The present invention relates to an apparatus for depositing silver in a stationary can or the like, as is done in connection with cards, combining machines, drafting arrangements and the like in printing plants.

Sliver-depositing apparatus for stationary cans are known wherein an eccentric disc is rotatable in a stationary frame. A turn plate is eccentrically received in the eccentric disc and is provided with a channel for guiding silver through the turn plate to the can. The inlet of said channel moves in a circular path around the rotation axis of the eccentric disc which rotation axis coincides with the axis of the can. In the conventional arrangements the calender rollers above the inlet of the sliver channel in the turn plate are either stationary or rotate with the turn plate. If the calender rollers are stationary the silver, because of the considerable diameter of the sliver guide channel, is upset and warped at each revolution of the turn plate, that is, the sliver is subjected to alternating tensile loads or forces and compression loads or forces along its length for each revolution of the turn plate. Rotating the calender rollers avoids this difficulty but require a very complicated drive for the calender rollers, the drive being derived from the turn plate.

Apparatus for depositing silver in cans are known wherein the turn plate rotates eccentrically in an eccentric disc and the calender rollers do not rotate with the turn plate but are centrically, rotatably arranged on the turn plate. The rollers are driven by an extension of a calender roller which extension slidably engages a bevel gear which receives its drive from a shaft which is normal to the axis of the bevel gear. This results in an inverted slider-crank mechanism in a frame whereby the calender rollers are driven at slightly increasing and decreasing speed, causing minor faulty drafts which cannot be permitted.

It is an object of the present invention to provide an apparatus for depositing silver in a stationary can which avoids the aforesaid disadvantages of conventional apparatus. According to the invention a wheel is rotatable in a stationary frame and a turn plate is rotatable in said wheel whereby the rotation axis of the turn plate is parallel with and spaced from the rotation axis of the wheel so that the rotation axis of the turn plate performs a circular movement. A pair of calender rollers and their drive are placed above the abovedescribed wheel and also perform a translatory, circular movement which corresponds to that of the eccentric rotation axis of the turn plate. A further characteristic feature of the apparatus according to the invention resides in the fact that the calender rollers and their drive are placed in a structure which is translatory moved in a circular path by the turn plate. The eccentricity of the turn plate axis relative to the wheel wherein the turn plate is rotatable, is preferably adjustable.

The novel features which are considered characteristic of the invention are set forth with particularity in the appended claims. The invention itself, however, and additional objects and advantages thereof will best be understood from the following description of embodiments thereof when read in connection with the accompanying drawing wherein:

FIG. 1 is a schematic, vertical sectional view through a sliver-depositing apparatus according to the invention; the section is made along line I—I of FIG. 2.

FIG. 2 is a horizontal, sectional view of the apparatus shown in FIG. 1, the section being made along line II—II of FIG. 1.

FIG. 3 is a schematic, perspective illustration, with parts broken away, of a modified silver-depositing apparatus according to the invention.

FIG. 4 is a schematic, perspective part-sectional illustration of a portion of the apparatus shown in FIG. 3.

FIG. 5 is a schematic illustration of the means for driving the calender rollers and turn plates of the apparatus shown in FIG. 3.

Referring more particularly to FIG. 1 of the drawings, numeral 3 designates a wheel having a toothed rim 2 and being rotatable around an axis K—K in a stationary can frame 1. The wheel 3 is provided with a bore 3' whose center is eccentric with respect to the wheel 3 by a distance E. An eccentric bushing 4 which can be turned around its axis EB—EB is positioned within bore 3' and held in the desired angular position relative to the wheel 3 by screws. The top of the bushing 4 is provided with a bore 5' whose center is eccentric relative to the axis EB—EB by a distance e. The bore 5' receives a turn plate 5. The top of the bushing 4 is provided with an annular outer flange 6 which is substantially in the same horizontal plane as the plate 5. The latter is provided with a sliver guide channel 7 and is mounted for rotation in the bore 5' around an axis T—T.

The flange 6 is rotatable in and supports a ring 8 which carries a pair of calender rollers 9, drive means 10, bearing means 11 for the drive shaft 22 of a roller 9 and a cover 12 provided with a sliver supply guide 13. The cover 12 is preferably hinged at 12' to the frame 1. The ring 8 is guided by means of two parallel arms 14 rotatable around stationary pins 15 (FIG. 2). Pins 16 are fast on the ring 8 and movable in slots in the arms 14. The distance R between the pins 15 and 16 corresponds to the radius R of the translatory circular movement of the rotation axis T—T of the turn plate 5 around the axis K—K of the wheel 3. The distance R corresponds to the eccentric position e of the center of rotation of the turn plate 5 which can be adjusted by adjustable rotation of the eccentric bushing 4 in the wheel 3 upon loosening the securing of the screws and is between $R = E + e$ and $R = E - e$. The ring 8 and the parts mounted thereon perform a translatory circular movement with the radius R on the rotating flange 6.

The calender rollers 9 are rotated by a shaft 20 connected to a vertical shaft 17 by means of a double universal joint 18 having a telescoping intermediate member 19. A bevel gear 21 mounted on the shaft 20 drives the shaft 22 through a bevel gear 21'. The shaft 20 also supports a gearwheel 20' driving by means of a toothed belt 20" a toothed rim 25 provided on a sleeve 24 which is rotatable in the frame 1. The teeth of the rim 25 mesh with the gaps between the teeth of the toothed rim 3 of the wheel 3.

The sliver guide 13 on the calender performs a translatory, circular movement and receives the sliver 26 shown by a dash-dot line from a roller pair 27 below the center of the circular path travelled by the sliver guide 13.

The embodiment of the invention shown in FIGS. 3 to 5 comprises two turn plates 28 and 29. There are eccentric bushings 30 and 31 mounted on turn plates 28 and 29, respectively. The bushings 30 and 31 are provided with slots receiving screws 34 (FIG. 4) for fixing the bushings in a desired position for adjusting the relative position of the rotation axes of the
3. The turn plates 28, 29 and of the wheels 32 and 33. The turn plates 28, 29 are rotatable in rings 35, 36, respectively. The rings support a calender roller unit 37 serving both turn plates and a cover 38 which is hinged to the unit 37 and provided with two sliver supply guides 39 of which only one is shown. The rings 35 and 36 are connected by the unit 37 which has two rigidly connected arms 40 and 40' and resembles the letter V. Each arm supports a pair of calender rollers which are placed at the free ends of the arms. The arm 40 is rigidly connected to the ring 36 of the respective turn plate 28 by means of screws 41 and 42. The arm 40' is connected to the ring 35 associated with the second turn plate 29 by means of a releasable articulation 43. The arms 40 and 40' support the drive shafts 44 (FIG. 5) of the respective calender rollers. The shafts 44 are rotated by a double universal joint 45 through a bevel gear 46 driving bevel gears 47 and 48 connected to the shafts 44. The wheel 32 is provided with teeth in mesh with the teeth of a pinion 49 and is rotated thereby. The wheel 33 is driven by the wheel 32 through an intermediate gear 50. A toothed belt 51 whose teeth mesh with teeth 52, 53 on the turn plates 28, 29 and with teeth of a gear 54 driven by the double universal joint 45, rotates the turn plates.

We claim:

1. An apparatus for depositing sliver into stationary cans, comprising:
   a. a stationary frame,
   b. a wheel rotatable in said frame around a stationary axis,
   c. a bushing eccentrically mounted on said wheel and being adjustably fixedly secured thereto for movement therewith,
   d. a turn plate eccentrically and rotatably placed in said bushing and having a rotation axis for moving circularly and translatorily about the axis of said wheel upon rotation of said wheel,
   e. a pair of calender rollers placed above said turn plate coincidently of the axis of said turn plate,
   f. a channel in said turn plate for receiving sliver from said calender rollers and passing the sliver toward a can,
   g. drive means for said calender rollers, and
   h. support means for said drive means and said calender rollers,

   said support means being mounted on said bushing and permitting movement of said calender rollers and drive means in a circular, translatory movement corresponding to the circular, translatory movement of said rotation axis of said turn plate.

2. An apparatus as defined in claim 1, including a drive shaft, and a double universal joint device connecting said drive shaft to said drive means for driving the latter.

3. An apparatus according to claim 2, wherein said means for rotating said turn plate includes means operatively connecting said turn plate to said double universal joint device for driving said turn plate.

4. An apparatus for depositing slivers into stationary cans, comprising:
   a. a stationary frame,
   b. a wheel rotatable in said frame around a stationary axis,
   c. a turn plate eccentrically and rotatably placed in said wheel and having a rotation axis for moving circularly and translatorily about the axis of said wheel upon rotation of said wheel,
   d. means for rotating said wheel and turn plate,
   e. a pair of calender rollers placed above said turn plate, a channel in said turn plate for receiving sliver from said calender rollers and passing the sliver toward a can,
   f. drive means for said calender rollers, and
   g. support means for said drive means and said calender rollers,

   means operatively connecting said support means to said turn plate for circular, translatory movement of said support means corresponding to the circular, translatory movement of said rotation axis of said turn plate, and

   rotatable means interposed between said turn plate and said wheel for adjusting the eccentricity of the rotation axis of said turn plate relative to the rotation axis of said wheel, said rotatable means being adjustably fixedly secured to said wheel for movement therewith.

5. An apparatus for depositing slivers into stationary cans, comprising:
   a. a stationary frame,
   b. a turn plate eccentrically and rotatably placed in said wheel and having a rotation axis for moving circularly and translatorily about the axis of said wheel upon rotation of said wheel,
   c. a pair of calender rollers placed above said turn plate, a channel in said turn plate for receiving sliver from said calender rollers and passing the sliver toward a can,
   d. drive means for said calender rollers,
   e. support means for said drive means and said calender rollers,

   said support means being operatively connected to said turn plate permitting movement of said calender rollers in a circular, translatory movement corresponding to the circular, translatory movement of said rotation axis of said turn plate, and

   a drive shaft, a double universal joint device connecting said drive shaft to said drive means for driving the latter, a gearwheel being mounted on said driven element, said turn plate including a toothed rim, and a toothed belt extending around said gearwheel and said toothed rim for driving said turn plate.

6. An apparatus for depositing slivers into stationary cans, comprising:
   a. a stationary frame,
   b. a wheel rotatable in said frame around a stationary axis,
   c. a bushing eccentrically fixedly mounted in adjustable relation in said wheel for movement therewith,
   d. a turn plate eccentrically and rotatably placed in said bushing and having a rotation axis for moving circularly and translatorily about the axis of said wheel upon rotation of said wheel,
   e. a pair of calender rollers placed above said turn plate coincidently of the axis of said turn plate,
   f. a channel in said turn plate for receiving sliver from said calender rollers and passing the sliver toward a can,
   g. drive means for said calender rollers, and
   h. guide means for guiding the sliver to said calender rollers,

   said support means being mounted on said bushing and permitting movement of said calender rollers and drive means in a circular, translatory movement corresponding to the circular, translatory movement of said rotation axis of said turn plate.

7. An apparatus for depositing slivers into stationary cans, comprising:
   a. a stationary frame,
   b. a plurality of wheels rotatably supported by said frame for rotation around stationary axes,
   c. a bushing eccentrically fixedly mounted in each of said wheels in adjustable relation for movement therewith,
a turn plate eccentrically and rotatably placed in each of said bushings, each turn plate having a rotation axis for moving circularly and translatorily about the axis of the corresponding wheel upon rotation of said wheels,
means for rotating said wheels and turn plates, a pair of calender rollers placed above each turn plate coincidently of the axis of each said turn plate, a channel in each turn plate for receiving sliver from the respective calender rollers and passing the sliver through the respective turn plate, drive means for said calender rollers, and support means for said drive means and said calender rollers,
said support means being operatively connected to said turn plates permitting movement of said calender rollers and drive means in a circular, translatory movement corresponding to the circular, translatory movement of said rotation axes of said turn plates.

8. An apparatus for depositing slivers into stationary cans, comprising:
a stationary frame,
a plurality of wheels rotatably supported by said frame for rotation around stationary axes, a turn plate eccentrically and rotatably placed in each of said wheels, each turn plate having a rotation axis for moving circularly and translatorily about the axis of the corresponding wheel upon rotation of said wheels,
means for rotating said wheels, a pair of calender rollers placed above each turn plate, a channel in each turn plate for receiving sliver from the respective calender rollers and passing the sliver through the respective turn plate, drive means for said calender rollers, support means for said drive means and said calender rollers, and means individually operatively connected to each of said turn plates for movement thereby, said support means being connected to said last mentioned means permitting movement of said calender rollers in a circular, translatory movement of said support means corresponding to the circular, translatory movement of said rotation axes of said turn plates.

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