April 7, 1953 H. B. RAND ET AL 2,633,588

APPARATUS FOR REMOVING CARBONIZED MATERIAL FROM TEXTILE FABRICS

Filed July 9, 1947 3 Sheets-Sheet 1

FIG. 5

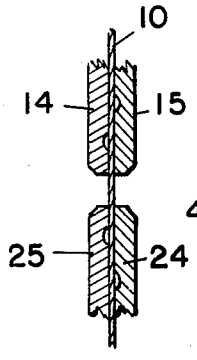


FIG. 6

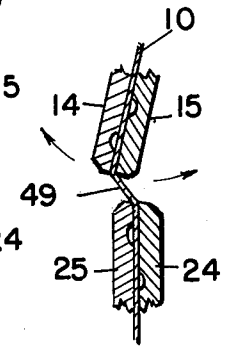


FIG. 7

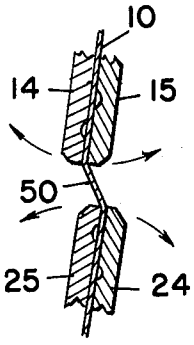


FIG. 1

Inventors

HOWARD B. RAND,
ROYAL N. HOYT,

By Robt E. Barry
Attorney

April 7, 1953 H. B. RAND ET AL 2,633,588

APPARATUS FOR REMOVING CARBONIZED MATERIAL FROM TEXTILE FABRICS

Filed July 9, 1947 3 Sheets-Sheet 2

FIG. 3

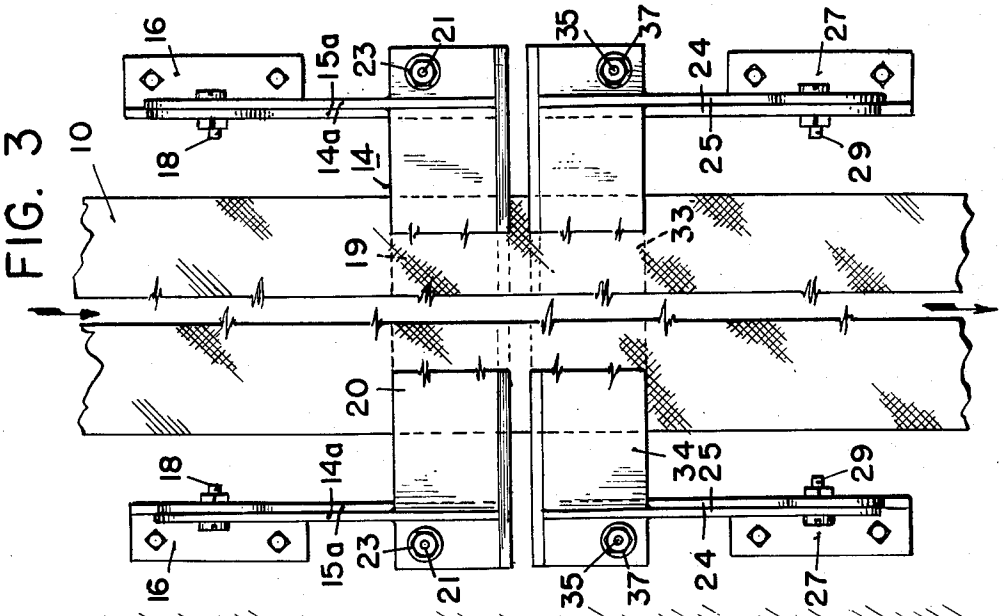
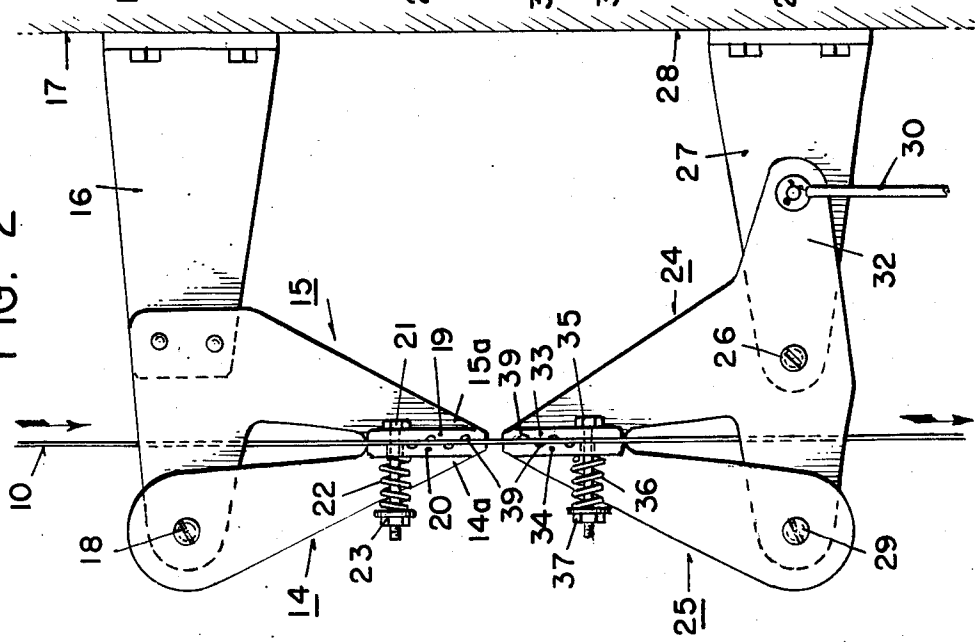


FIG. 2



INVENTORS:
HOWARD B. RAND,
ROYAL N. HOYT,

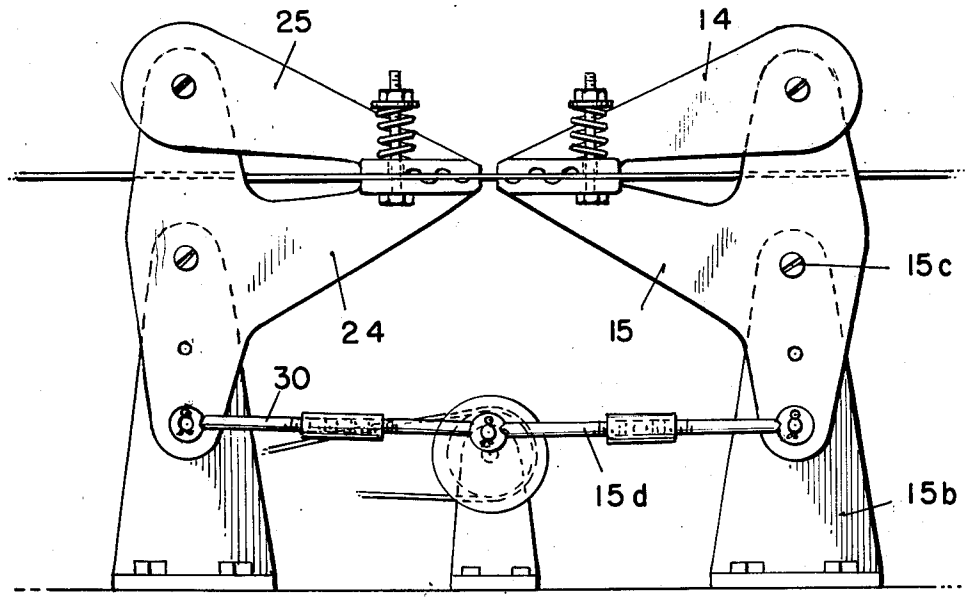
BY Robt C. Barry
ATTORNEY

April 7, 1953 H. B. RAND ET AL 2,633,588

APPARATUS FOR REMOVING CARBONIZED MATERIAL FROM TEXTILE FABRICS

Filed July 9, 1947 3 Sheets-Sheet 3

FIG. 4



Inventors

HOWARD B. RAND,
ROYAL N. HOYT,

By Robt E. Barry
Attorney

Patented Apr. 7, 1953

2,633,588

UNITED STATES PATENT OFFICE

2,633,588

APPARATUS FOR REMOVING CARBONIZED MATERIAL FROM TEXTILE FABRICS

Howard B. Rand and Royal Nason Hoyt,
Haverhill, Mass.

Application July 9, 1947, Serial No. 759,788

6 Claims. (Cl. 15—94)

1

This invention relates to apparatus for removing carbonized vegetable matter from textile fabrics.

At the present time, the woolen textile industry uses what is known as a rope crusher for the purpose of removing carbonized vegetable matter and lint from woven cloth. Such cloth, is rolled into a loose rope which is then made into a belt and placed between weighted rollers about 20 inches in diameter, which rollers pound the cloth for the purpose of eliminating the carbon and other foreign substances. In the use of such machine, it takes from one-half to two hours to perform the operation and considerable cloth damage, such as rents, occurs, due to the pounding action of the rollers.

The primary object of the present invention is to provide apparatus by the use of which the time of cloth treatment is shortened and the cloth is cleaned without damage thereto.

Another object of the invention is to provide a machine which will enable the cloth to be passed through flat and continuously thereby making it unnecessary to twist the cloth into a rope and preventing damage to the treated fabric.

For the attainment of these ends, and the accomplishment of other new and useful objects, as will appear, the invention consists in the features of novelty in the construction, combination and arrangement of the several parts, generally shown in the accompanying drawings and described in connection with our novel method.

In the drawings:

Fig. 1 is a diagrammatic side elevation of one embodiment of an apparatus in accordance with the invention with certain parts in vertical section.

Fig. 2 is an enlarged side elevation of one of the jaw ensembles.

Fig. 3 is a similar view taken at right angles to Fig. 2 and with parts broken away to facilitate illustration.

Fig. 4 is a side elevation of a modification of one of the jaw ensembles but arranged horizontally instead of vertically.

Figs. 5, 6 and 7 are diagrammatic views illustrating the action of the jaws.

Referring to the drawings, 10 designates a cloth web as it enters the apparatus from the carbonizing machine. Immediately thereafter, it is moved forwardly by any suitable means such as a sand covered drive roll 11 arranged between idler rolls 12 and 13. After leaving the roll 13, the cloth enters a pair of non-vibrating jaws 14 and 15, best illustrated in Figs. 2 and 3. As shown in those figures, the jaw 15 is stationary and supported by a bracket 16 from a portion 17 of the frame of the apparatus. The jaw 14 is pivotally connected at one end, as indicated at 18, to the jaw 15, and the jaws are provided at their opposite ends with plates 19 and 20 between which the cloth is drawn. To keep the cloth taut or exert tension thereon, the plates are yieldingly urged toward one another by any suitable means, for example, by bolts 21 which pass through the plates and are provided with coil springs 22, the compression of which may be adjusted by means of nuts 23.

2

It may be seen from Fig. 3 that the plates 19 and 20 extend entirely across the machine and are supported at their ends by the brackets 14a and 15a so that the cloth, while in a plane will pass between the plates of the opposed jaws.

The jaws 14, 15 cooperate with adjacent vibrating jaws 24 and 25, the former of which is pivotally mounted at 26 on stationary brackets 27 supported by a part 28 of the frame of the machine. The jaw 24 is pivotally connected to the jaw 25, as indicated at 29, and the jaws 24 and 25 are simultaneously vibrated by any suitable means such as a pitman 30, connected at one end to a driven eccentric 31 (Fig. 1) and at the opposite end to a tail 32 of the jaw 24. The jaws 24 and 25 also have plates 33 and 34 through which the cloth is drawn in passing between the jaws, and here also the plates 33 and 34 are urged toward one another by yielding means such as bolts 35 surrounded by coil springs 36, adjustably compressed by nuts 37.

The plates 19, 20, 33 and 34, in practice, are about six feet long, and the movable jaws 24, 25 are vibrated between 600 and 700 times per minute, the rate of vibration being adjustable through the use of a variable speed motor (not shown). As will be hereinafter disclosed, if the jaws 14 and 15 are arranged to vibrate, as well as the jaws 24 and 25, the vibrations per minute may be decreased.

The space between the plates 19 and 20, and 33, 34 being adjustable, it is obvious that the machine will handle cloth of different thicknesses.

For the purpose of carrying away the carbon, lint or the like, removed from the cloth by vibration, we preferably employ a nozzle 38 which is connected to any suitable vacuum creating means and terminates adjacent to the confronting ends of the plates 19, 20 and 33, 34.

Where necessary or desirable, the confronting faces of the plates 19, 20 and 33, 34, may be provided with grooves 39 to aid in loosening carbon or the like from the cloth.

As illustrated in Fig. 4, the jaws 14 and 15 may

be arranged to vibrate in the same manner as the jaws **24** and **25** but in directions opposite to the movements of the jaws **24**, **25**. For this purpose, the jaw **15** is pivotally mounted on a bracket **15***b*, as indicated at **15***c*, and the jaw is oscillated about its pivotal support by any suitable means such as an eccentrically driven pitman or link **15***d*.

As best shown in Fig. 1, we may use one or more sets of jaws **14**, **15** and **24**, **25**, and the jaws **24**, **25** may be vibrated from a common eccentric **31** driven by a variable speed motor. Sand covered rolls **11***a* and idler rolls **12***a*, **13***a* may be arranged between each jaw ensemble to advance the cloth between the jaws, and if desired, the cloth after leaving the last jaw ensemble may pass about sand covered rolls **41**, **42** before being further cleaned by a rotary brush **43** which cooperates with an adjustable ledger **44**. A suction nozzle **45** may be associated with the brush **43** for carrying away the foreign matter. The cloth after passing the last rotary brush may be drawn forwardly by a sand covered drive roll **46** cooperating with an idler roll **47**, and between the rolls **46** and **47**, and the last brush **43**, and oscillating beater bar **48** may be employed to beat the cloth to remove the final trace of carbon and foreign particles therefrom.

The operation of the apparatus may be more clearly understood from the diagrams in Figs. 5, 6 and 7. In Fig. 5, the jaws **14** and **15** are aligned with the adjacent jaws **24** and **25** and the cloth web in the vicinity of the jaws is maintained in a single plane. If one set of jaws remain stationary such as the jaws **24** and **25** and the other set of jaws **14** and **15** are moved relative to the jaws **24** and **25** the cloth will be kinked as shown at **49** in Fig. 6. If both sets of jaws vibrate, one set relatively to the other, the kinking will be more pronounced, as indicated at **50** in Fig. 7.

It may be seen from the drawings that in the operation of the machine, the cloth while travelling will pass between the cooperating sets of jaws, which will not only act to maintain the cloth in taut condition, but to kink or impart flexibility to the cloth entirely across the width of the same, and it will be noted that the cloth, after looming and carbonizing passes through coperating jaws which exert a scrubbing and vibrating action that removes the carbon and lint. In the rope type crusher heretofore mentioned, the cloth is detached from the carbonizing dryer and baker and then loaded in rope form into the roll type crusher. The crushing effect is uneven and a large percentage of the carbon dust and lint is left in the cloth to be removed later. In the use of our open-width crusher it is unnecessary to detach the cloth from the carbonizing dryer and baker, it being possible to use our open-width crusher in conjunction with the carbonizing dryer and baker, thus employing three machines in one continuous operation.

The jaws may be either smooth or groove and if grooved, the grooves are staggered in the confronting faces of the jaw plates, as shown in Fig. 2.

From the foregoing, it will be understood that the jaws do not beat the cloth as it passes through the machine, they merely keep the web of the material under tension, so as to prevent too fast a feed. However, as one or both sets of jaws of each jaw ensemble, can be vibrated, the cloth is flexed in the space between the opposed sets of adjacent jaws, as indicated in Figs. 6 and 7, the flexing being at the rate of approximately 600 to 700 times per minute. This shakes out the carbon or other foreign matter, which is then picked up by a vacuum to remove the same. As heretofore mentioned, if both sets of jaws are vibrated in opposite directions, as indicated in Fig. 7, the speed of vibration may be decreased.

Heretofore, where a rope crusher was not employed, the prior proposals in which the cloth or web is treated, fall into one or two classes. The web is either subjected to a beating action which causes considerable wear, or to the action of brushes which have the same result plus the loss of nap, or to the action of air blasts and vacuum. In our apparatus, the jaws themselves exert no beating action on the cloth as they merely exert tension and by the vibration of one or both pairs of jaws, the cloth is flexed at high speed between the pair of opposed jaws. This flexing action does not cause wear like a beating or brushing operation, but loosens the carbon and other foreign matter so that it may be readily removed by vacuum.

The sets of jaws in Fig. 1 are shown vertically arranged or in superposed relation, but it is obvious that the jaws of one or all of the jaw ensembles may be horizontally disposed, if desired.

While we have disclosed some preferred forms of the apparatus to be practiced by the use thereof, we are aware that changes may be made in the details of the apparatus without departing from the spirit of the invention, as expressed in the following claims.

What we claim and desire to secure by Letters Patent is:

1. In a machine of the character described, a first set of jaws and a second set of jaws each having a pair of confronting plates, the plates of one set of jaws having edges arranged in close proximity to and confronting edges of the plates of the other set of jaws, means for vibrating at least one set of jaws relatively to the other set of jaws, means for feeding a web of textile fabric progressively through both sets of jaws, and yielding means urging the plates of each set of jaws into gripping relation with the web.

2. In a machine of the character described, a first set of jaws and a second set of jaws each having a pair of confronting plates, at least one pair of plates being provided with transversely extending grooves in the confronting faces thereof and the grooves of one plate being staggered with reference to the grooves of the opposite plate, the plates of one set of jaws having edges arranged in close proximity to and confronting edges of the plates of the other set of jaws, means for vibrating at least one set of jaws relatively to the other set of jaws, means for feeding a web of textile fabric progressively through both sets of jaws, and yielding means for urging the plates of each set of jaws towards each other to grip the web.

3. In a machine of the character described, a first set of jaws and a second set of jaws each having a pair of confronting plates, the plates of one set of jaws having edges arranged in close proximity to and confronting edges of the plates of the other set of jaws, means for vibrating at least one set of jaws relatively to the other set of jaws, means for feeding a web of textile fabric progressively through both sets of jaws, bolts passing through each pair of plates, nuts on the bolts, springs arranged on the bolts engag-

ing the plates at one end and engaging the nuts at the other end, and said nuts being threaded on the bolts for varying the compression of the springs.

4. Apparatus for crushing and removing carbonized material from a moving flat web of textile fabric consisting of, a first set of jaws and a second set of jaws each having a pair of confronting members, the members of one set of jaws having edges arranged in close proximity to confronting edges of the other members of the other set of jaws, means for oscillating the edges of one set of jaws transversely of the edges of the other set of jaws, means for moving a web of textile fabric in a flat condition between the members of both set of jaws, and means urging the members of each set of jaws towards each other to grip the web therebetween whereby the carbonized material is crushed between the members of the jaws and the web is flexed while moving between the jaws.

5. Apparatus for crushing and removing carbonized material from a continuously moving flat web of textile fabric consisting of, a first set of jaws and a second set of jaws each having a pair of confronting members, the members of one set of jaws having edges arranged in close proximity to confronting edges of the other members of the other set of jaws, means for drawing a web of textile fabric in a flat unfolded condition between the members of both sets of jaws, means urging the members of each set of jaws towards each other to frictionally grip the web, and means for oscillating the edge of one set of jaws transversely of the direction of movement of the web and relative to the other set of jaws.

6. Apparatus for crushing and removing carbonized material from a moving flat web of textile fabric consisting of, a first set of jaws and a second set of jaws each having a pair of grip members, the grip members of one set of jaws having edges arranged in close proximity to edges of the other grip members of the other set of jaws, means for oscillating the edge of the first set of jaws transversely of the edge of the second set of jaws, means for oscillating the edge of the second set of jaws transversely of the edge of the first set of jaws, means for moving a web of textile fabric in a flat condition between the grip members of both sets of jaws, and means urging the members of each set of jaws towards each other to frictionally engage and press against opposite sides of the web whereby the carbonized material is crushed between the grip members of the jaws and the web of textile fabric is flexed during movement between the jaws.

HOWARD B. RAND.
ROYAL NASON HOYT.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,077,867	Becker et al.	Nov. 4, 1913
1,176,995	Stirn	Mar. 28, 1916
1,375,663	Ainsworth	Apr. 26, 1921
2,104,102	Ruthven	Jan. 4, 1938
2,211,838	Riggs	Aug. 20, 1940