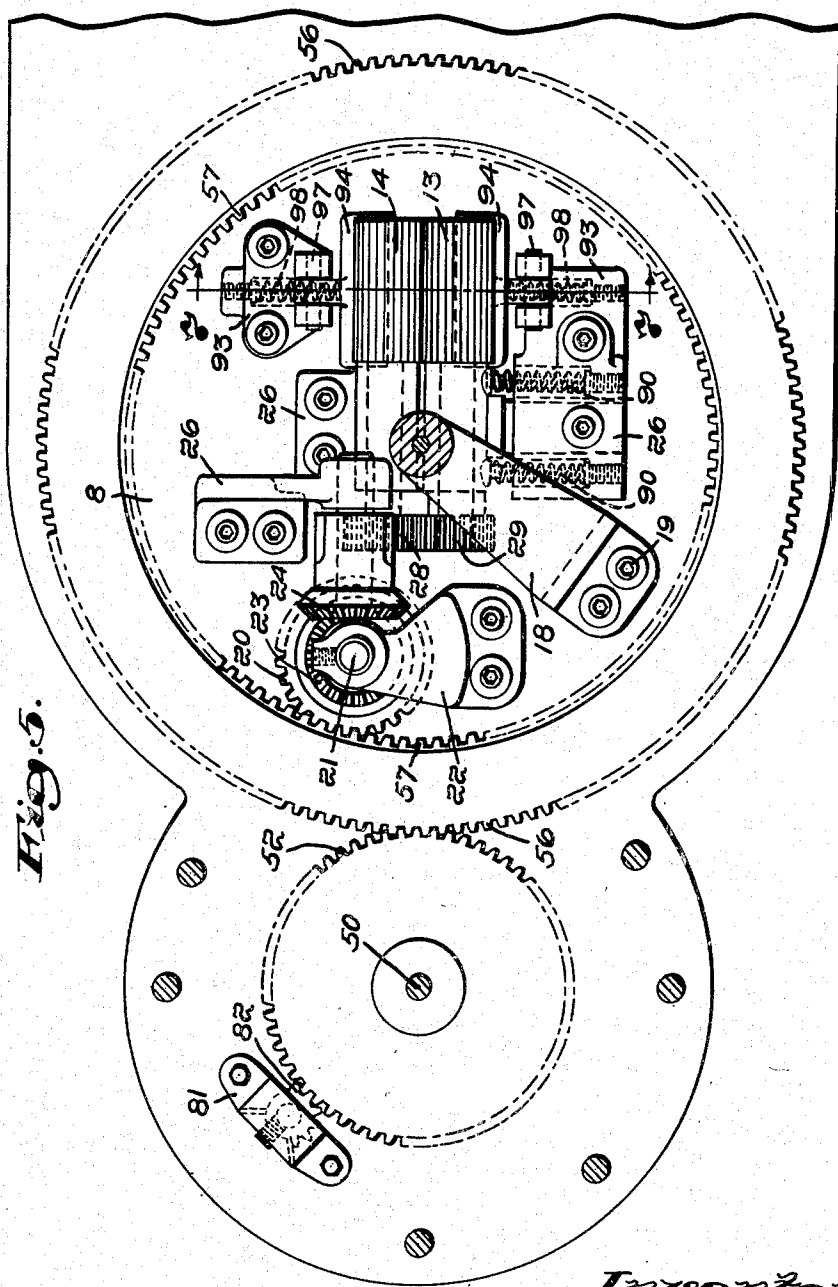
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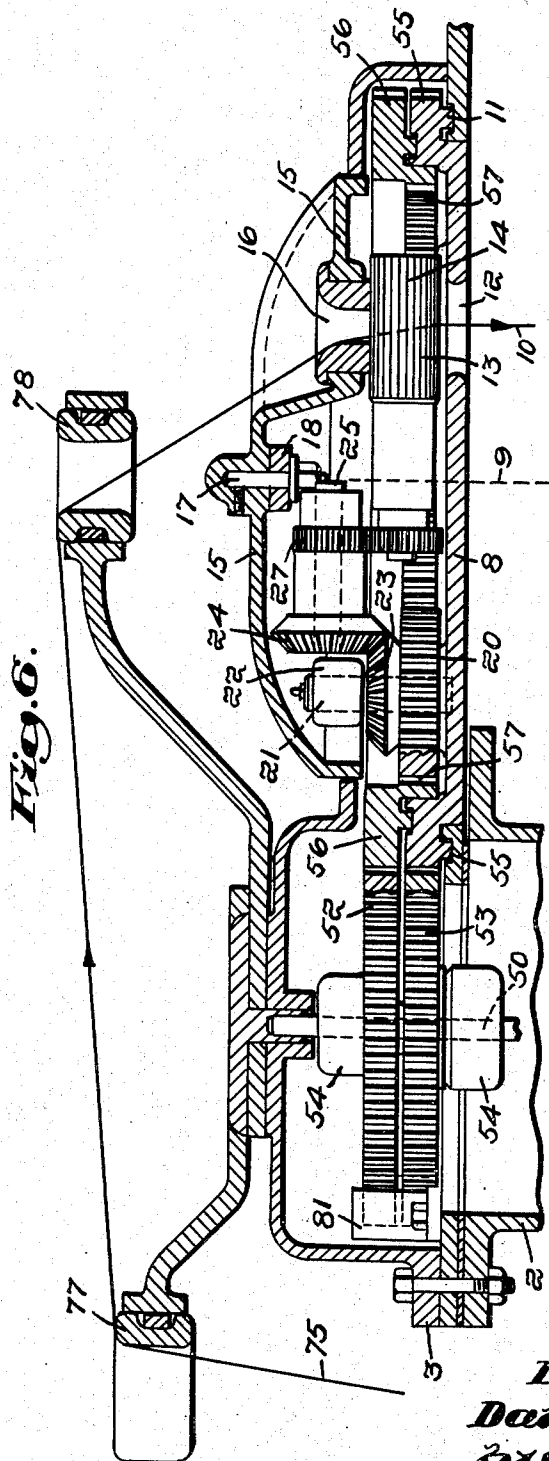
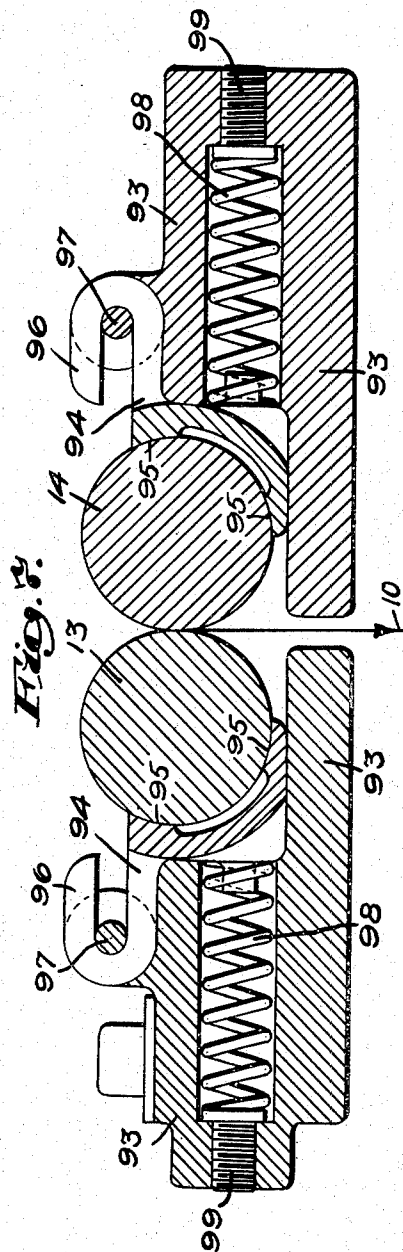
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4 Sheets-Sheet 4



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SILVER COILER

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11 Claims. (Cl. 19—159)

This invention relates to a coiling apparatus in which a strand, usually a sliver, such as produced by a carding operation or a roving discharged from a drawing frame, is symmetrically coiled into a can in such a manner that it may readily be withdrawn therefrom in further processing operations. An apparatus or machine of this type usually comprises a frame having a base and a head supported from and above the base by a hollow column and the base is provided with a seat for the can mounted for rotation on a vertical axis and the head is provided with a plate or table mounted for rotation on a vertical axis eccentric to the axis of the can seat. The strand or sliver is fed through an aperture in the table eccentric to the axis of the table and the can is rotated so that the strand is deposited in the can in symmetrical coils peripherally arranged around the interior of the can.

In the usual type of this apparatus the plate or table in the head is provided with an upstanding projection having a tubular passageway, the entrance to which is on the axis of rotation of the table and the exit from which is at the opening in the table eccentric to its axis. Feed rolls are mounted in a fixed position just above the entrance to this passageway and an opening is provided in a cover or cap secured to the head of the frame, with this opening on the axis of rotation of the table. Thus the strand may readily be inserted through the cover between the feed rolls and into the tubular passageway without stopping the operation of the apparatus.

It has been found, however, that this type of apparatus is ill adapted to handling strands or slivers formed of rayon, or other synthetic fibres, particularly because the tubular passageway becomes gummed up and sticky and the apparatus fails properly to deliver the strand into the can and has frequently to be stopped and cleaned, thus delaying the operation of the carding frame or drawing frame or other apparatus from which the strand is being discharged.

The object of the invention is to provide a construction in which the feed rolls are positioned directly over the eccentric opening or aperture through the table so that the strand will pass directly from the bite of the feed rolls into the can, thus eliminating any passageway which would become fouled by the fibre. This requires, however, that the feed rolls shall be secured to the table and revolve bodily about the axis of the table. This also requires that the guide eye or opening through the cover must also be vertically aligned with the aperture in the table and revolve with this aperture about the axis of the table. Since then the path of the strand is revolving rapidly about the axis of the table it is not practical to introduce the strand into feeding position while the machine is in operation. Furthermore, if the apparatus be stopped to permit introduction of the strand the feed rolls stop their rotation and it is impossible to introduce or thread the sliver in place.

The object of the invention is further to obviate these difficulties and provide an apparatus in which with the feed rolls mounted on the table directly over the eccentric aperture in the table the strand may be introduced at any time without stopping the operation of the feed rolls.

The object of the invention is further to provide such a construction in which the cover is mounted upon and rotates with the table or plate so that the guide opening remains in vertical alinement with the aperture in the table through which the strand passes into the can.

These and other objects and features of the invention will appear more fully from the accompanying descrip-

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tion and drawings and will be particularly pointed out in the claims.

The drawings illustrate a preferred form of apparatus embodying the invention.

In the drawings:

Fig. 1 is a view, chiefly in vertical cross section, of the apparatus;

Fig. 2 is a view, chiefly in vertical cross section, taken at right angles to Fig. 1 through the vertical column;

Fig. 3 is a detail partially in vertical cross section of a locking mechanism employed;

Fig. 4 is a top plan view, partially in horizontal cross section, of the construction shown in Fig. 3, taken on the line 4—4;

Fig. 5 is a top plan view, on a larger scale with the covering portion removed, of the construction shown in Fig. 1;

Fig. 6 is a side elevation, partially in vertical cross section, of the upper portion of the apparatus shown in Fig. 1 also on a larger scale; and,

Fig. 7 is a detail in end elevation and partially in vertical cross section of the feed rolls and associated elements, see Fig. 5.

The apparatus comprises a suitable frame having a hollow base 1, a hollow vertical column 2 extending upward therefrom, and a head indicated generally at 3 mounted on the top of the column. A seat 4 for the can 5 is mounted for rotation on a vertical axis at 6 on a portion of the base extending laterally from the column 2. Usually a strut 7 extends at the side of the can opposite the column 2 connecting the base and the portion of the head overhanging the can.

The table 8, which is shown in the form of a flat plate, is mounted in the head to rotate on a vertical axis 9 eccentric to the vertical axis 10 of the can and its seat and for that purpose is provided with an annular rib 11 riding in an annular trackway in the head. An aperture 12 is formed in the table 8 eccentric to its axis of rotation 9 and directly over this aperture a pair of feed rolls 13 and 14 are mounted on the table for rotation on parallel horizontal axes. The cap or cover 15 is secured to and rotates with the table and is provided with a guide eye 16 in vertical alinement with the aperture 12. The strand or sliver is introduced or threaded into the machine by being passed through the guide eye 16 directly into the bite of the rolls 13 and 14 and discharges through the aperture 12 so that it passes directly into the can. The cover 15 is conveniently secured to the table to rotate therewith by a suitable locking pin or bolt 17 mounted in a bracket 18 secured at 19 to the table and upstanding therefrom.

Thus it will be seen that the path of the strand through the guide eye 16 between the feed rolls and through the aperture 12 revolves about the axis 9, while the can rotates on the axis 10 and the strand is laid in the required manner in a continuous series of coils symmetrically about the interior periphery of the can.

When the strand has to be introduced, either at the starting of the machine or more usually whenever a strand breaks and it has to be started again into the can, it is necessary to stop the rotation of the table but to maintain the operation of the feed rolls.

In the preferred construction illustrated the feed rolls are operated from a pinion 20 journaled on a vertical shaft 21 secured at its lower end to the table 8 and at its upper end to a bracket 22 secured to and projecting upward from the table 8, and means are provided for rotating this pinion in the same direction when the table is either rotating or stationary, thus to cause the feed rolls at all times to act to feed the strand into the can. A bevel gear 23 is shown secured to and rotating with the pinion 20 and engaging a bevel gear 24 on a stub shaft 25 mounted in a bracket 26 secured to the table 8 and in which the feed rolls are journaled. This shaft carries a gear 27 engaging a gear 28 on the shaft of the feed roll 14 and the gear 28 engages a gear 29 on the shaft of the feed roll 13.

The main driving shaft is shown as a shaft 40 extending transversely through and journaled in the column 2 and driven from any suitable source of power, as by a sprocket chain 41. This shaft, by any suitable mecha-

nism, rotates the can seat. As shown, a sprocket chain 42 and suitable sprockets connects the shaft 40 to a transverse shaft 43 journaled in the column and carrying a worm 44 engaging a worm wheel 45 on the upper end of a vertical shaft 46 mounted in the bottom of the column and carrying at its lower end a gear 47 which in turn drives a gear 48 journaled in the base which engages a gear 49 formed on the periphery of the can seat 4.

In the preferred mechanism for rotating the table 8 and the pinion 20 a vertical shaft 50 is journaled in suitable brackets 51 in the upper portion of the column 2. A pair of superposed driving gears 52 and 53 are connected to the upper end of the shaft 50, each by a standard form of overrunning clutch 54 but functioning in opposite directions. The lower driving gear 53 engages a gear on the periphery of the table which in the form illustrated is the toothed periphery 55 of the table and the driving gear 52 engages the external teeth 56 of a combined internal and external gear mounted for rotation concentric the table, being seated therein and having its internal teeth 57 engaging the pinion 20.

The driving shaft 40 has journaled thereon a pair of oppositely facing bevel gears 60 and 61 engaging a bevel gear 62 on the lower end of the shaft 50. A suitable clutch 63 is movable to clutch either the gear 60 or the gear 61 to the shaft 40 and thus effect the rotation of the shaft 50 in either direction. For operating the clutch a shaft 64 is shown journaled transversely in the column operated by a handle 65 and carrying a cam 66 engaging a lever 67 journaled at 68 and at its opposite end engaging a second lever 69 fulcrumed at 70 and connected to the clutch. Thus by shifting the clutch the driving gears 52 and 53 are selectively rotated but in opposite directions, with the other remaining stationary.

With the construction shown the pinion 20 must always rotate clockwise to cause the feed rolls to feed the strand down into the can. When the apparatus is running under normal working conditions with the table 8 rotating, the table will rotate counterclockwise, the driving gear 53 being driven clockwise, and the driving gear 52 remaining stationary due to the action of the overrunning clutches. Thus the pinion 20 is revolved about the axis 9 in engagement with the internal teeth 57 and rotates clockwise. When it is desired to stop the rotation of the table to introduce a strand end the clutch 63 is shifted, the shaft 50 rotates in the opposite direction, the driving gear 53 remains stationary, and the driving gear 52 rotates counterclockwise due to the action of the overrunning clutches. Thus the table 8 is held stationary by the driving gear 53 and the combined external, internal gear is rotated clockwise by the driving gear 52 and rotates the pinion 20 clockwise. Either of the driving gears is therefore selectively rotated but in opposite directions from the driven means of the apparatus and with the other remaining stationary, thus to cause the pinion which drives the feed rolls in either case to rotate in the same direction and thus feed the strand into the can.

The strand 75 is guided to the machine in any suitable way and is shown as passing from between rolls 76 up through a guide eye 77 secured to the frame, and thence through a second guide eye 78 also secured to the frame. When a fresh strand end is to be introduced as, for example, when the running strand has broken, the operative throws the clutch to stop the rotation of the table and introduces the fresh end into the guide eye 16 where it is immediately seized by the feeding rolls and started into the can. Then the operative throws the clutch in the opposite direction and the operation of the machine proceeds as usual.

There is also provided means for positively locking either of the driving gears 52 and 53 against rotation when the other is being rotated and a preferred construction for that purpose is shown in detail in Figs. 3 and 4. This comprises a stub shaft 80 mounted, parallel to the shaft carrying the driving gears, in a bracket 81 bolted to the frame. On this stub shaft is journaled a pair of gear segments 82 and 83 fixed at right angles to each other with the gear segment 82 engageable with the upper driving gear 52 and the gear segment 83 engageable with the lower driving gear 53. A pair of abutments 84 and 85 are formed on the bracket 81 to limit rotation of the gear segments so that when either gear segment is rotated out of engagement with its cooperating driving gear it engages an abutment and thus holds the other gear

segment in position to lock its cooperating driving gear against rotation.

Preferably the stub shaft 80 is slabbed at the side so that it cannot rotate and is mounted to slide in a groove 86 in the bracket and the stub shaft is also preferably yieldingly pressed by suitable springs 87 against the plate 88 secured to the face of the bracket 81. This enables the gear segments to move back slightly and insure proper disengagement of either from its cooperating driving gear.

The feed rolls are preferably pressed together so as to maintain a firm feeding grip of the strand or sliver. For that purpose in the construction illustrated one of these feed rolls as, for example, the feed roll 13, is pressed toward the other by springs 90 mounted in an upstanding portion of the bracket 26. These springs act against the bearing for the feed roll 13 which is mounted for the slight movement required for the purpose.

It is important that the feed rolls be kept free from the collection of lint and any gummy or other foreign substance such as is present particularly in strands of synthetic fibre. For that purpose the two feed rolls are provided with clearer elements pressed yieldingly against the periphery of the rolls. A simple and preferred construction for this purpose is illustrated particularly in Figs. 5 and 7. A bracket 93 for each roll is mounted on the table 8. The clearer element 94 having two edges or faces 95 extending substantially the length of the rolls is mounted to slide toward and from the roll as by an arm 96 hooked over a rod 97 mounted transversely on the bracket 93. This clearer element is yieldingly pressed into engagement with the roll as by a spring 98 mounted in the bracket and seated against an adjusting screw 99.

Having thus described the invention, what is claimed

35 as new, and desired to be secured by Letters Patent, is:
1. In a can strand coiler of that type comprising a frame having a base and a head supported from and above the base, a can seat mounted for rotation on the base on a vertical axis, and a table mounted on the head for rotation on a vertical axis eccentric to the axis of the can seat, the combination of a pair of feed rolls mounted on the table for rotation on parallel horizontal axes, a guide eye supported from the table above the bite of the feed rolls and eccentric the axis of the table, an aperture through the table vertically beneath the guide eye, and means for rotating the feed rolls to feed the strand into the can with the table either rotating or stationary.

2. In a can strand coiler of that type comprising a frame having a base and a head supported from and above the base, a can seat mounted for rotation on the base on a vertical axis, and a table mounted on the head for rotation on a vertical axis eccentric to the axis of the can seat, the combination of a pair of feed rolls mounted on the table for rotation on parallel horizontal axes, a guide eye supported from the table above the bite of the feed rolls and eccentric the axis of the table, an aperture through the table vertically beneath the guide eye, a pinion journaled on the table, gears connecting the pinion and the feed rolls, and means for rotating the pinion in the same direction with the table either rotating or stationary to cause the feed rolls to feed the strand into the can.

3. In a can strand coiler of that type comprising a frame having a base and a head supported from and above the base, a can seat mounted for rotation on the base of a vertical axis, and a table mounted on the head for rotation on a vertical axis eccentric to the axis of the can seat, the combination of a pair of feed rolls mounted on the table for rotation on parallel horizontal axes, a guide eye supported from the table above the bite of the feed rolls and eccentric the axis of the table, an aperture through the table vertically beneath the guide eye, a pinion journaled on the table, gears connecting the pinion and the feed rolls, driven means on the frame, a gear on the periphery of the table, a combined internal and external gear mounted for rotation concentric the table with its internal teeth in engagement with the pinion, and means for selectively rotating either of said gears but in opposite directions from the driven means with the other stationary to cause the pinion in either case to rotate in the direction for operating the feed rolls to feed the strand into the can.

4. In a can strand coiler of that type comprising a frame having a base and a head supported from and

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above the base, a can seat mounted for rotation on the base on a vertical axis, and a table mounted on the head for rotation on a vertical axis eccentric to the axis of the can seat, the combination of a pair of feed rolls mounted on the table for rotation on parallel horizontal axes, a guide eye supported from the table above the bite of the feed rolls and eccentric the axis of the table, an aperture through the table vertically beneath the guide eye, a pinion journaled on the table, gears connecting the pinion and the feed rolls, a vertical shaft in the frame, means for driving the shaft in either direction, a pair of superposed driving gears journaled on the shaft, an over-running clutch between each driving gear and the shaft, a gear on the periphery of the table in engagement with the lower driving gear, a combined internal and external gear mounted concentric the table with its external teeth in engagement with the upper driving gear and its internal teeth in engagement with the pinion, the said mechanism acting, when the shaft is driven in one direction with the lower driving gear clutched thereto and the upper driving gear unclutched therefrom, to rotate the table and thereby to rotate the pinion due to its revolution in engagement with the thus stationary internal gear and, when the shaft is rotated in the opposite direction with the upper driving gear clutched thereto and the lower driving gear unclutched therefrom, to rotate the pinion by the rotating internal gear with the thus stationary table, whereby the feed rolls act to feed the strand into the can with the table either rotating or stationary.

5. A can strand coiler having the construction and operation defined in claim 4, together with means for positively locking either driving gear against rotation when the other is being rotated.

6. A can strand coiler having the construction and operation defined in claim 4, together with a stub shaft parallel to the shaft carrying the driving gears, a pair of gear segments fixed at right angles to each other and mounted on the stub shaft to engage respectively the said driving gears, a pair of abutments positioned to limit rotation of the gear segments when either gear segment is rotated out of engagement with its cooperating gear thereby positively to lock either driving gear against rotation when the other is being rotated.

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7. A can strand coiler having the construction and operation defined in claim 6, together with means for mounting the stub shaft for yielding bodily movement toward and from the shaft carrying the driving gears.

8. A can strand coiler having the construction and operation defined in claim 1, together with a cover for the table supported from the table and having the guide eye mounted in the cover.

9. A can strand coiler having the construction and operation defined in claim 1, together with a strand guide located above the table and secured to the frame for guiding the strand to the guide eye.

10. A can strand coiler having the construction and operation defined in claim 4, in which the means for driving the shaft in either direction comprises a main driven horizontal shaft, a bevel gear secured to the vertical shaft, a pair of oppositely disposed bevel gears journaled on the driven shaft engaging the bevel gear on the vertical shaft, and means for clutching either of the bevel gears on the horizontal shaft thereto.

11. In a can strand coiler of that type having a can seat mounted for rotation on a vertical axis, a can supported by said seat and rotatable therewith, a table above the can mounted to rotate on a vertical axis eccentric to the axis of the can seat and can and having an aperture eccentric to its axis for the passage of the strand into the can, the combination of a pair of feed rolls mounted on the table for rotation on parallel horizontal axes with the bite of the feed rolls directly over said aperture, and drive means for the feed rolls acting to rotate the feed rolls in the direction to feed the strand through said aperture with the table either rotating or stationary.

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