Nov. 19, 1929. J. E. JOHNSON 1,735,903

AIR BAG CLEANING AND BUFFING MACHINE

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Fig. 1

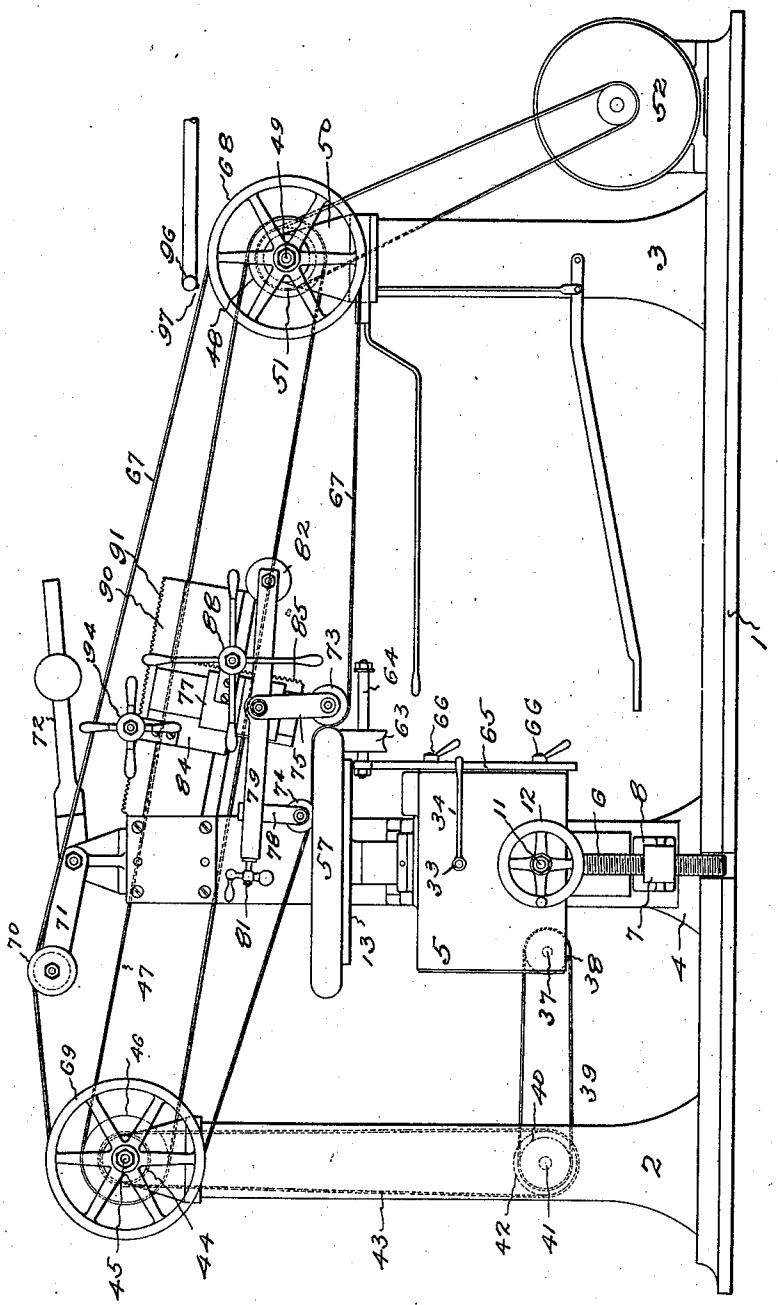

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Fig. 2

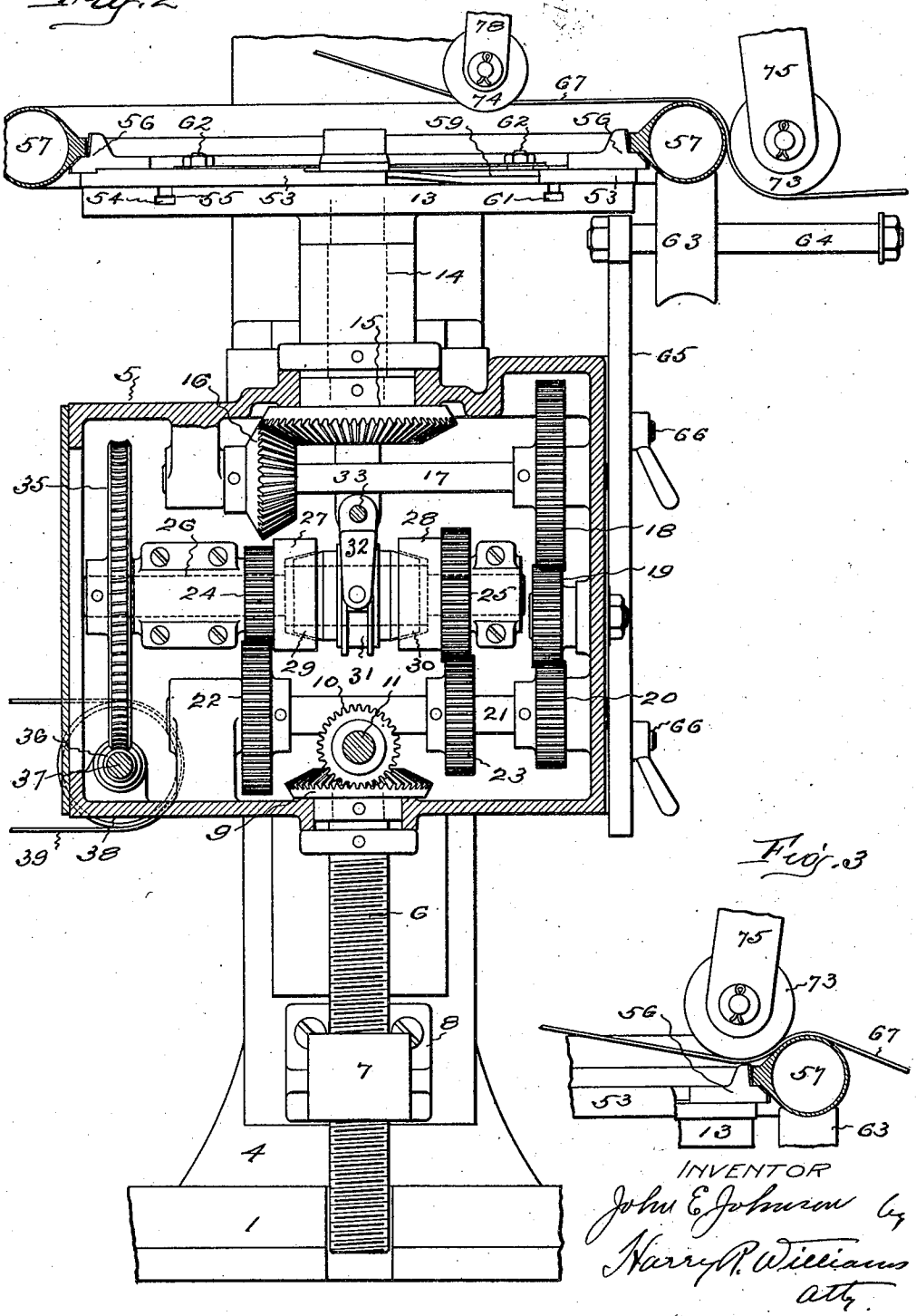

Fig. 3

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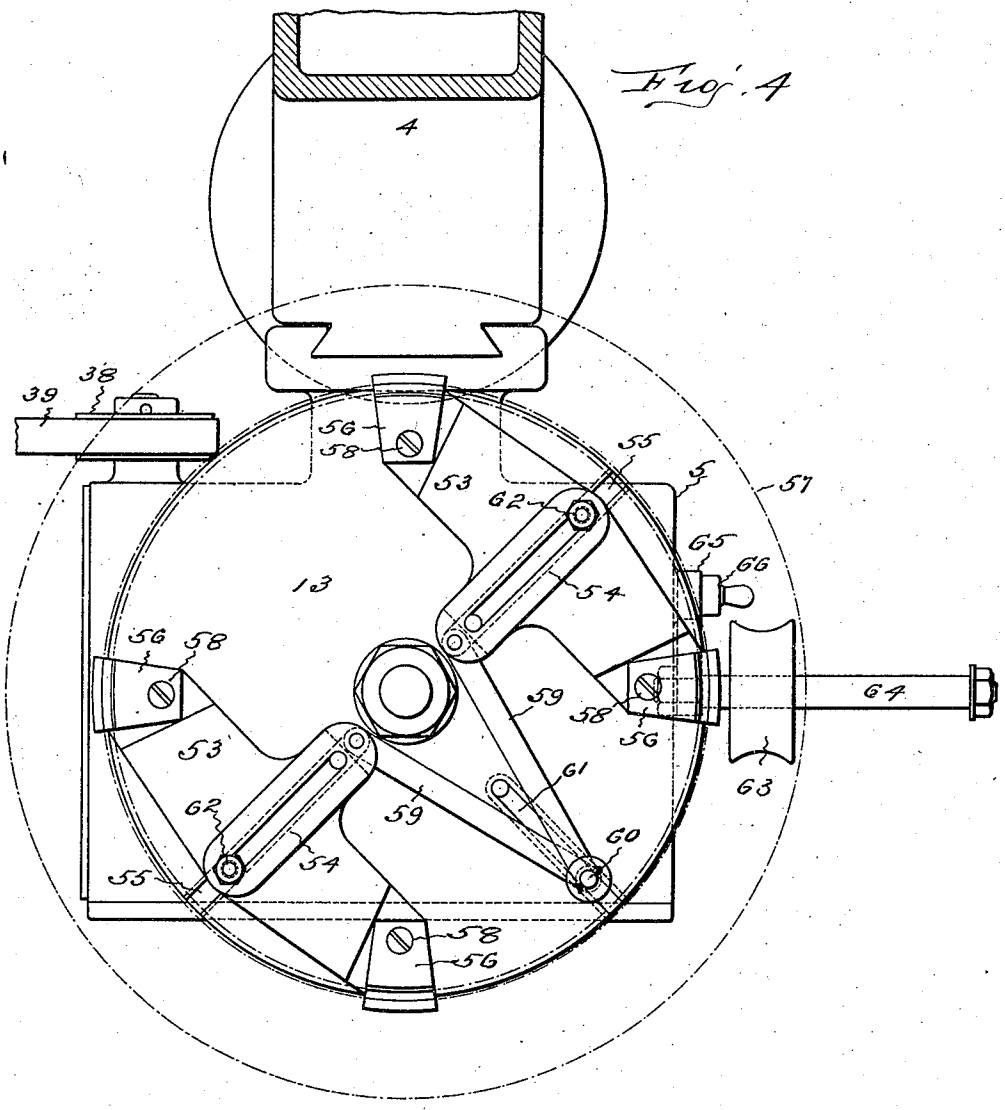
Fig. 4



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AIR BAG CLEANING AND BUFFING MACHINE

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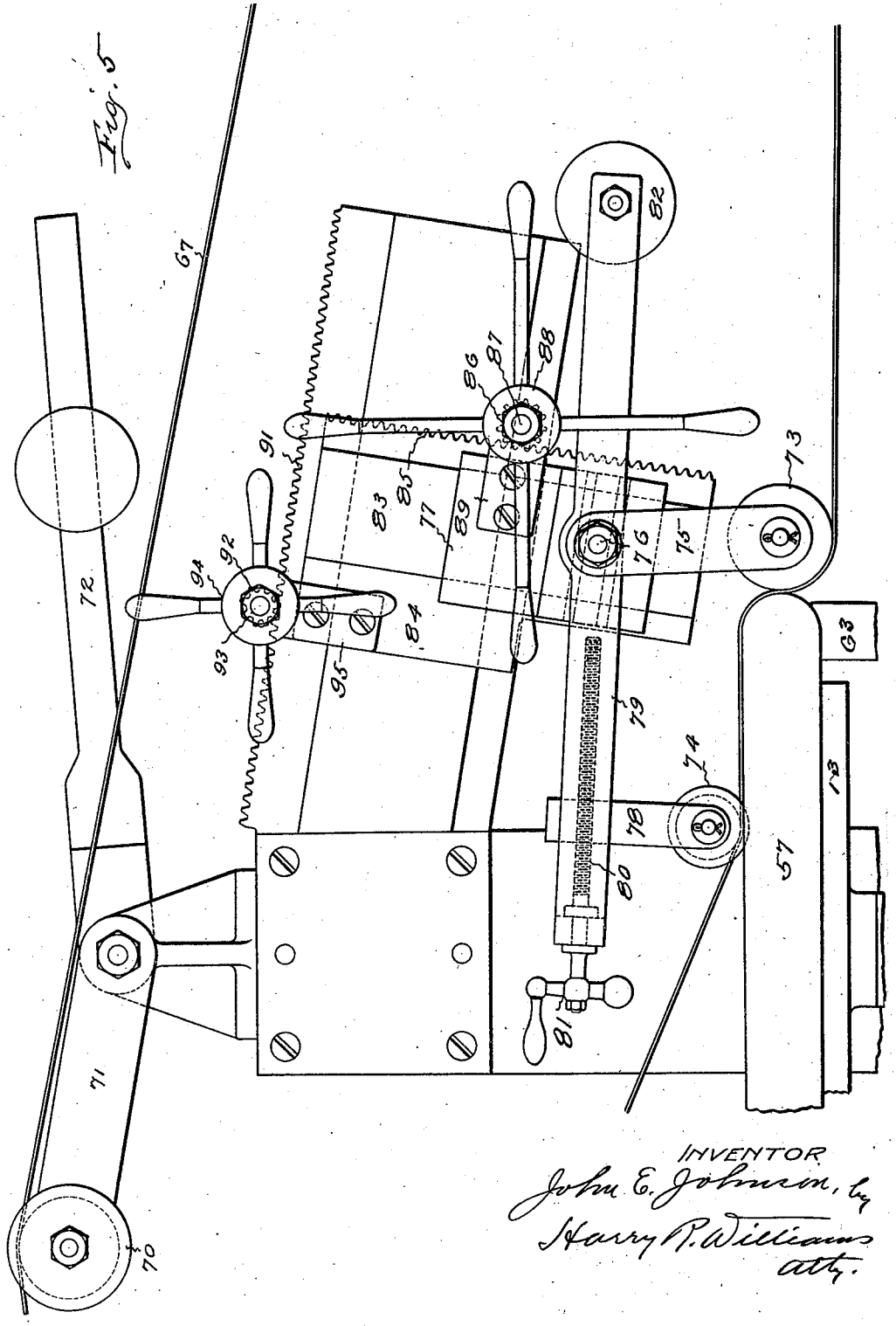
Fig. 5



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UNITED STATES PATENT OFFICE

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AIR-BAG CLEANING AND BUFFING MACHINE

Application filed January 15, 1926. Serial No. 81,362.

This invention relates to those machines which are designed for cleaning and buffing the outer surfaces of air inflated rubber bags of the type which are used in the manufacture of tires, more particularly in the curing of cord and balloon tires, such bags having exterior outlines that conform approximately to the interior of the tires.

The object of the invention is to provide a simple machine of this character on which air bags of different sizes may be easily placed and very rapidly and thoroughly cleaned.

The machine illustrated as embodying the invention has a rotating table with fingers for receiving and holding the bags, the fingers being radially adjustable in order to fit bags of different diameters and the table being vertically adjustable to bring the bag surfaces into proper relation with the cleaning means. Mechanisms are provided for rotating the table at different speeds so as to expose the entire circumference of the bags to the action of the cleaning means at such a rate that the bags will be completely cleaned. The cleaning means consists of a rapidly running endless belt having a surface coated with hard granular particles, such as carborundum, of the necessary size to properly rub the surfaces of the bags. This belt passes around two pulleys, both of which are driven, and it is held against the bag surfaces by the pressure of a roll which is mounted on slides that are adjustable vertically and longitudinally so that the belt may by proper adjustments be brought into contact with the entire surfaces of the bags. Rollers are provided to guide and keep the proper tension on the belt, and a roller is adjustably mounted so as to support the bags beneath the locality where the cleaning belt is pressed against the bags. Means, such as an air nozzle connected with a blower, are provided for cleaning the belt of particles it picks up during operation.

In the accompanying drawings Fig. 1 shows a front elevation of a machine embodying the invention. Fig. 2, on larger scale and with the casing in section, shows a front elevation of the bag carrying table and its elevating and rotating mechanisms, with the cleaning belt guided to rub the outer surface of the bag. Fig. 3 is a detail showing the cleaning belt guided to rub the inner surface of the bag. Fig. 4 shows a plan of the table and bag holding fingers. Fig. 5 shows a front elevation of the pressure and guide rolls and the mechanism for adjusting the rolls horizontally and vertically so that they may be positioned to cause the belt to clean the entire surface of the bag.

The machine illustrated has a bed 1 with a column 2 near one end, a column 3 near the other end, and a column 4 between those at the ends. Movable vertically on the lower part of the front of the intermediate column is a carriage 5. Rotatably connected with the lower part of this carriage is a screw 6 that is threaded through a sleeve 7 at the end of a bracket 8 which is fastened to the front of the intermediate column near the bed. On the upper end of this screw in the carriage is a bevel gear 9 engaged with a bevel gear 10 on the spindle 11 that at the front of the frame has a hand wheel 12. By means of this hand wheel and the gears and screw the carriage may be adjusted up and down on the front of the column.

The table 13 is attached to the upper end of a vertical shaft 14 that is rotatably mounted in suitable bearings in the upper part of the carriage. On the lower end of this shaft in the carriage is a bevel gear 15 meshing with which is a bevel gear 16 on one end of a horizontal shaft 17 that is mounted in the carriage. On the other end of this horizontal shaft is a gear 18 meshing with which is an intermediate gear 19 that is engaged by a gear 20 on one end of a horizontal shaft 21 mounted in the carriage. Fastened on this shaft 21 are gears 22 and 23 of different diameters, the former of which is engaged by a gear 24 and the latter is engaged by a gear 25, The gears 24 and 25 are of different diameters. The gear 24 is fastened to a female clutch member 27 and the gear 25 is fastened to a female clutch member 28. These gears and clutch members are loose on the horizontal shaft 26 which is mounted in the carriage. Adapted to engage these clutch members are the male clutch members 29 and 30 which are provided with a grooved collar 31 and are splined to

the shaft 26. Engaging with this collar is a fork 32 on a spindle 33 that extends to the front of the frame and is provided with a hand lever 34. On an end of the shaft 26 is a worm wheel 35 that is engaged by a worm 36 on a shaft 37 that has a pulley 38. By manipulating the lever 34 the clutch may be engaged with either the gear 24 or the gear 25, and thereby the ratio of rotation of the table to the rotation of the worm may be varied and the table rotated at the desired speed. All of these parts are mounted on the carriage so that they will be moved up and down with the table when the hand wheel 12 is turned, without interfering with the rotation of the table.

The pulley 38 is connected by a belt 39 with a pulley 40 on the shaft 41 that is mounted on the column 2. The shaft 41 also has a pulley 42 that is connected by a belt 43 with a pulley 44 on the shaft 45 mounted in a bearing at the top of the column 2. On the shaft 45 is a pulley 46 that is connected by a belt 47 with a pulley 48 on the driving shaft 49 that is mounted in brackets 50 at the top of the column 3. On the shaft 49 and connected by any well known type of clutch is a pulley 51 that may be belted to any convenient source of driving power, for instance, an electric motor 52. By the mechanisms above described the table may be raised and lowered as required and may be rotated at the desired speed, which is relatively very low compared to the speed of the driving shaft.

On the top of the table is a chuck designed to fit into the air bag and hold it on the table while being cleaned. This chuck comprises a pair of radially movable face plates 53 that have T-shaped tongues 54 fitted into similarly shaped grooves 55 in the upper face of the table. At the side ends of these plates are angularly flanged fingers 56 which are designed to fit against and under the inner edge of the air bag 57 placed on the table to be cleaned, so as to support and hold the air bag in position from the inner side, leaving the periphery of the bag unobstructed. As the chuck face plates are movable radially outward according to the diameters of the bags, these fingers are pivotally connected by studs 58 with the plates so that they may be turned to conform to the arcs of the bags of different diameters. To ensure the uniform outward movement of the fingers the inner ends of the chuck plates are connected with each other by two links 59 that are hinged together by a stud 60, the head of which is adapted to move in the radial T-shaped slot 61 in the upper face of the table. When the plates are adjusted to the necessary positions to hold the bag to be cleaned they may be clamped in place by the studs and nuts 62. The air bag to be cleaned is placed over the table and its inner edge rested upon these fingers which have been properly adjusted for the particular size of bag to be cleaned.

On one side below and adjacent to the edge of the table is a roller 63 shaped to support the air bag at this locality. This roller is slidably mounted on a rod 64 that projects horizontally from a vertically adjustable bar 65 that is fastened to the side of the carriage by clamps 66. When these clamps are loosened this supporting roller may be raised or lowered, depending on the size of the air bag that is to be supported. As this roller is mounted on the carriage it moves up and down with the table.

The cleaning belt 67 has one surface roughened, preferably by a coating of granular abrasive particles, and it passes around a pulley 68 fastened on the driving shaft 49 at the top of the column 3 and around a pulley 69 tight on the shaft 45 at the top of the column 2. A tightener roll 70 on a rocker arm 71 connected to a weighted lever 72 at the top of column 4 is arranged to give the cleaning belt the desired tension.

The rapidly running belt is pressed down against and guided over the surface of the bag to be cleaned, as the bag rotates slowly with the table, by a pressure roll 73 and flanged belt guide roll 74. The pressure roll 73 is carried by a fork 75 that has a limited oscillatory adjustment on a stud 76 which projects from a vertical movable slide 77. The guide roll 74 is carried by a fork 78 that is adjustable along one limb of a lever 79 which is fulcrumed on the stud 76. A screw 80 with a handle 81 is provided for adjusting the fork and guide roll along the lever. At the end of the other limb of the lever is a counterbalancing weight 82. The vertical adjustable slide 77 is movable up and down on a way 83 formed on the front face of a horizontally movable slide 84. On the edge of the slide 84 are rack teeth 85 engaging with which are the teeth of a pinion 86 fastened to the spindle 87 of the hand wheel 88 that is carried by a bracket 89 attached to the vertical slide. Upon turning the hand wheel 88 the slide 77 carrying the pressure roll 73 and the guide roll 74 may be moved up and down on the slide 84. On the upper edge of an arm 90 that extends from the top of the column 4 are rack teeth 91 and engaging with these teeth is a pinion 92 fastened to the spindle 93 of the hand wheel 94 that is carried by a bracket 95 attached to the horizontal slide. Upon turning the hand wheel 94 the slides carrying the pressure and guide rolls may be adjusted horizontally.

A pipe 96 with nipples 97 may be led from any supply of air under pressure to a position close to the abrasive surface of the cleaning belt 67 for the purpose of blowing particles from the belt and keeping it clean.

A bag is placed upon the chucking arms of the table with the section that is in the

plane of the cleaning belt resting upon the supporting roll, the roll and table being adjusted to the required height. The slides are then adjusted by turning the hand wheels so that the pressure and guide rolls will cause the belt to run against the upper outer quadrant of the bag. The table is then set in motion so that the bag is carried slowly around and the driving mechanism started so that the belt will travel rapidly and abrade the section of the bag with which it is in contact, around the entire circumference. The pressure and guide rolls to accomplish this are adjusted to the position illustrated in Fig. 2. After the upper outer quadrant of the bag has been cleaned by the belt entirely around its circumference the hand wheels are turned and the slides adjusted to such positions that the pressure roll will be on the inside of the bag as shown in Fig. 3. With the roll in this position the belt is caused to rub against and clean the inner upper quadrant of the bag. After the entire upper half of the bag has been cleaned the slide carrying the pressure and guide rolls is lifted and the bag taken off and replaced in an inverted position on the table arms and supporting roll. Then the pressure and guide rolls are adjusted so that the belt will clean this section of the bag. By this means the entire effective surface of the bag may be rapidly abraded and cleaned and buffed by means of the cleaning belt.

The invention claimed is:

1. A machine for cleaning air bags comprising a table rotatable in a horizontal plane and having means for retaining the bag to be cleaned, mechanism for rotating the table, an endless abrasive belt supported above and movable across the top of the table, mechanism for causing the belt to travel continuously in one direction, rolls extending between the upper and lower sections of said belt and adapted to positively engage and press the lower section of the belt downward, a vertically adjustable slide carrying said rolls, and a horizontally adjustable slide carrying the vertically adjustable slide, whereby the rolls may be located to guide said belt against the outer and inner periphery of a bag located on the table.

2. A machine for cleaning air bags comprising a table rotatable in a horizontal plane and having means for retaining the bag to be cleaned, mechanism for rotating the table, an endless abrasive belt supported above and movable across the top of the table, mechanism for causing the belt to travel continuously in one direction, rolls extending between the upper and lower sections of said belt and adapted to positively engage and press the lower section of the belt downward, oscillatory supports for said rolls, a vertically adjustable slide carrying said supports, and a horizontally adjustable slide carrying said vertically adjustable slide.

3. A machine for cleaning air bags comprising a table rotatable in a horizontal plane and having means for retaining the bag to be cleaned, mechanism for rotating the table, an endless abrasive belt supported above and movable across the top of the table, mechanism for causing the belt to travel continuously in one direction, a pressure roll and a guide roll, extending between the upper and lower sections of said belt and adapted to positively engage and press the lower section of the belt downward, oscillatory supports for said rolls, said guide roll being horizontally adjustable on its support, a vertically adjustable slide carrying said oscillatory supports, and a horizontally adjustable slide carrying said vertically adjustable slide.

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