

April 1, 1969

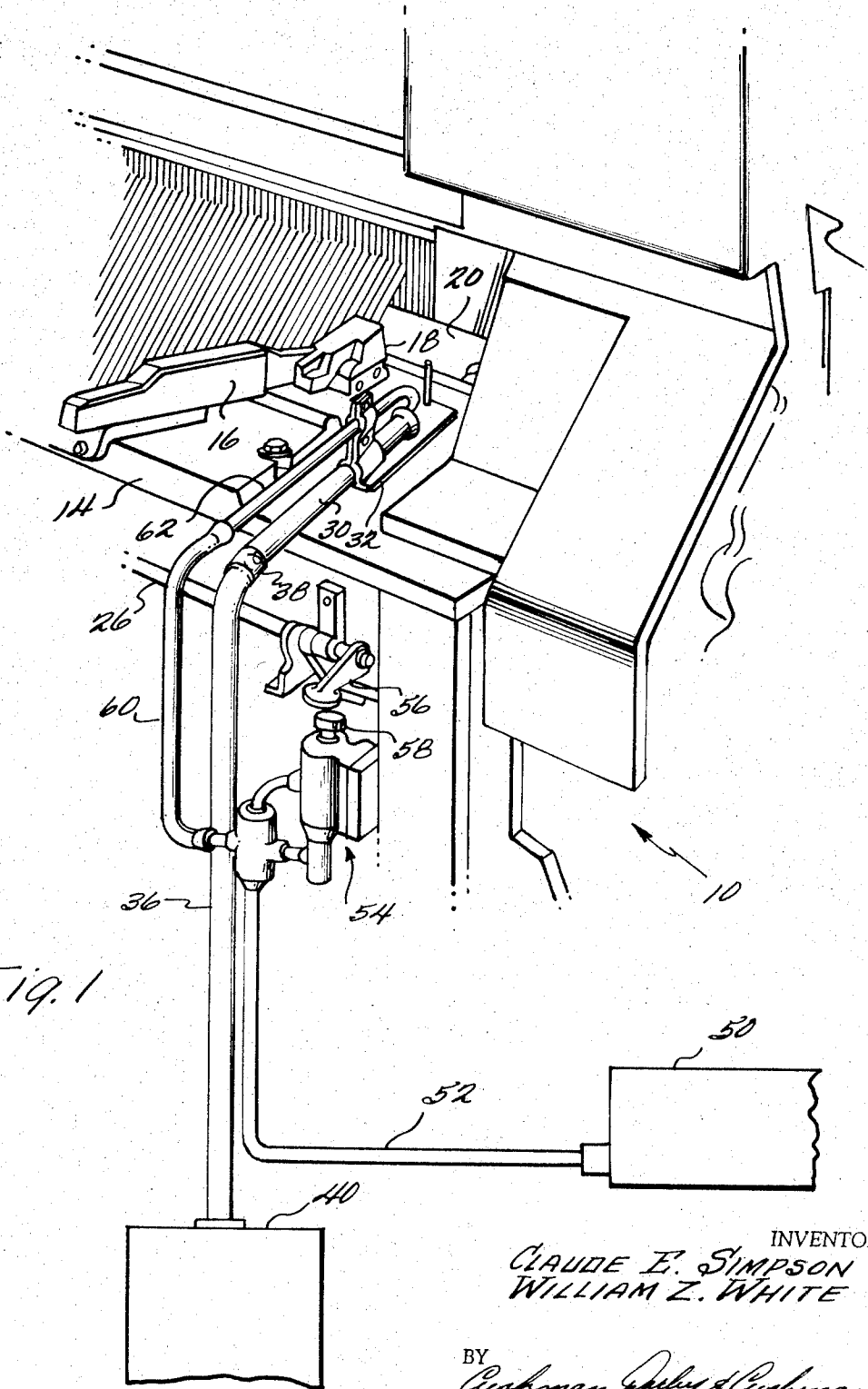
C. E. SIMPSON ET AL

3,435,856

FILLING TAIL REMOVAL EQUIPMENT

Filed Sept. 5, 1967

Sheet 1 of 3



INVENTORS  
CLAUDE E. SIMPSON  
WILLIAM Z. WHITE

BY  
*Cushman, Kelly & Cushman*  
ATTORNEYS







**April 1, 1969**

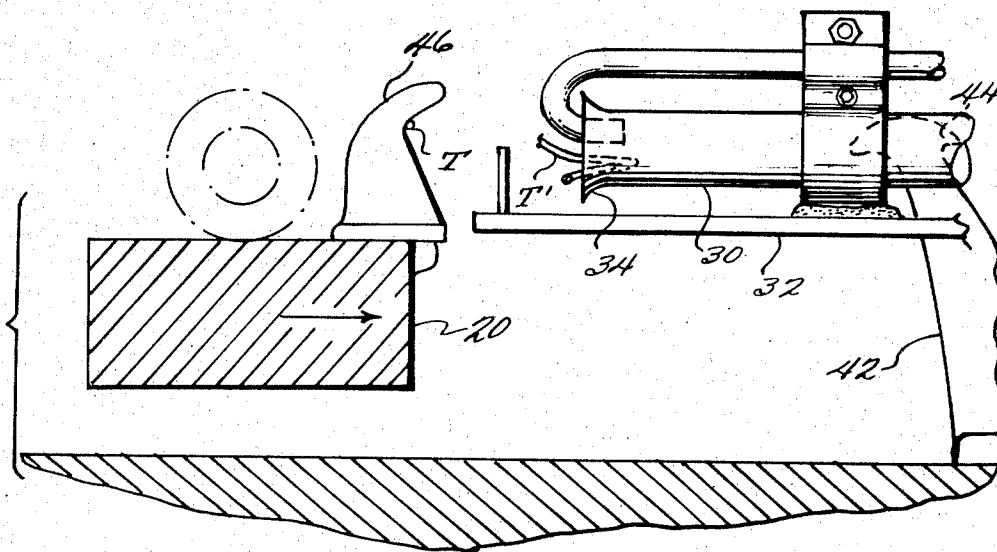
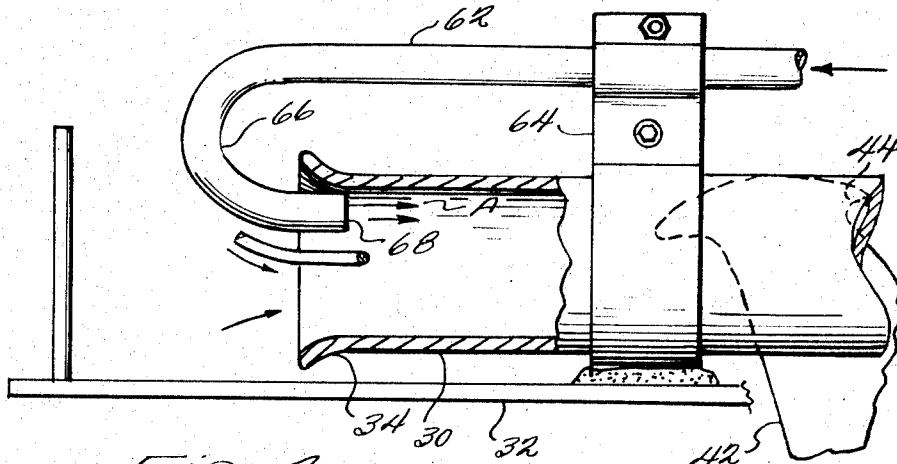
C. E. SIMPSON ET AL

3,435,856

# FILLING TAIL REMOVAL EQUIPMENT

Filed Sept. 5, 1967

Sheet 3 of 3



INVENTORS  
CLAUDE E. SIMPSON  
WILLIAM Z. WHITE

BY *Cushman, Bradley & Cushman*  
ATTORNEYS



1

3,435,856

## FILLING TAIL REMOVAL EQUIPMENT

Claude E. Simpson and William Z. White, Galax, Va., assignors to Burlington Industries, Inc., Greensboro, N.C., a corporation of Delaware

Filed Sept. 5, 1967, Ser. No. 665,352

Int. Cl. D03d 45/02

U.S. Cl. 139—256

10 Claims

### ABSTRACT OF THE DISCLOSURE

Filling tail removal equipment for removing the filling tails of both a spent bobbin and a full bobbin in automatic filling replenishing loom, the equipment including a single filling tail removal pipe having forced air under positive pressure discharged into the mouth thereof for first retaining the filling tails and, then after severance of the filling tails at the fabric selvage by the temple cutter, conveying the filling tails into a receptacle.

The present invention relates to improvements in filling tail removal equipment for automatic filling replenishing looms and the like and more particularly to equipment which will completely remove the filling tails of both the spent and full bobbins from the lay and shuttle box area and the like and, more particularly, to equipment which will completely remove the filling tails of both the spent and full bobbins from the shuttle box and lay area of the loom and deposit the same into a receptacle immediately after transfer.

This invention is an improvement over the filling tail removal equipment described in the common assignee's United States Patent 3,175,588 issued Nov. 30, 1965, to Duward P. Angle as well as the filling tail removal equipment described in the copending United States application Ser. No. 608,799 of Howell M. Tate filed Jan. 12, 1967. In the aforementioned patent and pending application, filling tail removal equipment is disclosed utilizing two clearer or filling tail removal pipes or tubes, each of which utilized a suction for respectively removing the filling tails of the full bobbins. The apparatus of the aforementioned patent and pending application requires modification of the looms to provide for positive holding of the filling tails during and just after transfer. While such apparatus has been commercially successful and especially adaptable on looms utilizing Fiberglas fillings, it has been found that the present invention is much more adaptable in a situation where the filling yarns or threads are not as slippery as Fiberglas and, thus, do not need to be individually held and separately removed.

An important object of the present invention is to provide filling tail removal equipment for automatically filling replenishing looms which utilize only a single filling tail removal pipe, the pipe being supplied with forced air under a positive pressure, rather than a vacuum, for holding and positively conveying the filling tails into a receptacle.

Another object of the present invention is to provide filling tail removal equipment which eliminates one or two costly venturies for creating suction and, thus, also eliminates the possibility of clogging of the equipment at the venturies by the filling tails as was the case in prior equipment.

Still another object of the present invention is to provide an improved filling tail removal equipment for automatic filling for replenishing looms or the like, the equipment requiring a minimum of modification to the loom and a minimum maintenance once installed on the loom.

A still further important object of the present invention is to provide filling tail removal equipment utilizing

2

a single filling tail removal pipe which substantially simultaneously removes both the outgoing and incoming tails, the equipment further eliminating the use of special guides and the necessity for means for holding the tails until cut by the temple cutter.

These and other objects and advantages of the present invention will become more apparent in the following specification, claims and drawings in which:

FIGURE 1 is a fragmentary sectional view of the filling replenishing side of an automatic filling replenishing loom the view omitting certain conventional parts of the replenishing equipment and loom, and the view further illustrating the present invention installed thereon with a schematic showing of the positive pressure forced air system for the filling tail removal pipe;

FIGURE 2 is a schematic plane view of the loom of FIGURE 1 with standard parts of the loom being omitted for purposes of clarity and illustrating the filling tail removal equipment of the present invention acting on an outgoing filling tail of a spent bobbin as the tail is severed by the Stafford-type cutter and prior to its being severed by the temple cutter;

FIGURE 3 is a view somewhat similar to FIGURE 2, the view illustrating the position of the filling tail of a full bobbin after transfer, the view also illustrating the positioning of the filling tail of a spent bobbin;

FIGURE 4 is an enlarged schematic view partly in vertical section illustrating the novel filling tail removal pipe of the present invention, and

FIGURE 5 is a view somewhat similar to FIGURE 4 but illustrating the filling tail of a full bobbin about to be positioned across the mouth of the filling tail removal pipe as the lay of a shuttle box moves toward the same.

Referring now to the drawings wherein like character and reference numerals represent like or similar parts and, more particularly, to FIGURE 1 of the drawings, the loom shown thereon is but a fragmentary portion of an automatic filling replenishing loom. The loom 10 may be of the type shown and described in more detail in the prior United States Patent 2,766,779, granted Oct. 16, 1956, to William V. Goodhue and Robert E. Morton.

The loom 10 has a loom frame with the usual breast beam 14 on which is mounted a temple 16 for holding the selvage of the fabric F being woven. The temple 16 is provided with the usual temple thread cutter 18 for severing the ends of the filling along the fabric selvage as is conventional in the art. Loom 10 is also provided with a reciprocating lay 20 on which is mounted a shuttle box generally indicated at 22 (FIGURES 2 and 3).

At the replenishing end of the loom, there is provided the usual magazine (not shown) for receiving full bobbins from a winding mechanism or the like (also not shown). As a bobbin in the shuttle S of the loom becomes spent as shown in FIGURE 3, the transfer mechanism ejects the same and then replenishes the shuttle with a full bobbin from the magazine. The transfer mechanism for ejecting the spent bobbin from the shuttle S and for replenishing the shuttle with a full bobbin may be of the type described in the aforementioned Angle Patent 3,175,588 or the aforementioned Goodhue Patent 2,766,779 and, therefore, need not be repeated herein.

A Stafford-type cutter 24 as shown in FIGURES 2 and 3 is provided for cutting the filling tail from the spent bobbin, the Stafford-type cutter 24 being fully disclosed in United States Patent 1,552,388, issued Sept. 1, 1925, to A. E. Stafford. As is conventional, the Stafford cutter 24 moves in and out of the shuttle box 22 during the transfer cycle to engage and cut the filling tail of the spent bobbin. The control of the movement of the Stafford-type cutter is operatively through rotation of a transfer rod or shaft 26 (FIGURE 1), such rotation being initiated by a signal from a conventional



midget feeler (not shown) positioned on the opposite side of the loom. When such a midget feeler senses that the bobbin of the shuttle S is spent and should be replaced when the shuttle returns to the replenishing side of the loom, the midget feeler causes rotation of the transfer rod 25 which, in turn, initiates transfer action as well as the filling tail removal action which will be described in more detail later in the specification.

The filling tail equipment of the present invention includes a single filling tail removal pipe 30 mounted on the stationary breast beam 14 by a suitable bracket 32, the pipe 30 being positioned between the temple cutter 18 and the shuttle box 22. The pipe 30 has a flared mount portion 34 facing the lay 20 and a longitudinal axis which is horizontal and which is transverse of the lay. An unobstructed flexible conduit or hose 36 is connected to the rear end of the pipe 30 by means of a hose clamp 38 or the like, the other end of the conduit or hose 36 being connected to a receptacle 40 for collecting filling tails and lint.

A shuttle feeler tip 42 (FIGURES 2 and 3) having conventional movement into and out of the shuttle box to determine whether or not a shuttle S is properly positioned in the box, is provided with a hook or eye 44 facing away from the lay and toward the pipe 30, the hook or eye being arranged to pick up the outgoing tail of a spent bobbin to strip the same from the lay and shuttle box and to pull the same toward and across the mouth of the filling tail removal pipe 30. Substantially simultaneous with the picking up of the outgoing filling tail by the shuttle feeler tip 42 is the action of the Stafford-cutter 24 in moving forward and opening its jaws to receive the outgoing tail and then retracting and closing its jaws to sever the same.

A hook 46 fixed to the lay 20 on the front box plate and facing in the general direction of the filling tail removal pipe 30 is provided for engaging the incoming filling tail of the full bobbin on the second pick after transfer to strip the tail from temporary holding means 48 of the type disclosed in the aforementioned Angle Patent 3,175,588 or Goodhue Patent 2,766,779. The hook 46 carries the incoming tail across the mouth of the filling tail removal pipe 30 just as the hook 44 on the shuttle filler tip 42 carries outgoing tail across the mouth. A more detailed description of the operation for removal of both the outgoing and incoming filling tails will follow later in the specification.

In order to convey the outgoing and incoming filling tails through the pipe 30 and the unobstructed conduit 36 to the receptacle 40, the pipe is supplied with forced air positively injected into the mouth 34 of the same. In more detail, a source of compressed air such as a compressor 50 is provided. A high pressure conduit 52 extends from the compressor to a timer delay pilot valve 54 which is normally closed. The timer delay pilot valve may be of the type disclosed in the United States application Ser. No. 610,290 of John M. Cochran, Jr., filed Jan. 19, 1967, or it may be any other suitable type of timer delay valve. A lever 56 mounted on the transfer starting rod 26 may be utilized to engage a valve operating member 58 on the timer delay pilot valve 54 to cause the valve to open so as to supply compressed air from the same to a conduit 60 extending and connected to a tube 62 supported above the pipe 30 by a bracket 64. The pipe 62 has its free end reversed as shown at 66 and it terminates or opens to the mouth of the pipe 30 at 68. It has been found that the tube 62 need only extend into the mouth 34 of pipe 30 in the order of one-fourth to one-half inch and the blast of forced air under positive pressure from the tube 62 as shown by the arrows A in FIGURE 4 is sufficient to first hold the outgoing and incoming filling tails until such time as the temple cutter 18 severs the same from the selvage of the fabric and then conveys the tails through the pipe and unobstructed conduit 36 to the receptacle 40. The diameter of the air

supply tube 62 is less than the interior radius of the pipe 30 so that there will be ample room for the filling tails to enter the mouth of pipe 30 and be drawn there-through.

The operation of the filling tail removal equipment of the present invention will be briefly described as follows. At the outset of the description, it will be understood that the outgoing filling tail is identified as T' whereas the spent bobbin will be identified as B' and the incoming tail will be identified as T with the full bobbin being identified as B. In describing the operation of the present invention, a description of the positioning and holding of the outgoing tail T' will be given first and then it will be followed by a description of the positioning and holding of the incoming tail T. The removal of both the outgoing tail T' and the incoming tail T occurs almost simultaneously once the respective tails are cut at the selvage of the fabric by the temple cutter 18, it being understood that such removal occurs during and just after transfer so that the tails do not have to be held until the next transfer.

When the midget feeler on the opposite side of the loom indicates that a bobbin is spent and transfer is necessary, it initiates starting of the transfer mechanism by causing the transfer starting rod 26 to rotate. When this rod rotates, the usual transfer action takes place as described in the aforementioned Goodhue et al. patent or the aforementioned Angle patent. Rotation of the rod 26, in addition to initiating the transfer cycle also causes the valve operating member 58 to be depressed to actuate the timer delay valve 54 to an open position for a predetermined length of time. When the timer delay valve 54 opens, compressed air from the compressor 50 flows through the conduit 52 and then through the conduit 60 into the tube 62 where it is discharged into the mouth of the filling tail removal pipe 30. The air under a positive pressure is forced through the mouth 34 of the pipe 30 down through the conduit 36 into the receptacle 40, the pressure being sufficient to first hold the filling tails T' and T and then convey the same into the receptacle 40.

With the initiation of the actuation of the transfer mechanism, the Stafford-type cutter 24 moves into the shuttle as the shuttle and lay 20 approach the pipe 30. The jaws of the cutter open and engage the outgoing tail T' of the spent bobbin B', the jaws then close to completely sever the tail T'. At the same time the Stafford-type cutter 24 is entering the shuttle to pick up and cut the tail T', the shuttle feeler tip 42 has also entered the shuttle box and the outgoing tail T' rides over the nose of the shuttle feeler tip and into its hook 44. While the above-described action is occurring, the lay 20 is still moving forward and as the shuttle feeler tip 42 is withdrawn away from the lay, it carries with it the tail T' and brings it across the mouth 34 of the pipe 30 where the tail T' is partially drawn into the pipe due to the forced air flowing into the mouth of the same. The tail T' will be held in this position until the temple cutter 18 severs the other end of the same. The tail T' is then conveyed on the flow of forced air through the pipe 30 and conduit 36 into the receptacle 40.

As soon the spent bobbin B' has been ejected from the shuttle S, the full bobbin B is removed from the usual magazine and inserted into the shuttle S. The incoming tail T of the full bobbin B is temporarily held by the holding means 48 and after two picks, the hook 46 fixed to the lay, will engage the filling tail T on the forward movement of the lay and will cause the tail T to be stripped from the holding means and pushed across the mouth of the pipe 30. As shown in FIGURE 3, the tail T has already been pushed across the mouth of the pipe 30 and is being held by the pipe 30 until the temple cutter 18 cuts the same at the selvage of the fabric F. FIGURE 3 also illustrates the tail T' being held by the pipe 30 and it will be understood that both tails will be successively cut at the selvage so that they are removed substantially simultaneously through the pipe 30.



The arrangement of filling tail removal equipment heretofore described provides an improved, simple, economical and efficient arrangement for removing the outgoing and incoming tails of spent and full bobbins respectively during and immediately after transfer. It will be noted that both tails are removed through the same filling tail removal pipe 30 and that this pipe as well as the conduit 36 are unobstructed with venturies or the like and thus there is little chance of the tails becoming clogged in the pipe. Also, the filling tail removal equipment of the present invention eliminates the use of mechanical holding means for the tails from the time of transfer until the next transfer cycle occurs and, in fact, the only holding of the tails that is necessary is accomplished by the single filling tail removal pipe 30.

The foregoing description of the apparatus fully and effectively accomplishes the objects and advantages of the present invention. However, certain modifications may be made to the apparatus without departing from the spirit of the invention. The terminology used in the specification is for the purpose of description and not limitation, the scope of the invention being defined in the claims.

What is claimed is:

1. In an automatic filling replenishing loom having a reciprocating lay with a shuttle box thereon at the replenishing end thereof, and a temple cutter for cutting tails of spent and/or full bobbins at the selvage, the improvement in filling tail removal equipment comprising: a filling tail removal pipe positioned between the temple cutter and the shuttle box and arranged to cooperate with the lay upon forward movement of the same, said pipe having a mouth at one end facing the lay; means for collecting filling tails removed through said pipe; an unobstructed conduit connected to the other end of said pipe and to said collecting means; means for positioning a filling tail across the mouth of said pipe prior to said filling tail being cut by the temple cutter; and means for supplying a positive blast of air into the mouth of said pipe at least during the time the filling tail extends across the mouth until at least the time the temple cutter cuts the filling tail, said positive blast of air holding the filling tail across the mouth of said pipe until said temple cutter cuts the same and then forcing the tail through the pipe and conduit into said collecting means.

2. Filling tail removal equipment as claimed in claim 1 in which said means for supplying a positive blast of air into the mouth of said pipe includes compressed air supply means, conduit means connected to said compressed air supply means, and a tube connected at one end to said conduit means and having its other end opening into the mouth of said pipe.

3. Filling tail removal equipment as claimed in claim 2 in which said tube extends along the exterior of said pipe and has a reverse bend in its other end so as to position the opening of the other end within the mouth of said pipe.

4. Filling tail removal equipment as claimed in claim 2 in which said tube has an exterior diameter less than the interior radius of said pipe.

5. Filling tail removal equipment as claimed in claim 2 in which said conduit means includes means for supplying compressed air from said supply means for a predetermined length of time.

6. Filling tail removal equipment as claimed in claim 2 in which said means for positioning a filling tail across the mouth of said pipe includes a shuttle feeler tip movable to feel the tip of a boxed shuttle and having a hook thereon, said hook being arranged to pick up the filling tail of a spent bobbin and direct it towards the mouth of said pipe.

7. Filling tail removal equipment as claimed in claim 2 in which said means for positioning a filling tail across the mouth of said pipe includes a hook carried on said shuttle box and lay and arranged to engage the filling tail of a full bobbin and direct it toward the mouth of said pipe.

8. In an automatic filling replenishing loom having a reciprocating lay with a shuttle box thereon at the replenishing end thereof, a temple cutter for cutting tails of spent and full bobbins at the selvage, and a Stafford-type cutter for cutting the filling tail of a spent bobbin, the improvement in filling tail removal equipment comprising: a single filling tail removal pipe positioned between the temple cutter and the shuttle box, said filling tail removal pipe having a mouth at one end facing the lay for cooperation therewith upon forward movement of same; a source of compressed air; conduit means connected to said source of compressed air; a tube connected at one end to said conduit means and having its other end opening into the mouth of said pipe for supplying a positive blast of forced air into the mouth and through the pipe; an unobstructed conduit connected to said pipe on its end opposite the mouth; a receptacle disposed at the other end of said unobstructed conduit for collecting filling tails; a first means for engaging the filling tail of a spent bobbin and positioning the same across the mouth of said pipe prior to the same being cut by the temple cutter; and a second means for engaging the filling tail of a full bobbin and positioning the same across the mouth of the pipe prior to the same being cut by the temple cutter, said filling tails of the spent and full bobbin being positively forced through said pipe and conduit into said receptacle by the forced air as soon as the same are respectively cut by said temple cutter.

9. Filling tail removal equipment as claimed in claim 8 in which the end of said tube opening into the mouth of said pipe extends into said pipe a distance in the order of  $\frac{1}{4}$  to  $\frac{1}{2}$  inch.

10. Filling tail removal equipment as claimed in claim 8 including means to supply compressed air to said tube from said supply means for a predetermined time just prior to said means positioning the filling tail of the spent bobbin across the mouth of said pipe until after the temple cutter cuts both the filling tails of the spent bobbin and the full bobbin.

#### References Cited

##### UNITED STATES PATENTS

2,766,779	10/1956	Goodhue et al.	139—256
2,928,430	3/1960	Consoletti et al.	139—256
3,175,588	3/1965	Angle	139—256

##### FOREIGN PATENTS

790,858	2/1958	Great Britain.
---------	--------	----------------

HENRY S. JAUDON, *Primary Examiner.*