Jan. 26, 1960 H. M. BROWN 2,922,197

SLIVER EVENER

Filed May 7, 1958

Fig. 2.

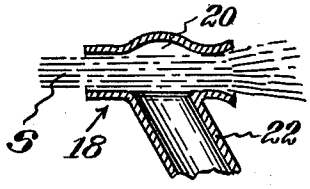
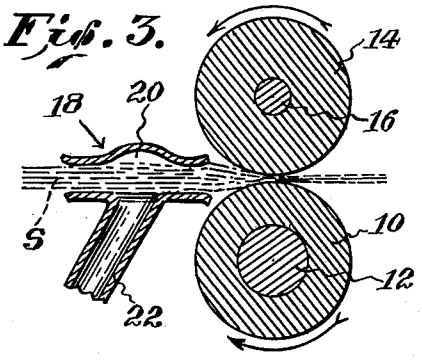


Fig. 3.



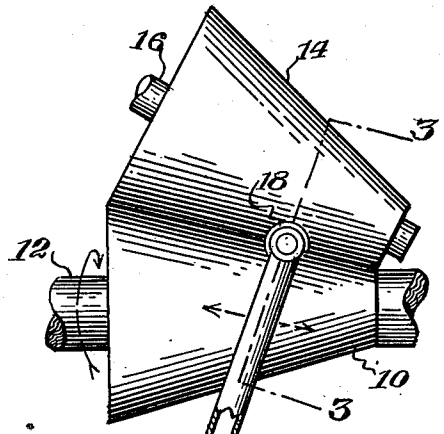
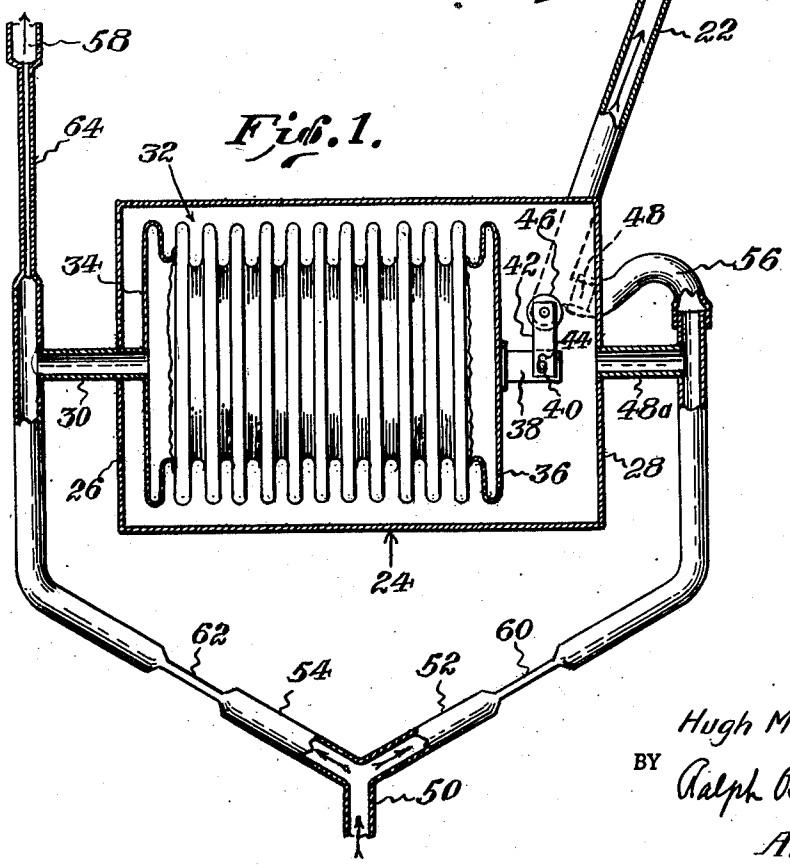


Fig. 1.



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SLIVER EVENER

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7 Claims. (Cl. 19—71)

This invention relates to a sliver evening device for use on roving frames, and especially to a device wherein slivers of various sizes or densities may be fed to a roving frame and converted into rovings of uniform size.

The main object of this invention is to produce a uniform roving from a non-uniform roving by means of an adjustable feed device.

Another object of the invention is to devise a sliver evener using feed rolls which rotate at a constant speed, thus avoiding the necessity for changing the speed of rotating parts which have considerable inertia. For this purpose, the feed rolls are of conical form, and variation in the rate of feeding the sliver is obtained by guiding the sliver into the rolls through a trumpet which is shiftable along the length of the feed rolls.

A further object of the invention is to incorporate a sliver sensing device within the trumpet which feeds the sliver to the feed rolls.

The sliver guiding trumpet is made to function as a sliver sensing element by providing an air chamber in the trumpet surrounding the sliver, and connecting the air chamber to a pneumatic system so that the trumpet with the sliver passing therethrough constitutes a variable restriction outlet of the pneumatic system, the resistance to flow of air through said outlet being varied by the size and density of the sliver passing through the trumpet.

Still another object of the invention is to devise a servo-motor controlled by the sensing arrangement and operating to shift the guiding trumpet to the proper position, without imposing any substantial mechanical load upon the sliver.

The trumpet is mounted for movement longitudinally of the feed rolls to feed the sliver to the rolls at points of different diameters, and the movement of the trumpet is controlled or affected by means of a differential pneumatic motor which is connected across the arms of a pneumatic Wheatstone bridge.

A suitable embodiment of the invention is shown in the accompanying drawing in which:

Fig. 1 is a partly diagrammatic front elevation, partly in section;

Fig. 2 is a fragmentary section through the trumpet guide; and

Fig. 3 is a fragmentary section on the line 3—3 of Fig. 1.

Referring now to Fig. 1, a conical feed roller 10 is mounted on a driven shaft 12 which is driven at a constant rate from any suitable source. The feed roller may be in advance of the drawing rolls of a roving frame, or it may be placed at the feed side of a conventional drawing frame. Adjacent the feed roller 10 is a pressure roller 14, rotatable on a shaft 16. The shaft 16 may be weighted by any suitable known weighting devices.

A trumpet guide 18 is located ahead of the rolls 10, 14, to direct a sliver S into the bight of the rolls. The guide 18 is substantially tubular and has a peripheral air chamber 20, intermediate its ends, which is in communication with a tubular arm or stem 22 on which the guide 18 is mounted. The arm 22 supporting guide 18 is suitably mounted to permit guide 18 to execute a traverse motion longitudinally of the bight of the rolls. One suitable mounting and operating arrangement will now be described.

The lower end of arm 22 is pivotally mounted on a fluid-tight casing 24 which is mounted adjacent the feed rolls 10 and 14 in any suitable manner. A short tube 30 is mounted in one end wall 26 of the casing 24 and projects into the interior of the casing 24. A bellows 32 has an end wall 34 connected to the inner end of the tube 30 whereby one end of the bellows 32 is rigidly supported by the tube and the tube 30 is in communication with the interior of the bellows 32. The opposite end of the bellows 32 is closed by an end wall 36 which is freely movable in the casing. The movable end wall 36 is connected to arm 22 to turn the arm about its pivotal axis by an arrangement which includes a trunnion 38 attached to the end wall 36 and provided with a cross pin 40. A fork 42 having a slot 44 at its lower end rides on the pin 40 and has its upper end connected to a rock-shaft 46 which extends through the casing 24 in a fluid-tight joint and is connected at its outer end to the lower end of the tubular guide arm 22. Adjacent the lower end of the guide arm 22, there is a nipple 48 by which the arm is connected through a flexible hose 56 to a branch conduit 52 leading off from an air-supply conduit 50. The space within casing 24 is connected to conduit 52 through conduit 48*a* opening through end wall 28.

A second branch conduit 54 leading from air-supply conduit 50 is connected to the interior of bellows 32 through the tube 30, and the outer end 58 of the branch 54 is open to the atmosphere. In the branches 52 and 54 there is a constricted portion or restrictor 60 and 62, respectively, interposed between conduit 50 and the motor connections 48*a* and 30 respectively. Also, adjacent the outlet end 58 of the branch 54, there is a restricted portion or restrictor 64 which may be a variable restrictor. The sliver S passing through the trumpet 18 acts as a restrictor. The restrictor portions 60, 62 and 64 form three fixed arms of a pneumatic bridge, generally similar to a Wheatstone bridge. The sliver restricting air passage of the trumpet forms the fourth arm of the bridge. The restrictors are predetermined according to the constants of the apparatus and need not be changed during normal operation of the machine.

The operation of this sliver evener will be apparent from the above description, but the following resume is deemed useful. Air under pressure of about 3 pounds, above atmospheric, is introduced into the pipe 50 and the interior and exterior of the bellows will be under the same pressure where there is the same pressure-drop across restrictors 60 and 62. With a normal sliver S, for which the adjustments have been made, passing through the trumpet 18 and being fed by the rolls 10 and 14, there will be a balance of the pressures on the bellows 32, and the differential will be zero. A heavy sliver will tend to choke the trumpet 18, and cause pressure to build up outside the bellows 32, and move the head 36 to the left, in Fig. 1, causing the rock shaft 46 to rotate clockwise and move the trumpet toward the small end of the cone rollers 10 and 14. This will feed the sliver at a slower rate and even up the portion operated upon by the roving frame. If the sliver be thin or light, more air will escape at the trumpet and a reverse operation will take place since the greater pressure will be within the bellows.

I have found that slivers varying from 25% above to 25% below normal may be fed by this means with the production of a substantially uniform roving. In trials,

slivers varying in weight from 33 to 50 grains per yard were fed to the input of the trumpet **18**. The sliver issuing from the output varied from 31.28 grains per yard to 31.68 grains per yard or a total variation in this range of only 0.4 grain per yard.

While I have illustrated and described a preferred form of my invention, it is to be understood that changes may be made within the skill of the art and within the scope of the appended claims.

I claim:

1. A sliver feeding device comprising a conical drive roll, a pressure roll cooperating with said drive roll, a trumpet for guiding the sliver into the bight of said rolls and being movable along the length of said rolls, said trumpet having an air chamber formed therein around the sliver passing therethrough, a pneumatic system connected to said air chamber to supply air thereto, a pneumatic motor embodied in said system and being responsive to variations in pressure resulting from variations in the flow of air out of said trumpet as controlled by variations in size and density of said sliver, and a connection between said motor and said trumpet for shifting said trumpet to vary the rate of movement of the sliver through the trumpet.

2. A sliver feeding device according to claim 1 wherein said trumpet is carried at the end of a tubular arm constituting an air supply conduit for said chamber in said trumpet, and means for mounting said tubular arm for pivoting about a fixed axis displaced from said trumpet.

3. A sliver feeding device according to claim 1 wherein said pneumatic system comprises two branch conduits leading from a common source of compressed air, one of said branch conduits leading to said trumpet and including a restrictor for limiting the flow of air to said trumpet, said second branch conduit including two restrictors embodied therein in serial relation, said pneumatic motor being connected to respond to the difference between the pressure-drop developed across one restrictor in one branch conduit and the pressure-drop developed across a restrictor in the other branch conduit.

4. A device according to claim 3 wherein said pneumatic motor comprises a fluid-tight casing, a bellows

mounted within said casing and having one end rigidly connected with said casing and the other end free to move within said casing, a pneumatic connection from one branch conduit to the space surrounding said bellows within said casing, a pneumatic connection from the other branch conduit to the space within said bellows at the fixed end thereof, and a mechanical connection from the free end of said bellows to the mounting arm of said trumpet to shift said arm in response to the difference in pressure between the interior of said bellows and the exterior thereof.

5. A device according to claim 4 wherein said mechanical connection comprises a rock-shaft passing through the wall of said casing through a fluid-tight joint and having said tubular arm mounted on the outer end thereof, a lever carried by said rock-shaft within said casing, and a connection from said lever to the free end of said bellows.

6. A device according to claim 1 wherein said pneumatic system comprises an air supply conduit connected to the chamber in said trumpet through a flow restrictor, and said pneumatic motor is connected to respond to the pressure in said conduit at a point between said restrictor and said trumpet.

7. A device according to claim 6 wherein said pneumatic motor comprises a differential bellows having closed spaces on opposite sides of a movable wall, a conduit connecting one of said spaces with said air supply conduit at a point between said restrictor and said trumpet, means for maintaining a predetermined air pressure within the other space of said differential bellows, and a mechanical connection between the movable wall of said bellows and said trumpet for moving said trumpet is response to pressure variations within said bellows.

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