

March 20, 1934.

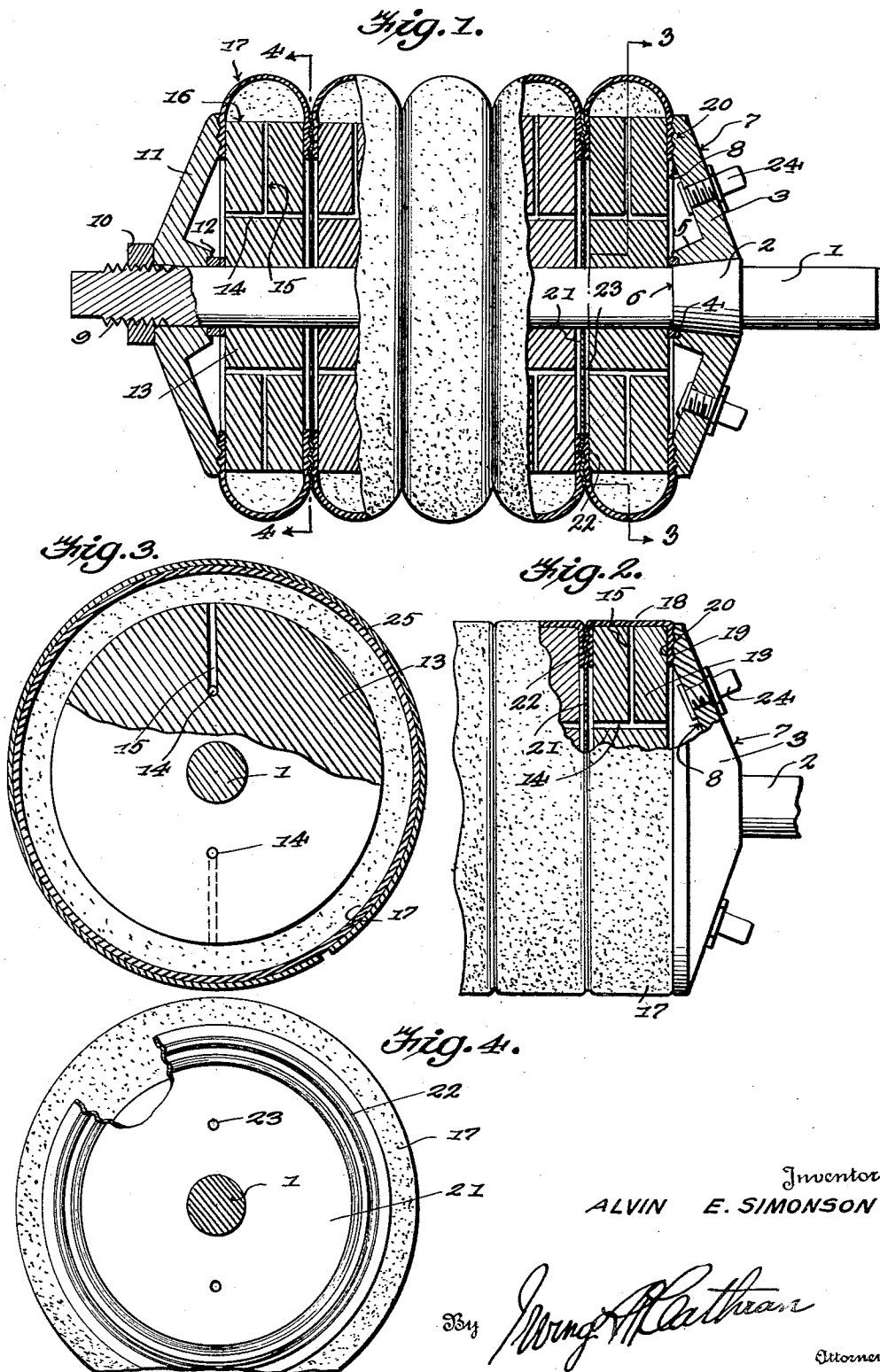
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1,951,998

SECTIONAL INFLATING DEVICE

Filed March 7, 1932

2 Sheets-Sheet 1



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2 Sheets-Sheet 2

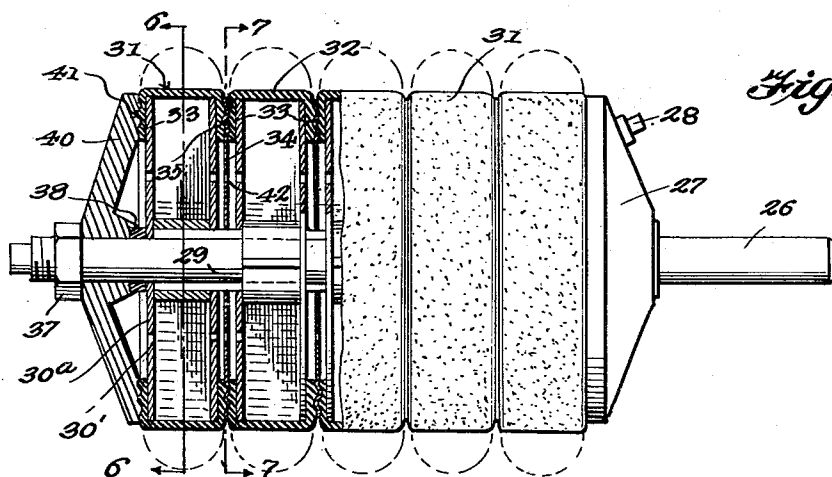


Fig. 5.

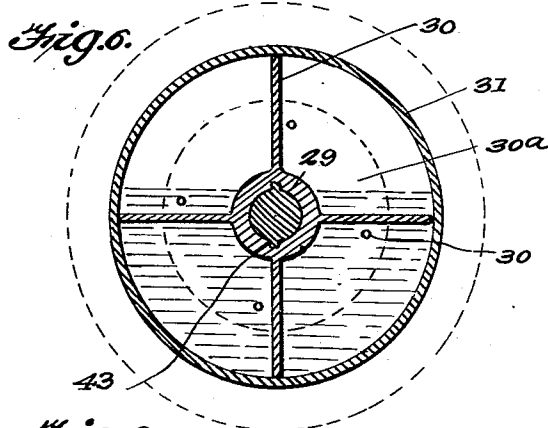


Fig. 6.

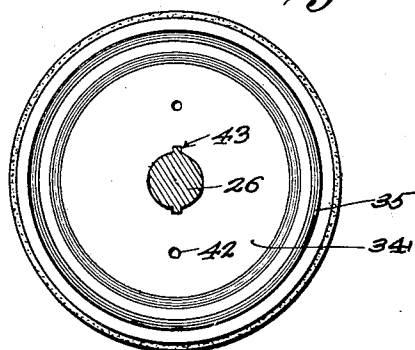


Fig. 7.

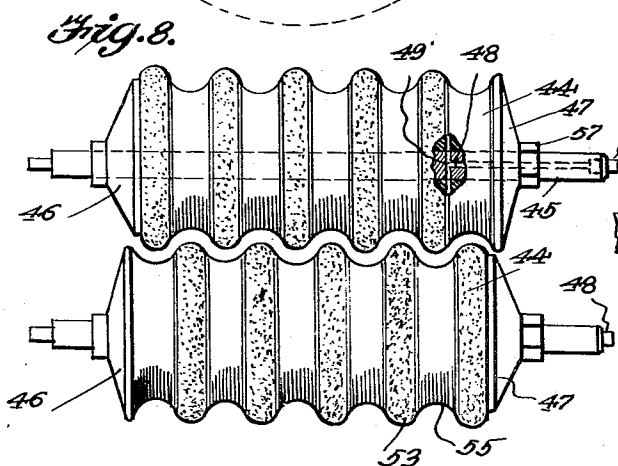


Fig. 8.

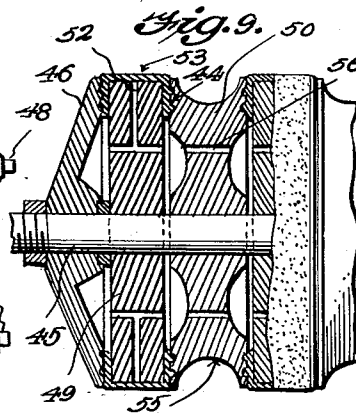


Fig. 9.

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1,951,998

SECTIONAL INFLATING DEVICE

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5 Claims. (Cl. 51—192)

This invention relates to a sectional inflating device especially adapted for use in grinding and polishing, and the principal object of the invention is the production of a simple and efficient sectional inflating device which will efficiently support the polishing or grinding elements and whereby the tension of the inflated device may be increased or diminished at the will of the operator.

Another object of this invention is the production of a simple and efficient means for supporting the sectional inflatable elements in an assembled position or relation to constitute an efficient support for the usual split metal polishing or grinding sleeve, used particularly for internal polishing of bushings, sleeves, and cylinders.

A still further object of this invention is the production of a simple and efficient sectional inflatable core which is adapted for use in many different ways, such for instance as a grain cleaning roller upon a fanning mill, and the same structure may be employed in any place where an air cushion wheel is desired.

With these and other objects in view, the invention consists in certain novel constructions, combinations and arrangements of parts as will be hereinafter fully described and claimed.

In the drawings, Figure 1 is a side elevation partly in section of my improved device;

Figure 2 is a side elevation of one end of the device shown in Figure 1 in a deflated position;

Figure 3 is a section taken on line 3—3 of Figure 1;

Figure 4 is a section taken on line 4—4 of Figure 1, certain parts being broken away;

Figure 5 is a side elevation partly in section of a modified form of the invention;

Figure 6 is a section taken on line 6—6 of Figure 5;

Figure 7 is a section taken on line 7—7 of Figure 5;

Figure 8 is a plan view of the present invention adapted to a fanning mill structure, illustrating a pair of grain cleaning rollers arranged in their relative associated positions; and

Figure 9 is a longitudinal section of one end portion of the structure shown in Figure 8.

By referring to the drawings, it will be seen that 1 designates the supporting shaft which is provided with the cone-shaped abutment 2 near one end, the cone-shaped abutment producing a wedge-like bearing for the valve supporting head 3. A suitable rubber or other washer 4 is carried by the annular flange 5 of the valve head 3

and this washer 4 engages the inner end 6 of the substantially cone-shaped abutment 2 carried by the shaft 1, so as to constitute a seal at the inner end of the annular flange 5. The valve head 3 is annular in shape and has its outer edges pitched inwardly to produce an inclined outer face 7, and an inclined inner face.

The supporting shaft 1 is provided with a threaded outer end 9 for receiving the binding nut 10, this binding nut engaging the end plate 11, the end plate 11 being formed similar to the valve head 3 and carrying a sealing washer 12, as shown.

A plurality of disc sections 13 are mounted upon the supporting shaft 1 and these disc sections are provided with air passageways 14 extending transversely thereof which air passageways 14 communicate with the radially extending passageways 15 extending to the periphery 16 of the disc sections 13.

A rubber or elastic covering 17 is fitted over the periphery or outer edge of each of the disc sections 13, as shown, and these coverings 17 are normally substantially U-shaped in cross-section to provide outer tread portions 18, and side annular flanges 19 for fitting between the respective disc sections 13, as shown. The valve head 3, as well as the end plate 11, is each provided with corrugated inner edges 20 for firmly gripping the side annular flanges of the adjoining covers 17 as shown in Figures 1 and 2 of the drawings, and mounted upon the shaft 1 and intermediate the respective disc sections 13 are arranged metal disc plates 21 having annular corrugations 22 formed near the outer periphery thereof for fitting between the respective flanges 19 of the flexible or rubber covers 17, thereby firmly clamping and gripping the flanges 19 of the respective covers 17 and holding the same against accidental displacement from the disc sections 13. These disc plates 21 are provided with suitable apertures 23 for the purpose of permitting the inflated medium such as air, or liquid, to pass from one disc section to the other.

As shown in Figure 1, suitable valves 24 are employed for the purpose of permitting the device to be inflated and deflated at the will of the operator, and as the air passes into the valve head 3 through the valves 24, the air will pass through the channels 14 and 15 and force the outer portion 18 of the inflatable or rubber cover 17 to the position shown in Figure 1.

A suitable split sleeve to which is secured a suitable abrasive element and indicated by the numeral 25 may be slipped over the entire length of

- the sectional inflated device and will be firmly held thereon by increasing the pressure within the inflatable device through the valves 24. As the grinding continues, and should it be desired to increase the pressure, additional pressure may be inserted through the valves 24 for increasing the expansion of the flexible or rubber cover 17 and naturally expanding the expanding element 25 which, as stated above, consists of a split ring structure of the usual type carrying an abrasive substance or element. This abrasive substance or element may be renewed to produce an efficient hone for truing and straightening a hole, and it should be understood that any suitable or desired means may be employed for grinding and polishing, the present invention residing solely in the sectional inflated device, providing a support or holder for the grinding and polishing element.
- In Figure 5 there is shown a modified form of the invention wherein the shaft 26 is employed carrying a valve head 27 to which is secured suitable valves 28 for the purpose of inflating. A plurality of hub sections 29 are mounted upon the shaft 26 and these hub sections 29 are provided with radiating fins or impelling blades 30 which extend outwardly, as shown in Figure 6. Apertured cover supporting discs 30a are mounted upon each side of the blades 30 and abut the side edge thereof. These discs 30a carry the rubber covers 31 and furnish an abutment for the rubber flanges 33. The discs 30a are provided with apertures 30'. This rubber covering element is provided with an outer face 32 and inwardly extending annular flanges 33, between the adjacent flanges of the respective covering elements being mounted a disc plate or clinch washers 34, having corrugations 35 for the purpose of firmly clamping the adjoining annular flanges 33 of the covering sections together. The radially extending fins or blades 30 will constitute a reinforcement for this covering element 31, previously described, and spacing means for the discs 30a. The respective hub sections 29 are placed upon the shaft 26 and the valve head 28 is held upon the shaft 26 in an adjusted position by means of a clamping nut 36. A clamping nut 37 is carried by the opposite end of the shaft 26 and is threaded thereon, a suitable packing 38 being carried by the head 40 for abutting against one of the plates 30a. This plate 40 as well as the valve head 27 may be provided with suitable corrugations 41 for the purpose of firmly clamping the rubber or flexible covering element 31. It should be understood that the various sections of the inflated device will be firmly drawn together through the medium of the nuts 36 and 37, thereby causing the abutting flanges 33 of the respective inflatable sections 31 to be tightly drawn into engagement with the corrugated portions 35 of the plates 34. The plates 34 are provided with suitable air entrance openings 42 to permit the passage of air or liquid from one section to another.
- In the structure shown in Figures 5, 6 and 7, it will be seen that the plates 34 are keyed as at 43 to the shaft 26, to impart impelling movement as the shaft 26 is rotated. It should be further understood that as the inflating air or liquid is forced into the valve 28 this will cause the flexible covering element to expand to the position shown in dotted lines and a suitable burnishing, polishing or grinding sleeve such as is illustrated in Figure 3 in connection with the preferred embodiment may be mounted upon the inflatable core or supporting element for the purpose of facilitating internal grinding, polishing or cleaning. By means of the structure above described, and through the medium of the impelling blades the pressure may be varied depending upon the speed of the device as a result of the centrifugal force created.
- In Figures 8 and 9 of the present illustration, there is shown a device which is adaptable for use in connection with fanning mills, and which may be used as a grain cleaning roller. This will eliminate the necessity of the sieve in a shoe by constructing the roll as shown in Figures 8 and 9. In this form of the invention, a plurality of rollers 44 are employed mounted upon the supporting shaft 45, the rollers being so constructed as to produce a corrugated outer face, the corrugations of one roller interlocking with the corrugations of the adjoining roller.
- Each roller as stated above, is mounted upon a suitable shaft 45 and carries a primary head 46 at one end and a retaining plate 47 at the other for the purpose of holding the various sections in clamped and assembled relation. Suitable sectional discs 49 are mounted upon the supporting shaft 45, and between each disc is mounted a spacing disc 50. Each disc 49 is provided with transversely extending air passageways 52 extending to the peripheries of the discs 49. Suitable inflatable covers 53 are mounted upon the periphery of the discs 49 and these covers are substantially U-shaped in cross section and are engaged by the grooved faces 44 of the spacing discs 50. The spacing discs 50 are provided with a concaved outer periphery 55, as shown, and these discs 50 are also provided with transversely extending air passageways 56 to permit the passage of air from one section to another. These sections may be duplicated in any suitable or desired number to provide the alternate convex flexible spaced cleaning elements for the grain cleaning rollers, these concaved portions of the spacing discs 50 constituting the alternate concaved faces on the roller to receive the flexible or inflatable convex elements of the adjoining roller. One of the heads 46 or 47 may be provided with inflating valves such as is illustrated in Figures 1 and 5, or the device may be inflated by providing an inflating valve 48 at the end of the shaft 45, which communicates with a longitudinal passage 48' extending longitudinally of the shaft 45, suitable outlets 49' being provided to communicate with the interior of the device. These outlets 49' are preferably located to extend at right angles to the passage 48' at a point between the spacing discs 50 and the discs 49.
- Such an inflating means may be substituted for the inflating valves shown in Figures 1 and 5, if desired, without departing from the spirit of the invention.
- It should be understood that certain detail changes in the mechanical construction may be employed without departing from the spirit of the invention, so long as these changes fall within the scope of the appended claims. In the structures shown in Figures 8 and 9 suitable clamping nuts 57 may be employed at the ends of the shaft 45 for holding the various sections in clamped assembled relation.
- Having described the invention, what is claimed as new is:
1. A device of the class described comprising a supporting shaft, heads carried by said shaft, a plurality of disc sections upon said shaft in side-by-side relation to each other, means for clamp-

- ing said heads and disc sections in assembled relation upon said shaft, a flexible covering element extending circumferentially about each section in covering relation to the periphery thereof, means carried by said shaft between the various sections for engaging said flexible element and securing the same in engagement with said disc sections when the clamping means is tightened, each disc section being provided with a plurality of air channels extending transversely through the same and having portions opening through the periphery of the disk beneath the flexible covering element, and means for controlling passage of air through a head for increasing or decreasing the pressure within said covering element.
2. A device of the class described comprising a shaft, a plurality of disc sections mounted upon said shaft, a head carried by one end of said shaft, a valve for controlling passage of air through said head, a clamping head carried by the other end of said shaft and movable along the shaft for holding said disc sections in an assembled clamped relation between the heads, a flexible and elastic covering extending about the periphery of each disc section, said coverings being provided with inwardly extending annular side flanges engaged between the discs and heads, and air passages being provided through the disc sections whereby the covers may be distended.
3. A device of the class described comprising a shaft, a plurality of disc sections, means for holding said disc sections in clamped assembled relation, a disc plate interposed between each disc section and provided with a corrugated end, an elastic covering substantially U-shaped in cross section fitted upon the periphery of each disc section, each covering provided with an inwardly extending annular flange, the flanges of the adjoining covers being gripped by the corrugated portion of said plate for holding the covers in an assembled relation upon the disc sections, each disc section provided with air channels formed therein and communicating with the periphery thereof for facilitating the inflation and deflation of the flexible elastic covering elements, and valve means communicating with all the covering elements for inflating and deflating the same.
4. A device of the class described comprising a shaft, a substantially conical-shaped abutment formed upon said shaft, a valve head having a hub wedged upon said abutment, a sealing washer for sealing the inner end of the hub of said valve head, a plurality of disc sections mounted upon said shaft, a clamping plate slidable upon the opposite end portion of said shaft and provided with a sealing washer fitting closely around said shaft, a clamping nut upon said shaft engaging said clamping plate for urging the clamping plate and disc sections towards said head and securing the plate and disc sections in an adjusted position upon said shaft, elastic covers carried by said disc sections and extending about the peripheries thereof, and means for inflating and deflating said covers.
5. A device of the class described comprising a shaft, a plurality of nested elements mounted upon said shaft, each nested element comprising a hub portion having radiating fins, reinforcing disc plates abutting the edges of said fins, an elastic covering element mounted upon each section and provided with inwardly extending flanges fitting snugly against said disc plates, clamping plates in the nature of clinch washers carried by said shaft and having crimped marginal portions interposed between the flanges of the adjoining covering elements for holding the covering elements in position, and means for clamping all of said elements in nested assembled relation.

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