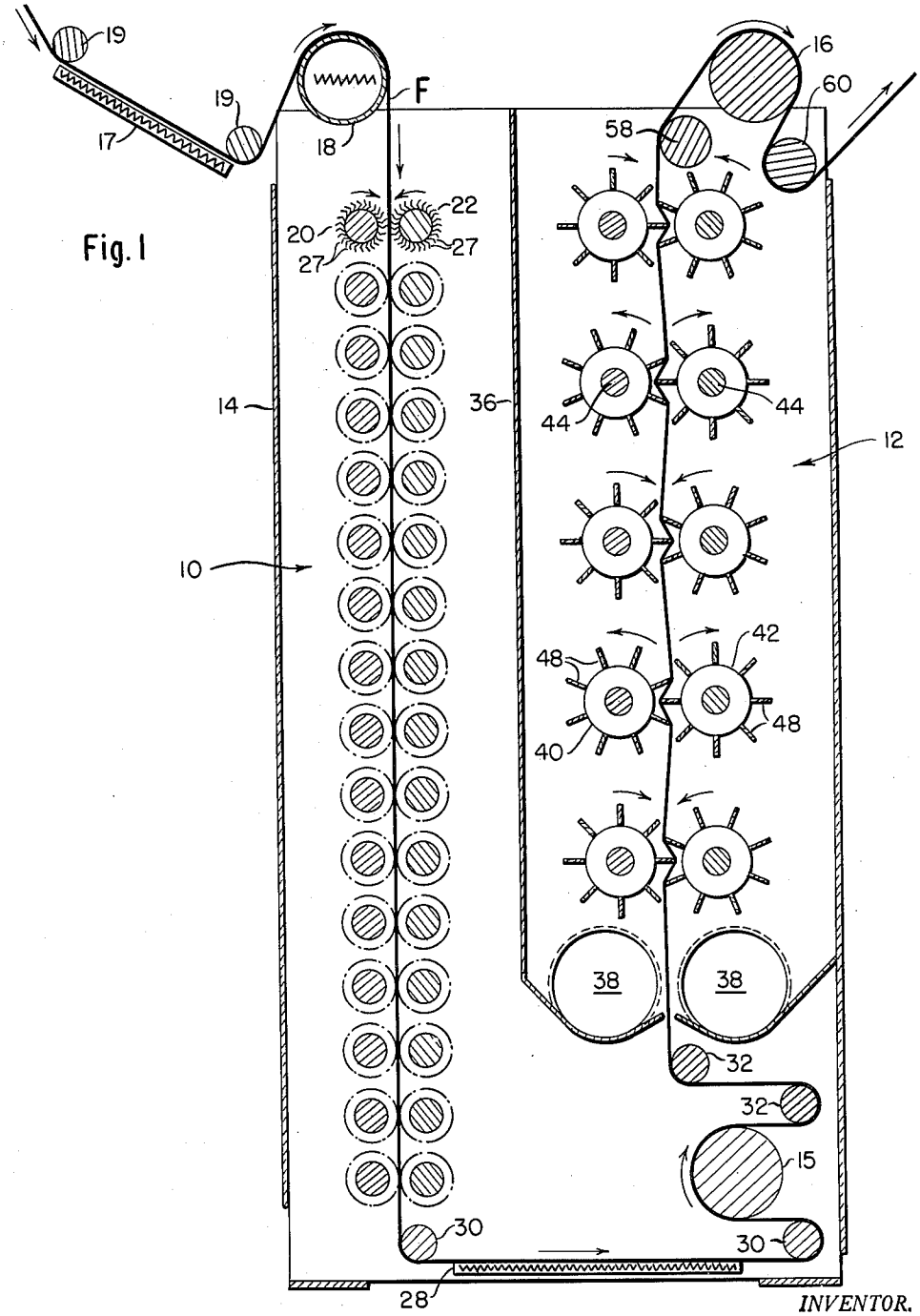
Jan. 10, 1956 W. N. HADLEY 2,730,113

FABRIC CARBON DUSTER AND METHOD

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Fig. 1



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FABRIC CARBON DUSTER AND METHOD

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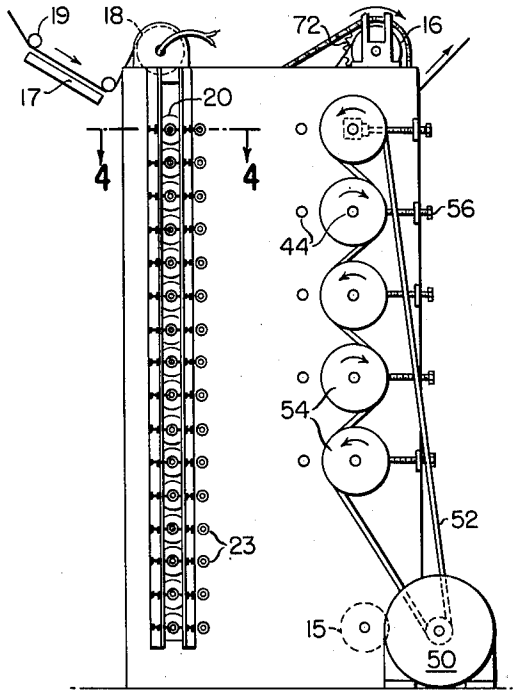


Fig. 2

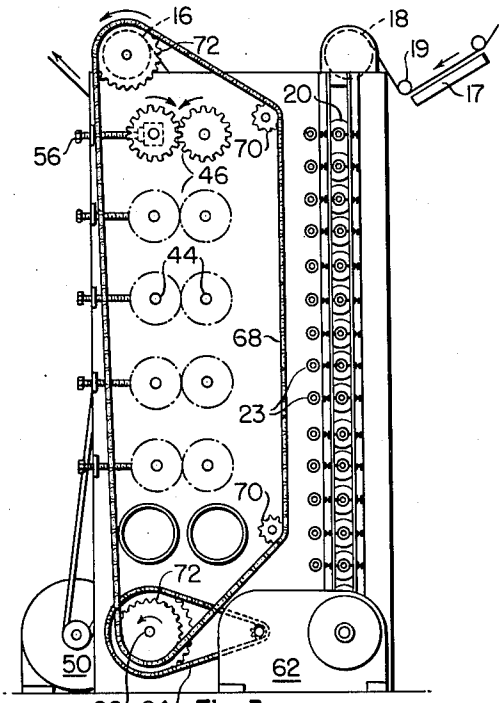


Fig. 3

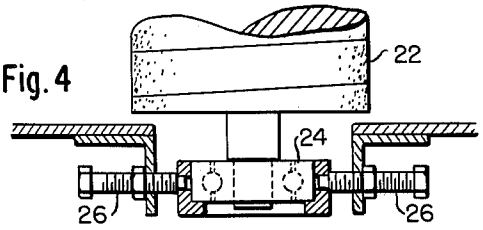


Fig. 4

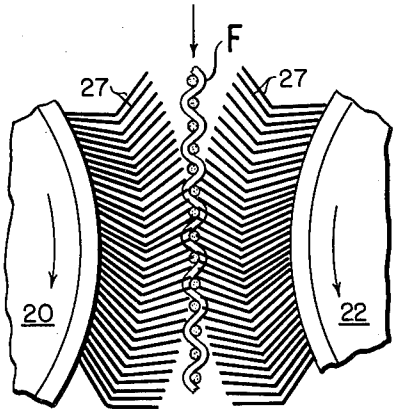


Fig. 5

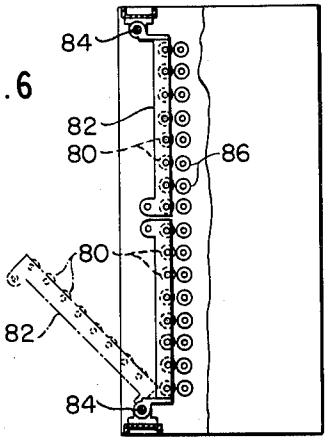


Fig. 6

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FABRIC CARBON DUSTER AND METHOD

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Application February 1, 1954, Serial No. 407,315

16 Claims. (Cl. 134—9)

This invention relates to a novel method and apparatus for removing carbonized vegetable matter from fabrics. Raw wool contains burrs and other vegetable matters which are commonly removing by carbonizing and dusting treatments either before or following fabrication. Most wool fabrics are thus treated first by the application of dilute sulphuric acid followed by baking at high temperature in an oven to burn or carbonize the vegetable matters. The fabric manufactured from the carbonized fibers is then run through crushing rolls to break up the carbonized matter and thereafter through a duster to remove the loosened carbon particles. The primary object of my invention resides in the production of a new and improved continuous method and apparatus for loosening and removing such carbonized material from fabric strip.

My invention contemplates receiving the fabric strip continuously from the carbonizing oven and first passing it through a char breaking field where it is subjected to a closely disposed needle penetrating treatment to break up the char interiorly and exteriorly of the fabric as the fabric passes through the field. The mechanism employed includes needle carrying cylindrical rolls which penetrate the fabric in closely disposed points thereover and therealong and preferably at and from both faces of the fabric. The needles employed are furthermore preferably inclined in a direction toward and to engage and penetrate the oncoming fabric and to withdraw freely from the receding fabric as hereinafter described. The production of a novel method and mechanism of this nature and for the purpose described comprises a further object of the invention.

A further and companion feature of the invention comprises a novel dust removing field to and through which the fabric is passed following its treatment in the first field. This latter field includes a plurality of pairs of fabric flexing rolls disposed to receive the fabric therebetween and rapidly flex it in opposite directions as it passes through the field, thus breaking up and removing the loosened char particles from the fabric. The rolls are housed within a chamber through which a flow of air is maintained to remove the loosened dust. The production of a novel method and apparatus embodying these features comprises another object of the invention.

Further features of the invention include means for maintaining the fabric heated as it passes through the fields, thereby facilitating the dust removing treatment, means providing relative adjustment of the rolls of each pair to accommodate fabrics varying in thickness and modify the fabric treatment, and means including a frame for supporting one set of penetrating rolls relative to their companion rolls together with means for moving the frame and its rolls bodily away from the companion rolls to facilitate the threading and application of the fabric to the rolls.

These and other features of the invention will be best understood and appreciated from the following description of preferred embodiments thereof, selected for purposes of illustration and shown in the accompanying drawings in which—

Fig. 1 is a vertical sectional view through a machine embodying the invention,

Fig. 2 is an end elevation of the machine on a reduced scale,

Fig. 3 is a like view of the opposite end of the machine.

Fig. 4 is an enlarged fragmentary view illustrating an adjustable mounting for the penetrating rolls,

Fig. 5 is an enlarged fragmentary view illustrating the wire clothing needles preferably employed and the penetrating of the fabric by the needles, and

Fig. 6 is an end elevation, partly broken away and on a reduced scale, of a modified construction.

The dusting mechanism embodying my invention, as illustrated in the drawings, comprises a char loosening and breaking field 10 and a dust removing field 12 both housed within walls 14. The fabric F to be treated as it comes from the baking or carbonizing oven is passed first through the field 10 and from thence through the field 12. Power driven drums 15 and 16 are provided for moving the fabric in the direction indicated by the arrows.

I have found that keeping the fabric heated very substantially facilitates the char removing operation and a hot plate 17 and heated cylinder 18 are provided at the entrance of field 10 for this purpose. Rollers 19 guide the fabric in contact with the plate and as it drags thereover and over the cylinder 18 it enters the field 10 in heated condition. The plate and cylinder can be heated electrically, by steam or otherwise.

The function of the field 10 is to so loosen and break up the carbonized vegetable matter in the fabric that it can be threafter removed in the field 12. The mechanism for performing this loosening function includes a plurality of pairs of parallel cylindrical rolls 20 and 22 disposed in vertical alignment and adapted to receive the fabric F therebetween. The rear rolls 22 are freely rotatable in fixed bearings 23 and the front rolls 20 are freely rotatable in bearings 24 adjustable toward and from the rear rolls by screws 26.

Carried by and projecting outwardly from the peripheries of the rolls are closely disposed fabric penetrating needles 27. The free ends of the needles are preferably inclined in a direction toward and to engage and penetrate the oncoming fabric and withdraw freely from the receding fabric, the preferred needle angle being substantially as illustrated in Fig. 5. The arrangement is such that the downwardly moving fabric causes the needles to penetrate into and through the fabric and to leave the fabric freely and without causing any napping effect. The adjustment of the front rolls provides for handling fabrics varying in thickness and furthermore controls the amount of penetration by the needles. It will be apparent that the needles penetate the fabric in closely disposed points thereover and therealong and serve to thoroughly loosen and break up the char into fine dust exteriorly and interiorly as the fabric passes through the several pairs of rolls.

From the field 10 the fabric is guided in surface contact with a hot plate 28 by two rollers 30, and from thence by the drum 15 and rollers 32 into the dust removing field 12. The mechanism in this field is enclosed within walls 36 and a circulation of air having exits at 38 is provided for carrying away the dust particles. The exits 38 are located at the bottom of the dusting chamber where the fabric enters and the dust naturally settles. As the fabric is passed through this chamber it is rapidly flexed in opposite directions to dust out the loosened particles and the mechanism for so flexing the fabric includes a

plurality of pairs of rolls **40** and **42** disposed in vertical alignment. Each pair of rolls is mounted on shafts **44** geared together at **46** and each pair carries alternately disposed fabric engaging and flexing baffles **48** extending longitudinally therealong.

The rolls are driven from a motor **50** by an endless belt **52** passing about sheaves **54** on the shafts **44** as illustrated in Fig. 2, the arrangement being such that alternate pairs of rolls are driven in opposite directions. The front rolls are adjustable by means of screws **56** to vary the gap between the rolls. As illustrated in Fig. 1, the rapidly rotating rolls alternately engage their baffles **48** with opposite faces of the fabric and so beat and flex the fabric in opposite directions that the broken and loosened particles are shaken free and carried away in the outgoing air stream. It will also be noted that rotation of the pairs of rolls alternately in opposite directions serves to amplify the dusting effect on the fabric. The dusting effect can also be increased or diminished by adjusting the screws **56**. As the fabric leaves the field **12** it passes over a roller **58**, drum **16** and outwardly over a roller **60**. The fabric feeding drums **15** and **16** are driven from a motor in a housing **62** through a chain **64** to the lower drum shaft **66** and from thence by a chain **68** disposed on idlers **70** and about sprockets **72** fixed to the drum shafts.

In Fig. 6 I have illustrated a modified construction in which the front penetrating rolls **80** are supported on frames **82** pivoted at **84** for outward bodily movement from their companion rolls **86**, as illustrated in broken lines. Such mounting makes the rolls accessible and aids in the fabric threading and applying operations.

It is believed that the method and apparatus comprising the invention will now be apparent and clearly understood. The drums **15** and **16** feed the fabric through the fields **10** and **12** in the direction indicated by the arrows. Downward movement of the fabric through the pairs of rolls **20** and **22** rotates the rolls and causes their needles **27** to penetrate the fabric in closely disposed points thereover and therealong and disintegrate the carbonized vegetable matter in and on the fabric. During continued upward movement of the fabric through the dusting field **12** the baffles **48** of the pairs of rolls **40** and **42** engage and flex the fabric in opposite directions. The rolls are driven at high speed during which the baffles not only rapidly flex the fabric but also beat and wipe across both fabric surfaces since the baffles travel much faster than the speed of the fabric. These actions are even further increased by the rotation of alternate pairs of rolls in a direction against the movement of the fabric. This combined flexing, beating and rubbing thoroughly dusts out the carbon particles which are thereupon immediately removed through the exit **38**. The maintaining of the fabric heated at **17**, **18** and **28** also facilitates the char removing operations. Thus the combined operations of thoroughly breaking up the char in and on the fabric in the field **10** and the subsequent removal of the resulting char dust in the field **12** results in a thorough cleaning of the fabric during one continuous passage through the machine.

Having thus disclosed my invention what I claim as new and desire to secure by Letters Patent is:

1. A continuous method of treating strip fabric to remove charred vegetable matter therefrom, which consists in feeding the fabric in open width through a char breaking field, and continuously penetrating the fabric in closely disposed points thereover and therealong in said field to engage and break up the char in the fabric as the fabric passes through the field.

2. The method defined in claim 1 plus the step of maintaining the fabric heated as it passes into said field.

3. A continuous method of treating strip fabric to remove charred vegetable matter therefrom, which consists in feeding the fabric in open width through a char breaking field, and continuously applying opposed forces to and penetrating the fabric in closely disposed points thereover and at both faces in said field to engage and break up the char in the fabric as the fabric passes through the field.

4. A continuous method of removing charred vegetable matter from strip fabric, which consists in feeding the fabric in open width through a char breaking field, continuously penetrating the fabric in closely disposed points thereover and therealong in said field to engage and break up the char in the fabric as the fabric passes through the field, continuing the penetrated fabric through a dust removing field, and rapidly flexing the fabric in opposite directions to further loosen the char as the fabric passes through the dust removing field.

5. The method defined in claim 4 plus the step of maintaining the fabric heated as it passes into said fields.

6. A continuous method of removing charred vegetable matter from strip fabric, which consists in feeding the fabric in open width through a char breaking field, continuously penetrating the fabric in closely disposed points thereover and therealong in said field to engage and break up the char in the fabric as the fabric passes through the field, continuing the penetrated fabric through a dust removing field, repeatedly flexing the fabric in opposite directions by alternately and forcibly engaging opposite faces thereof and therealong at a plurality of locations therealong in the dust removing field to further loosen the char as the fabric passes through the field, and maintaining a dust removing flow of air through and from the dust removing field.

7. The method defined in claim 6 in which the fabric is fed downwardly through the char breaking field and upwardly through the dust removing field and in which the dust removing flow of air moves downwardly through the dust removing field.

8. In a machine for removing vegetable char from a fabric strip, the combination of a plurality of pairs of parallel cylindrical rolls having fabric penetrating needles projecting outwardly from their peripheries, the rolls of each pair being spaced apart a distance to receive a fabric strip therebetween and penetrate both faces of the fabric and the pairs being aligned to receive the fabric consecutively therethrough, means mounting the rolls for free rotation, and means for drawing fabric through the rolls in a manner rotating the rolls and penetrating the fabric.

9. The combination defined in claim 8 in which the free ends of the needles are inclined in a direction toward and to engage and penetrate the on-coming fabric and to withdraw freely from the receding fabric.

10. The combination defined in claim 8 plus means for engaging and heating the fabric adjacent to its penetration by the needles.

11. The combination defined in claim 8 plus means for laterally adjusting one roll of each pair relative to the other roll to vary the width of the fabric receiving gap therebetween.

12. The combination defined in claim 8 plus a frame supporting one set of rolls relative to their companion rolls and including means for moving the frame and its rolls bodily away from the companion rolls.

13. A machine for removing vegetable char from fabric strip, comprising a plurality of pairs of parallel cylindrical rolls having fabric penetrating needles projecting outwardly from their peripheries, the rolls of each pair being spaced apart a distance to receive a fabric strip therebetween and penetrate both faces of the fabric and the pairs being aligned to receive the fabric consecutively therethrough, a plurality of pairs of fabric flexing rolls aligned to receive the fabric therethrough from the first named rolls, each pair of flexing rolls having alternately disposed fabric engaging and flexing baffles disposed longitudinally therealong to flex the fabric in opposite directions, means for rotating the fabric flexing rolls of each pair synchronously in opposite directions, and means for feeding the fabric in open width through the penetrating rolls and from thence through the flexing rolls.

14. The machine defined in claim 13 plus means for heating the fabric adjacent to its engagement by the rolls.

15. The machine defined in claim 13 plus means providing a chamber for housing the fabric flexing rolls, and means for maintaining a dust removing current of air past the flexing rolls and from the chamber.

16. The machine defined in claim 15 in which the pairs of fabric flexing rolls are aligned vertically in the chamber and the air current exit from the chamber is disposed beneath the fabric flexing rolls.

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