TEXTILE SLIVER CAN CHANGING AND STORAGE APPARATUS

ABSTRACT OF THE DISCLOSURE

Can changing apparatus for a high speed drawing frame having a series of drafting rolls and a coiler in lineal arrangement providing a can filling station. A full can storage station is positioned in lineal arrangement in front of the drafting rolls and coiler. It is spaced from the can filling station by an operator access platform in the form of a horizontal track. A full can is indexed by engagement with its bottom rim. The plate has a suitable switch for sensing the presence of any weight on the plate, so that a full can will not be doffed while an operator is standing on the platform as during drafting roll or coiler servicing. An empty can ready station is positioned beside filling stations and one or more empty can storage stations are provided in lineal arrangement parallel to that of the drafting rolls and full can storage stations, producing a U-shaped path of can travel with the filling and ready stations at the base of the U and the empty and full can storage stations at its ends. Can doffing and donning devices are provided together with suitable controls for operation of the apparatus, which are integrated with the operation of the drawing rolls and coiler by a yardage counter which senses a predetermined quantity of sliver delivered to a can at the filling station and actuates the controls at appropriate intervals as well as arresting the delivery of sliver and severing it so that the coiling operation can commence in each new can with a fresh end of sliver. After the can changing apparatus completes its operation, its controls restart the drawing rolls and coiler.

This invention relates to textile processing apparatus and more particularly to a novel can storage and changing apparatus for moving to and from a can filling station a succession of cans for filling with coiled sliver from a coiler such as is used at the delivery end of a textile sliver drawing frame of the like.

In modern high capacity textile fiber processing systems of the type employing several cards to produce a composite sliver for feeding directly to a single delivery drawing frame, as are shown in U.S. Patent No. 3,134,144, May 26, 1964, and U.S. Patent No. 3,268,953, August 30, 1966, for example the drawing frame must operate to process the sliver at speeds of 1500 feet per minute or even higher, measured at its delivery rolls. At such high outputs, the collection and storage of the produced sliver in coiled form in cans raises a number of problems, particularly since it is most desirable to avoid, to the greatest degree possible, a stoppage of the cards with the resulting deleterious effect on the sliver, for reasons explained in said patent and application. Thus, it is most important that any stoppage of the fiber delivery rolls during changing of a full can to an empty can can be short enough so that the cards may continue to operate during the can doffing cycle, and so that the practical problems in storing any substantial amount of the sliver being produced by the cards while the delivery rolls are stopped be avoided.

Another problem in systems of this type arises by reason of the high rate at which cans must be supplied to and removed from the coiler, by reason of the high rate of speed at which the sliver is delivered to the cans. To some extent, this problem is met by increasing can size, but this in turn makes more difficult the handling of full cans. And even with large cans, the filling of a can by a high speed drawing frame requires but 15 to 20 minutes, so that an uneconomical amount of operator utilization has been necessary with heretofore known changing mechanisms.

Still another problem with such machines has to do with the difficulty of operator access to the drafting and coiler elements at the output end thereof in which it has heretofore been necessary for the operator first to move one or more full cans and to interfere, as well, with the drafting function of the frame for the amount of time, such that the cards almost inevitably stop with the resulting deleterious effect on the sliver.

Accordingly, it is a major object of the present invention to provide novel can changing apparatus capable of dealing with the problems of changing cans at the output of a high speed drawing frame fed by a multiple card system without the necessity of stopping the cards during the can changing cycle and also capable of reducing the amount of operator attention required in its operation.

It is another major object of the invention to provide safe and convenient operator access to the drafting rolls and coiler directly from the delivery end thereof, so that necessary service functions such as cleaning of jams and break-ups may be quickly and easily accomplished to reduce down time to a minimum and yet with complete operator safety and without the necessity of manually moving full cans in order to achieve such access.

These and other objects of the invention are accomplished by providing a novel can changing apparatus having a plurality of can stations, not only including a can filling station and an empty can ready station, but also a reservoir for empty cans and storage for full cans, together with a control means therefor providing fully automatic operation with a minimum degree of operator supervision. In case the latter be required, the apparatus of the invention also includes novel operator access means preferably having safety means which controls the machine to prevent operator injury, while at the same time improving the access to the apparatus for minimum down time during necessary servicing operations.

Somewhat more specifically as to its station arrangement and controls, the invention provides, in a drawing frame or the like having a series of drafting rolls including a pair of delivery rolls and a coiler in lineal arrangement providing a can filling station, a novel can changing apparatus including a full can storage station position in lineal arrangement in front of the drafting rolls and coiler with full can sensing means for sensing the presence of a full can; an empty can ready station beside the filling station with ready can sensing means for sensing the absence of a full can; and an empty can storage station preferably in a lineal arrangement parallel to and transversely spaced from the lineal arrangement of the drafting rolls and full can storage station providing a U-shaped path of can travel with the filling and ready stations at the base of the U and the empty and full can storage stations at its ends.
For moving the full cans from the filling station, full can doffing means is provided, such having a retracted position and being responsive to suitable sensing means associated with the full can sensing means for moving to an advanced position to doff a full can from said filling station and preferably having associated therewith sensing means responsive to the advance of said full can doffing means to its advanced position followed by the retraction of said full can doffing means to its retracted position.

For moving an empty can from the ready station to the filling station across the base of the U, can doffing means is provided, such having a retracted position and being responsive to appropriate sensing means such as the can doffing means sensing means to draw an empty can from said ready station to said filling station. Can doffing means sensing means responsive to the retracted position of said can doffing means may be provided.

For moving empty cans to the ready station, conveying means are provided responsive to the ready can sensing means in the absence of a ready can at said ready station and preferably responsive to the can doffing sensing means if present.

In order that a can changing control system integrated with the drawing roll and coiler is provided so that these elements may be stopped or at least slowed down during the manually preferable retraction quantity sensing means such as a yardage counter is provided for sensing a predetermined quantity of sliver delivered to a can at said filling station, as well as means such as a clutch responsive to said sliver quantity sensing means for arresting the delivery of sliver from the sliver delivery rolls and means preferably responsive to a position of a can changing element for restarting the delivery rolls.

Preferably, too, means are provided responsive to the sliver quantity sensing means for severing sliver beyond said delivery rolls, so that the coiling operation can begin in each new can with a fresh end of sliver.

The invention meets the problem of access to the drafting elements and coiler at the delivery end thereof in a novel manner by spacing the full can storage station in lineal arrangement with the drafting elements and coiler a distance from the can filling station sufficient to provide an operator access station, such access station having thereat a horizontal plate member providing a firm footing for an operator, while permitting movement of a full can therefrom to the filling station to the full can output station, the dopped filled can thereon being advanced to the full can storage position by novel means engaging its bottom leading edge lower rim. Preferably the plate member has plate sensing means associated therewith for sensing the absence of a predetermined weight thereon, positively to prevent movement of a can from the filling station while an operator, or for that matter a full can, is on said plate member, as well as means preventing the movement of a full can to the full can storage position when the latter is already occupied.

For the purpose of explaining the various objects and features of the invention, reference is now made to the following detailed description of a preferred embodiment thereof, together with the accompanying drawings, wherein:

FIG. 1 is a plan view of the preferred embodiment of the can changing apparatus of the invention;
FIG. 2 is a side elevation, partly in section and partly broken away, of the apparatus of FIG. 1;
FIG. 3 is an end section of the apparatus of FIG. 1, taken on the line 3-3 thereof;
FIG. 4 is a side section of a portion of the apparatus of FIG. 1, taken on the line 4-4 thereof;
FIG. 5 is a cross section of the portion of the apparatus shown in FIG. 4, taken on the line 5-5 thereof;
FIG. 6 is a sectional side view of a coiler head including a severing device controlled by the operating and control means of the apparatus of the invention;
FIGS. 7 and 8 are, respectively, top and side sectional views showing the operation of the severing device of FIG. 6, and FIG. 9 is an electrical circuit diagram of the apparatus of FIG. 1.

Referring to the drawings, in FIG. 1 is shown a plan view of the apparatus of the invention wherein may be seen all of the can stations as well as the major mechanical and control elements therefor. Thus, in such apparatus, the cans C, indicated by circles, are automatically moved along a generally U-shaped path from an empty can storage station at positions R' and R" to an empty can ready station E, thence to a can filling station F, and, after being filled, through an operator access station A to a full can storage station S, from which latter station they may be removed manually or by suitable conveying means (not shown).

For accomplishing such movement, the apparatus is provided with a frame having side walls 10 and 12, and wall 11 and base 13. At the lower portion of the frame is mounted the manually preferable retraction and controls, and at the top of the frame (FIGS. 1 and 2) is mounted a sliver cutter and coiler generally designated 15 (FIGS. 6-8), a drafting element generally designated 14 having delivery rolls 16, 17 and certain control elements including clutch element 18 driven by main shaft 19, predetermined yardage counter and mechanical doff switch 166, as hereinbefore more fully described.

Along one sidewall 19 of the frame extending for the length thereof and about half the width the frame throughout the empty can supply station at positions R' and R" and ready station E are provided a series of rollers 20 rotate about transversely extending axes and driven by a suitable chain and sprocket drive 22 through a common one way clutch 24 by reversible motor 25. A stop member 26a, in the form of a vertically and transversely extending plate 30, is adjustably mounted adjacent end wall 11 on frame base 13 by slotted brackets 32 for movement toward and away from the final roller 22a of the series thereof in order to establish the position of a can in the empty can ready station E. A normally open ready can switch 34 is mounted on plate 30 for activation by the presence of a can in the empty can ready station E. The ready station E, also adjacent end wall 11, is mounted in a position transversely spaced from rollers 20 near the other side wall 12 of the frame a can turntable 40, such being driven from the collet 15 in a conventional manner by a chain and sprocket drive 42 and vertical shaft 44.

The novel operator access station of the invention is provided by a horizontal stand plate member 50 positioned linearly outwardly beyond turntable 40 and the overlying drafting element 14 and coiler 15 on the same side 12 of the frame and spaced from turntable 40. Horizontal stand plate member 50 is pivotally mounted about a transverse axis 52 at its side remote from turntable 40 for limited pivoted movement, generally in a horizontal plane, from a normal upward position maintained by spring 54 to a lowered position in contact with normally closed can sensing switch 56. Said switch is operated by the placing of any substantial predetermined weight on plate 50, whether it be an operator standing thereon for easy access to the coiler and drafting elements, or a full can in temporary storage thereon, as hereinafter explained in some detail.

A pair of pivoted swing arms are provided for moving a can to and from the can filling station F as shown in FIG. 9. Thus, dog arm 62 is mounted for swinging movement about the axis of its shaft 63, said shaft being mounted in the end wall 11 of the main frame with its axis extending longitudinally of the frame toward empty can storage positions R' and R", so that its free end carrying can pusher roller 64 normally lies in its retracted position along said wall 10 out of contact with a can. Arm 62 is actuated by air cylinder 65 through arm 66 on shaft 63, and the retracted and advanced positions of said arm are
sensed, respectively, by retracted position switch 67 and advanced position switch 68 mounted on end wall 11. Doff arm 72 is similarly mounted on side wall 12 for swinging movement about the axis of its shaft 75; said axis extending transversely of the main frame so that its roller 74 moves from its retracted position along rear wall 11 to its advanced position when activated by air cylinder 78 through arm 77. For sensing the movement of doff arm 72, a retract position switch 77 and advanced position switch 78 are provided mounted on side wall 12.

For supporting a can for movement from doffed position A on stand plate 50 and establishing a full can storage station 5, a series of divided supporting rollers 82 and 83 are provided mounted on frame side wall 12 and base 13, such being idler rollers, with one thereof, roll 81, being normally maintained in a raised position by sensing switch 82 for detecting the absence of a can at output station 5. The terminal roller 83 is preferably somewhat raised to maintain a can at station 5 until manually removed by an operator.

A chain and sprocket drive 84 carrying a pivoted lug 86 cooperating with a generally horizontal cam plate 87 is provided for moving a full can from its doffed position A on stand plate 50 by engagement by said lug with its leading edge lower rim 90. Lug 86, being pivoted adjacent its forward end on endless chain 84, cooperates with cam plate 87 which extends for nearly the entire upper flight of the chain to swing the lug in a clockwise direction (FIG. 4) upwardly upon advancing movement of the upper flight of the chain to engage the inner surface of the leading edge lower rim 90 of a can and move it (86a) toward full can supply station 5. When the lug (86a) reaches the end of its can plate, it will then be rotated in a counterclockwise direction as it continues to be advanced by the chain dropping downwardly out of engagement with the can rim at 91 for return movement along the lower flight of the chain. Chain and sprocket drive 84 is driven by motor 25 through one way clutch 26 by another chain and sprocket drive 28 and cross shaft 88, and a lug actuating switch 85 is provided adjacent the input end of the lower flight of the chain for engagement by lug 86.

The colling and severing apparatus 15 (FIGS. 6–8) per se forms no part of the present invention except by reason of its control by elements of the present invention. In general, it includes in addition to a drafting element 14' having a pair of delivery rolls 16, 17 with their drive element 18, main driving shaft 19 and control element 185 supported on end frame wall 11, a conventional collar 99 overlying a rotatable plate 91 carrying an inclined tube 92 rotatable on a vertical axis on suitable bearings.

In the construction as shown in FIGS. 6–8, collar head 90 is provided with a vertically disposed bore 93 located directly in the middle of the inclined rotatable coiler tube 92.

At the lower end of bore 93 above the upper end of inclined tube 92 are mounted the elements of the silver severing device which includes a comb 94, which is secured to drive indirectly projecting flange of the collar head 90 to extend transversely adjacent one edge and immediately above the inlet opening of the inclined tube 92 and a hook 95 which is arranged to swing laterally in a horizontal plane immediately beneath the lower end of the bore 93 and above the comb 94. Hook 95 comprises a wire member 96 having a downward extension which is fitted into a bearing on the collar head and provides a pivot support 97 about which the hook swings. A segmental gear 98 secured to the pivoting portion of the hook 95 is arranged for engagement with a rack 98 slidably supported in the collar head for movement by an air cylinder 99.

The hook is adapted to be swung across the inlet opening in the upper end of the inclined tube 92 and over the comb 94 to engage and to disrupt the sliver by means of operating connections which include an electrically operated air valve 100 for cylinder 99, the hook normally being maintained in the retracted inoperative position shown in FIG. 7 and being moved to the sliver severing position (FIG. 8) by actuation of cylinder 99.

An electrical drive and control system is provided for the apparatus of the invention as shown in FIG. 9 of the drawings, only those connections being shown which are believed necessary for a full understanding of the present invention, with relays and their contacts being similarly numbered with further individual identifying reference numerals. The drafting element and coiler drive is shown in the drawings of FIGS. 1–5 and is similar in general to an earlier design shown in U.S. Pat. No. 2,255,651.

The operation of the delivery rolls and coiler being controlled therefrom by a clutch 18 which is operated to start and stop the same as required in the operation of the apparatus of the present invention.

As shown in FIG. 9, the various electrical elements are shown connected between two circuit lines 102 and 104. The energizing elements for the can changing cycle include the normally open predetermined yardage counter switch 105. Such contacts are well known to those skilled in the art and need not be herein further described except as to their function of mechanically and momentarily contacting a switch connected upon reaching a predetermined yardage of sliver fed between a pair of rolls, as determined by the number of revolutions of said rolls. With such arrangement there need be no provision for resetting, although such can be included if desired. As herein shown, the yardage counter is driven with drafting element delivery rolls 16 and 17. The contacts 105 are provided with a parallel normally open momentary switch 106 for manual initiation of the can changing cycle and are in series with normally closed empty can limit switch contacts 110–1 and can changing timer relay coil 108. The drafting element clutch 18 is in series with normally open time delay can changing timer relay contacts 108–1. The roller cutter cylinder valve 100 and the full doff cylinder 75 have their operation initiated by full can doffing relay coil 108, being in series with its normally open time delayed contacts 108–2, contacts 109–1 of empty can doffing relay coil 109 and the normally closed contacts of stand plate switch 56. Said full coil is connected in series with normally open limit switch contacts 78 indicating that doff arm 72 has moved to its advanced position.

The empty can cylinder 65 has its operation initiated by limit switch 77 indicating that doffing arm 72 has returned to its retracted position, switched with the normally open contacts 109–2 of full can doffing relay 109 and with the normally closed limit switch 85 and full can absent switch 82 and its reverse terminals 25–2 for disengaging the empty can ready station contacts 34–1 of switch 34.

In operation of the apparatus, the empty can conveyor rolls 20, in the absence of a can at empty ready station E, move cans from empty can storage positions R' and R" to the ready position E, such being accomplished if dot arm switch 67 senses the dot arm in its retracted position and senses the absence of a can in contact with empty can ready switch 34. When an empty can reaches the ready station E, it activates ready switch 34, opening contacts 34–1 to cut off the current to motor 25, causing the conveyor rolls 20 to stop. Should the empty can at ready station E move away from the switch 34, the conveyor rolls 20 are automatically caused to start up again to properly reposition the such can. Thus an empty can is always in the ready position when needed if at least
one can is present at storage positions $R'$ or $R''$. Should no can be present at such positions normally open contacts 34–2 of underpressed switch 54 in series with coil cylinder 9 energizes the don arm cylinder through its contact 110–2 so that the don arm begins to return to its retracted position. The relay 110 also de-energizes the relay operated timer 109 through contact 110–1 which through contact 102–1, engages clutch 118 and restarts the draft ing element delivery rolls 16, 17 and the coiler. Relay 110 also de-energizes the full can doffed relay 109 through contact 110–3.

When the don arm 62 completes its retraction, limit switch 67 signals the return of this arm to its retracted position, so that the positioning of a can at ready station $E$ can again take place as described above.

In view of the above description, it will be appreciated that, in addition to a novel element arrangement and control system, the invention also makes unique provision for operator access directly to the front of the drafting rolls and the coiler by providing an access station in lineal arrangement therewith in the path of drafting movement therewith for access by an operator while a can is positioned in the filling station and in the storage station, without interfering with machine operation except at the actual time of doffing of a full can and without the necessity of moving a full can for such access during normal operation of the apparatus. Only the actual doffing of a can is prevented by the presence of an operator at the access station.

For operator safety and conveniences and as an aid to rapid service, the machine elements, the access station is preferably provided with a smooth, unobstructed horizontal surface of plate member 50 extending for the entire width of the delivery half side of the apparatus to provide a firm and safe footing for an operator, while permitting movement of a full can theretofrom the filling station $F$ to the full can storage station $S$, safety switch 56 being associated therewith positively to prevent doffing of a full can from the filling station $F$ while an operator, or for that matter a full can, is on said plate member. So that the plate member may have a surface without projections, the doffed filled can thereon is advanced therefrom to the full can storage position $S$ by the lug 86 engaging its leading edge lower rim 91, such being operable only when a can is not present at the full can storage position so that a second full can may be stored on the plate member at the operator access station $E$ without interfering with the filling of a can at the filling station, although the latter situation is not intended as a usual occurrence, since it interferes with the use of the access station by an operator. However, with a full can on the access plate, as soon as the can positioned at the full can storage station is removed, the apparatus will automatically function to activate lug 86 to advance the can on access plate 50 to the storage station $S$, once again making the access plate available to the operator. With the apparatus shown herein, then, nearly three cans may be filled before one need be removed, and additional full can storage positions, or completely automated can handling, could readily be provided utilizing the techniques of the present invention, so that machine cycle interference may be virtually eliminated as a cause of stoppage, resulting not only in unusually high operating efficiency but also minimizing the operator's attention required.

Thus it will be seen that the invention provides novel can changing apparatus having the various aspects enumerated above. Modifications may be made by those skilled in the art within the spirit of the invention and the scope of the appended claims.

What is claimed is:

1. A can filling apparatus having a can filling station, a full can storage station, a coiler, means providing a generally horizontal surface closely adjacent said can filling station and between said filling station and said storage station for access by
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an operator to said can filling station while a full can
is positioned at said can storage station,
means for moving a full can from said can filling station
to said full can storage station, and
selective control means for operation by an operator,
said means for moving said full can from said filling station
being responsive to said selective control means to prevent said movement.

2. A can doffing apparatus as claimed in claim 1
wherein
said selective control means includes sensing means re-
sponsive to a weight on said horizontal surface means,

3. A can doffing apparatus having
a can filling station,
a full can storage station linearly spaced from said can
filling station,
means providing a generally horizontal surface closely
adjacent said can filling station and between said filling
station and said storage station for access by an
operator to said can filling station while a full can is
positioned at said can storage station, and
means for moving a full can from said filling station
in a linear direction from said filling station to said
full can storage station including sensing means re-
sponsive to a weight on said horizontal surface means,
said means for moving said full can from said filling station
being responsive to said sensing means to pre-
vent said movement,

4. In a draw frame or the like having a series of draft-
ing rolls and a can coiler providing a can filling station,
can doffing apparatus including:
a full can storage station positioned in linear arrange-
ment with said drafting rolls and coiler in front there-
of and spaced from said can filling station,
horizontal plate means providing a generally hori-
zontal surface positioned closely adjacent said can
filling station between said filling station and said
storage station for access by an operator to the front
of said drafting rolls and coiler while a can is posi-
tioned in each of said filling station and said full can
storage station,
means for moving a full can from said can filling sta-
tion to said full can storage station including pushing means for
moving said full can to said horizontal plate means
toward said full can storage station, and
selective control means for operation by an operator,
said means for moving a can from said can filling sta-
tion being responsive to said selective control means
to prevent operation of said pusher means.

5. In a draw frame as claimed in claim 4
wherein
said means for moving a full can includes means in-
dependent of said pusher means for moving a can
from said horizontal plate means toward said full can
storage station.

6. In a draw frame or the like having a series of draft-
ing rolls and a can coiler providing a can filling station,
can doffing apparatus including:
a full can storage station positioned in linear arrange-
ment with said drafting rolls and coiler in front there-
of of and spaced from said can filling station,
horizontal plate means providing a generally horizontal
surface positioned closely adjacent said filling station
between said filling station and said storage station
for access by an operator to the front of said
drafting rolls and coiler while a can is positioned
in each of said filling station and said full can storage
station, said plate means including sensing means re-
sponsive to a predetermined weight on said plate
means,
means for moving a can from said can filling station
to said full can storage station including pusher means.

for moving said can to said horizontal plate means in-
cluding means effective to prevent operation of said
pusher means while a said predetermined weight re-
mains on said plate means, and means engaging the
lower rim edge of said can for moving said can from
said horizontal plate means toward said full can stor-
age station.

7. Can doffing apparatus as claimed in claim 6 further
including means responsive to the absence of a
Can at said full can storage station and said means engag-
ing said rim includes means effective to operate said latter
means only in the absence of a can at said full can stor-
age station.

8. Can doffing apparatus as claimed in claim 7 wherein
said means engaging said rim includes endless conveyor
means extending linearly away from an edge of said plate
means toward said full can storage station and log means
carried by said endless conveyor means effective to engage
said lower rim edge of a can advanced beyond said edge.

9. In a draw frame or the like having a series of draft-
ing rolls and a can coiler in linear arrangement providing a
can filling station,
can changing apparatus including
an empty can ready station positioned transversely of
said can filling station relatively to the linear ar-
rangement of said rolls, can danna means having a re-
tracted position at a side of said empty can ready
station remote from said can filling station,
can danna means sensing means for sensing the re-
tracted position of said can danna means,
ready can sensing means for sensing the absence of a
can at said ready station, and
empty can conveying means for moving an empty can
from an empty can storage position remote from said
ready station, said can conveying means being simulta-
neous responsive to said can danna means sensing
means and said ready can sensing means to move
a can from said empty can storage position to said
ready station when a can is absent from said ready
can station and said can danna means is in its re-
tracted position.

10. Can changing apparatus as claimed in claim 9
wherein
said empty can conveying apparatus extends
along a line parallel to the linear arrangement of said
drafting rolls.

11. In a draw frame or the like having a series of draft-
ing rolls including a pair of delivery rolls and a coiler pro-
viding a can filling station,
can changing apparatus including,
a full can storage station;
a full can sensing means for sensing the absence of a
can at said full can storage station;
an empty can ready station;
ready can sensing means for sensing the absence of a
can at said ready station;
can danna means movable between a retracted posi-
tion and an advanced position to doff a full can from
said filling station toward said full can storage sta-
tion;
can danna means having a retracted position and re-
sponsive to movement of said can danna means to
don an empty can from said ready station to said
filling station, and
empty can conveying means responsive to said ready
can sensing means for moving an empty can to said
ready station from an empty can storage station.

12. In a draw frame or the like having a series of
drafting rolls including a pair of delivery rolls and a coiler
providing a can filling station,
can changing apparatus including:
sliver quantity sensing means for sensing a predeter-
mimed quantity of sliver delivered to a can at said
filling station;
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means responsive to said sliver quantity sensing means for arresting said delivery rolls; a full can storage station; a full can sensing means for sensing the absence of a full can at said full can storage station; an empty can ready station; ready can sensing means for sensing the absence of a can at said ready station; can doffing means having a retracted position and responsive to said sliver quantity sensing means for moving to an advanced position to doff a full can from said filling station toward said full can storage station; can donning means having a retracted position and responsive to movement of said can doping means to don an empty can from said ready station to said filling station; empty can conveying means responsive to said ready can sensing means for moving an empty can to said ready station from an empty can storage station, and means for starting said delivery rolls to deliver sliver to the changed can at said filling station.

13. In a draw frame or the like having a series of drafting rolls including a pair of delivery rolls and a coiler in lineal arrangement providing a can filling station, can changing apparatus including: sliver quantity sensing means for sensing a predetermined quantity of sliver delivered to a can at said filling station; means responsive to said sliver quantity sensing means for arresting said delivery rolls; means responsive to said sliver quantity sensing means for severing sliver beyond said delivery rolls; a full can storage station; a full can sensing means for sensing the absence of a full can at said full can storage station; an empty can ready station; ready can sensing means for sensing the absence of a can at said ready station; can doffing means having a retracted position and responsive to said sliver quantity sensing means for moving to an advanced position to doff a full can from said filling station toward said full can storage station; can doffing means sensing means responsive to the advance of said can doffing means to its advanced position followed by the retraction of said can doffing means to its retracted position; can donning means having a retracted position and responsive to said can doffing means sensing means to don an empty can from said ready station to said filling station; empty can conveying means responsive to said ready can sensing means for moving an empty can to said ready station from an empty can storage station, and means for starting said delivery rolls to deliver sliver to the changed can at said filling station.

14. Can changing apparatus as claimed in claim 13, further including means for sensing the retracted position of said can donning means and wherein said means for starting said delivery rolls is responsive thereeto.

15. Can changing apparatus as claimed in claim 14, wherein said empty can conveying means is further responsive to said means for sensing the retracted position of said can doffing means.

16. In a draw frame or the like having a series of drafting rolls including a pair of delivery rolls and a coiler in lineal arrangement providing a can filling station, can changing apparatus including:
a full can storage station positioned in lineal arrangement with said drafting rolls and coiler in front thereof and spaced from said can filling station; full can sensing means for sensing the absence of a full can at said full can storage station; horizontal plate means providing a generally horizontal surface positioned between said filling station and said full can storage station for access by an operator to the front of said drafting rolls and coiler while a can is positioned in each of said filling station and said full can storage station; an empty can ready station; ready can sensing means for sensing the absence of a can at said ready station; full can doffing means having a retracted position and responsive to said sliver quantity sensing means for moving to an advanced position to doff a full can from said filling station to said plate means; can doffing means sensing means responsive to the advance of a full can to an advanced position; full can advancing means responsive to said full can sensing means for moving a full can from said plate means to said full can storage position in the absence of a can thereat; can doffing means having a retracted position and responsive to said said can doffing means sensing means to don an empty can from said ready station to said filling station, and empty can conveying means responsive to said ready can sensing means in the absence of a ready can at said ready station for moving an empty can to said ready station from an empty can storage station remote from said ready station.

17. Can changing apparatus as claimed in claim 16 further including:
plate sensing means sensing the absence of a predetermined weight on said plate means, wherein said full can doffing means is responsive to said plate sensing means to doff said can in the absence of said predetermined weight on said plate means.

18. In a draw frame or the like having a series of drafting rolls including a pair of delivery rolls and a coiler in lineal arrangement providing a can filling station, can changing apparatus including:
sliver quantity sensing means for sensing a predetermined quantity of sliver delivered to a can at said filling station; means responsive to said sliver quantity sensing means for arresting the delivery of sliver from said sliver delivery rolls; a full can storage station positioned in lineal arrangement with said drafting rolls and coiler in front thereof and spaced from said can filling station; full can sensing means for sensing the absence of a full can at said full can storage station; horizontal plate means providing a generally horizontal surface positioned between said filling station and said full can storage station for access by an operator to the front of said drafting rolls and coiler while a can is positioned in each of said filling station and said full can storage station; plate sensing means sensing the absence of a predetermined weight on said plate means; an empty can ready station; ready can sensing means for sensing the absence of a can at said ready station; full can doffing means having a retracted position and responsive to said sliver quantity sensing means and said plate sensing means for moving to an advanced position to doff a full can from said filling station to said plate means in the absence of said predetermined weight on said plate means; can doffing means sensing means responsive to the advance of a full can to an advanced position; full can advancing means responsive to said full can sensing means for moving a full can from said plate means to said full can storage position in the absence of a can thereat; can doffing means having a retracted position and responsive to said can doffing means sensing means to don an empty can from said ready station to said filling station, and empty can conveying means responsive to said ready can sensing means in the absence of a ready can at said ready station for moving an empty can to said ready station from an empty can storage station remote from said ready station.

19. Can changing apparatus as claimed in claim 18 further including:
plate sensing means sensing the absence of a predetermined weight on said plate means, wherein said full can doffing means is responsive to said plate sensing means to doff said can in the absence of said predetermined weight on said plate means.

20. In a draw frame or the like having a series of drafting rolls including a pair of delivery rolls and a coiler in lineal arrangement providing a can filling station, can changing apparatus including:
sliver quantity sensing means for sensing a predetermined quantity of sliver delivered to a can at said filling station; means responsive to said sliver quantity sensing means for arresting the delivery of sliver from said sliver delivery rolls; a full can storage station positioned in lineal arrangement with said drafting rolls and coiler in front thereof and spaced from said can filling station; full can sensing means for sensing the absence of a full can at said full can storage station; horizontal plate means providing a generally horizontal surface positioned between said filling station and said full can storage station for access by an operator to the front of said drafting rolls and coiler while a can is positioned in each of said filling station and said full can storage station; plate sensing means sensing the absence of a predetermined weight on said plate means; an empty can ready station; ready can sensing means for sensing the absence of a can at said ready station; full can doffing means having a retracted position and responsive to said sliver quantity sensing means and said plate sensing means for moving to an advanced position to doff a full can from said filling station to said plate means in the absence of said predetermined weight on said plate means; can doffing means sensing means responsive to the advance of a full can to an advanced position; full can advancing means responsive to said full can sensing means for moving a full can from said plate means to said full can storage position in the absence of a can thereat; can doffing means having a retracted position and responsive to said can doffing means sensing means to don an empty can from said ready station to said filling station, and empty can conveying means responsive to said ready can sensing means in the absence of a ready can at said ready station for moving an empty can to said ready station from an empty can storage station remote from said ready station.
don an empty can from said ready station to said filling station;
empty can conveying means responsive to said ready can sensing means in the absence of a ready can at said ready station for moving an empty can to said ready station from an empty can storage station remote from said ready station, and delivery roll starting means for starting said delivery rolls to deliver sliver to the changed can at said filling station.

19. A can changing apparatus as claimed in claim 18, further including can donning means sensing means responsive to the retracted position of said can donning means; said empty can conveying means further being responsive to said can donning means sensing means in the retracted position of said can donning means and said delivery roll starting means being responsive to a position of said can donning means.

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ROBERT R. MACKEY, Acting Primary Examiner.

I. C. WADDEY, Assistant Examiner.