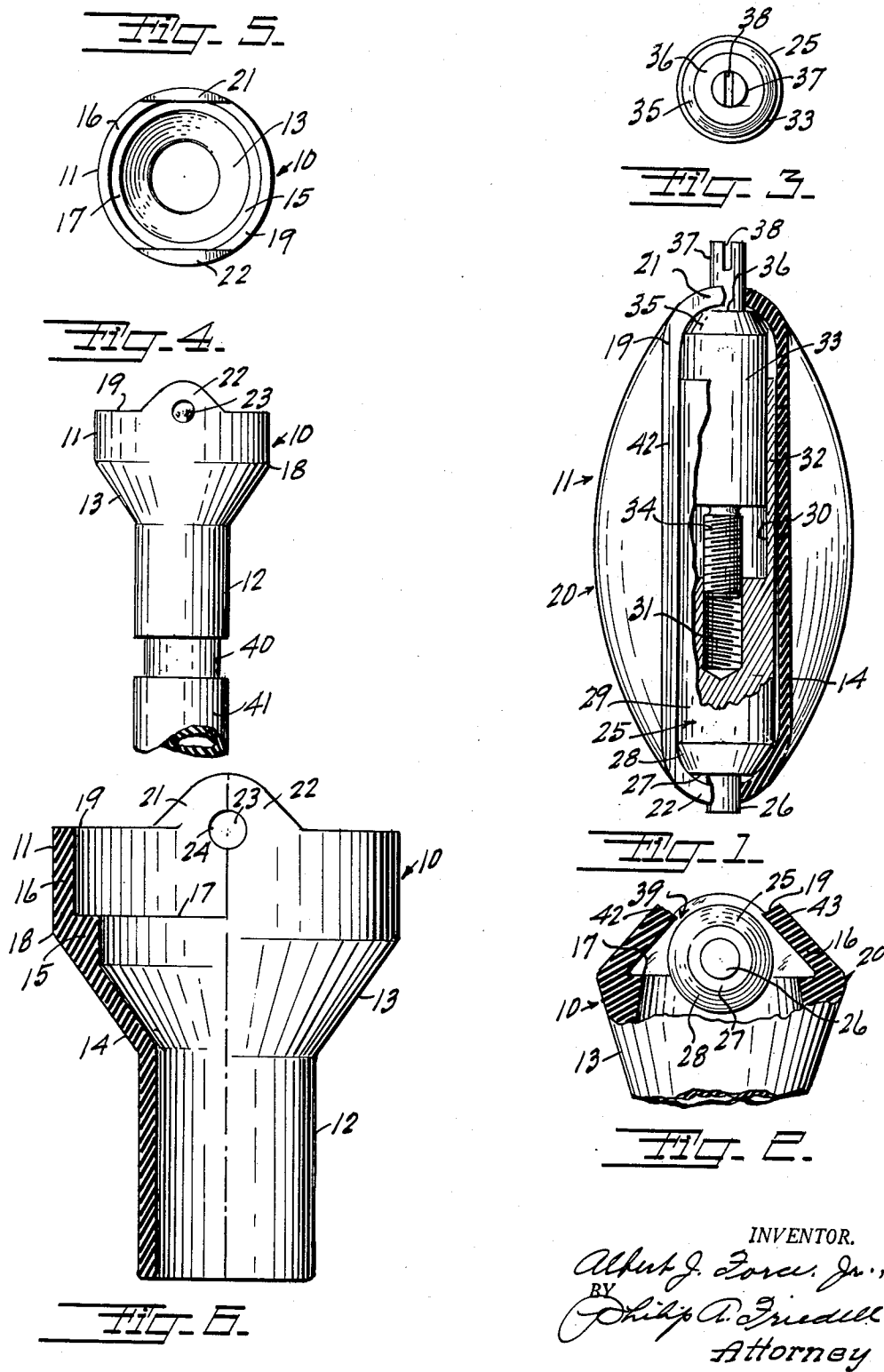


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A. J. FORCE, JR  
VIBRATORY MASSAGE DEVICE

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## VIBRATORY MASSAGE DEVICE

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8 Claims. (Cl. 128—38)

This invention relates to improvements in vibratory massage devices, and particularly to a vibratory device in which the suction hose of a vacuum cleaner or vacuum pump constitutes the vibratory element, operated by a vibratory valve, and is an improvement over existing devices of this nature in that the speed of vibration can be controlled at will.

Various types of apparatus have been proposed for creating a vibratory action in a suction hose, however, all have had disadvantages, such as being not self-starting, not having a predetermined period of vibration, not having suitable valve action for inducing strong vibration in the hose, and in all cases, the period of vibration is fixed. For ideal individual satisfaction and results, such vibration should be adjustable as to frequency, though within fairly narrow limits of the lower limit of audibility, ranging from possibly 10 to 30 cycles per second, and such has been accomplished through my improved vibratory valve, overcoming the disadvantages mentioned in other types including that disclosed in my copending application Serial Number 261,880, filed December 15, 1951, now Patent No. 2,655,146 of October 13, 1953.

The objects and advantages of the invention are as follows:

First, to provide a vibratory valve for inducing vibratory action in a suction hose and to provide adjustment of the valve for initiating vibration.

Second, to provide means as outlined in which the valve, following the initiation of vibration, may be adjusted at will to vary the speed of operation for a slower or a more rapid rate of vibration.

Third, to provide means as outlined with a spreader and reaction element having journals and with the valve housing being provided with diametric ears having passages therethrough for the journals.

Fourth, to provide means as outlined with a spreader and reaction element which is adjustable as to length for varying the rate of vibration.

In describing the invention reference will be had to the accompanying drawings, in which:

Fig. 1 is a top plan view of the invention shown partly in section to disclose the interior construction and relationship between the several elements.

Fig. 2 is a fragmentary elevation shown partly in section to illustrate the relationship between the edges of the vibratory portions of the housing and the spreader under vibrating conditions, as also the effect of the internal annular reinforcement.

Fig. 3 is an end elevation of the adjustable end of the spreader and reaction element.

Fig. 4 is a side elevation of the vibrator valve housing attached to a suction hose, and drawn to a reduced scale.

Fig. 5 is a top plan view of Fig. 4.

Fig. 6 is a side elevation of the vibrator valve housing shown in half section to clearly illustrate the inner annular reinforcement for limiting the vibratory portion.

The housing consists of a funnel-shaped member 10, formed of live rubber or other suitable resilient material, the upper end 11 of which is normally cylindrical, as is also the lower end 12, with the upper and lower cylindrical portions connected through a frusto-conical portion 13, the walls of all three portions indicated at 14 being substantially uniform in thickness with the exception of

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the juncture area between the upper cylindrical and the conical portion where an annular reinforcement is provided to stiffen this area sufficiently to limit vibratory valve action to the portion of the cylindrical wall 16 extending thereabove, the top surface of this reinforcement indicated at 17 being located in spaced relation above the break point 18 at the juncture of the upper cylindrical and conical portions, in fact, being located about one-fifth of the distance from the break point 18 to the top edge 19.

This reinforcement causes the vibratory valve action to exist only throughout this specific area because of the bulging of the housing at the reinforcement point, as indicated at 20 in Fig. 1. This reinforcement also reinforces about 25% of the conical portion at its upper end.

Ears 21 and 22 are located diametrically opposite each other and project from the top edge and each has a passage 23—24 formed therethrough with the axes coincident with this top edge 19.

The spreader and reaction element illustrated in Fig. 1 consists of a pair of telescopic members, the female member 25 having a journal 26 at one end and which continues into a right angle shoulder and thence being tapered as indicated at 28 to the cylindrical portion 29 which is counterbored at the other end as indicated at 30, with a tapped hole located axially from the counterbore as indicated at 31, the counterbore wall 32 being relatively thin.

The male element consists of a cylindrical body portion 33 which slidably fits in the counterbore 30 and terminates at one end in a threaded extension 34 for adjustment in the tapped hole 31, and terminates at the other end in a shoulder with a sloping portion 35 continuing into the square shoulder 36, and thence continuing into an axial journal 37 which is longer than the journal 26 so as to extend beyond the ear 21 or 22 to provide access to the screw driver slot 38 which is made wide enough for operation with a coin such as a half dollar when a screw driver is not available.

When the male element is screwed into the female element to the limit of adjustment, the spreader is of such length and diameter as to readily fit within the elongated housing by first inserting the journal 37 in one of the passages 23—24, then by stretching the housing or compressing the sides the other ear can be slipped over the other journal 26, the passages being a frictional fit on the journals so that the adjustment of the male element can be carried out without gripping the female element.

When suitably adjusted the device will appear as illustrated in Figs. 1 and 2, the reinforcement 15 causing the edges to incline toward the spreader and reaction element at an angle of approximately 45 degrees and to therefore overhang the spreader and reaction element as indicated at 39, and the greater the adjustment of the spreader and reaction element, the closer the side walls will be to the spreader and reaction element and the greater the overhang which reaches the 45 degree point as a maximum. As will be noted, the reinforcement 15 is essential in causing this angular relation between the inside walls of the housing and the spreader and reaction element and to insure a definite relationship therebetween in conformity with the degree of adjustment, since these features contribute definitely to the efficient operation of the valve.

With the spreader and reaction element in place in the housing, the housing hub 12 is slipped onto the connection 40 of the vacuum line such as the vacuum cleaner hose 41, the pump or vacuum cleaner is set into operation, the male element is adjusted through the medium of the screw driver slot 38 to increase the length of the spreader and reaction element and coincidentally increase the length and decrease the breadth of the elongated

opening, causing the lips 42 and 43 thus formed to start vibrating with a predetermined degree of adjustment. If the length is further increased, the lips are placed under increased tension and more closely related to the reaction element, and consequently the rate of vibration is increased.

The only sound produced is a flapping of the lips beating against the reaction element and which has no noticeable volume or intensity and does not contribute anything to the efficiency or operation of the device, in fact, its elimination would be desirable for noiseless operation of the unit.

This device is not the vibratory element but merely an automatic vibratory valve which opens and closes rhythmically in conformity with the tension under which the lips are placed, and obviously, the specific sub-atmospheric pressure would have some bearing on the speed of vibration. However, with the conventional vacuum cleaner the speed ranges from about ten to thirty cycles per second, so that the individual may select the rate of vibration preferred. However, this maximum rate could be increased if desired by making the lips thinner.

The hose 41 is the actual vibrating element, being vibrated throughout its length. Any portion of the hose can be used for small areas to be treated, or the hose may encircle any part of the body, for selective or general vibratory treatment.

I claim:

1. A vibratory valve for inducing vibration in a suction hose comprising a housing formed of resilient material and having one end attachable to the suction hose, and with the other end elongated and having a combined spreader and reaction device extending throughout the length of said other end with the inside edges closely related to the periphery of said spreader and reaction element for vibratory cooperation therewith under suction, and adjusting means on said spreader for varying the degree of elongation and coincidental therewith the relationship between said inside edges and said periphery for varying the speed of valve action for controlling the rate of vibration of the hose.

2. A vibratory valve for inducing vibration in a suction hose comprising a substantially funnel-shaped housing formed of highly resilient material and having connecting means at the smaller end for connection to a suction hose, and with the larger end normally cylindrical in form with a conical portion connecting the smaller and larger ends, a combined spreader and reaction element cylindrical in form and insertible in said larger end when said larger end is elongated diametrically with the intervening portions of said larger end closely related to the periphery of said combined spreader and reaction device for cooperation therewith under suction, and means for adjusting the length of said spreader and reaction device for varying the speed of vibratory valve action between said intervening portions and said combined spreader and reaction element for controlling the rate of vibration of said suction hose.

3. A structure as defined in claim 2, an internal annular reinforcement provided in said larger end and conical portion and extending to a plane above the break point between the larger end and the conical portion, to limit valve action to the cylindrical portion above the reinforcement and to maintain a uniform cycle of operation of the valve for any predetermined degree of adjustment of the combined spreader and reaction element.

4. A structure as defined in claim 2, diametric ears projecting from the top edge of said larger portion and each having a passage with its axis coincident with said top edge, and said combined spreader and reaction device having a journal at each end frictionally fitting in the respective passages to cause, in conjunction with said reinforcement, the intervening portions to overhang the periphery of the combined spreader and reaction element at an angle of approximately 45 degrees with respect to

the axis of the housing for cooperation with the periphery at points approximately 45 degrees from said axis for more uniform relationship and more efficient operation of the valve.

5. A structure as defined in claim 2, said combined spreader and reaction device comprising a pair of telescopic members threadably adjustable for increase or decrease in length at will for varying the tension of the intervening portions of the larger end of said housing for varying the speed of operation of the valve, and coincidental therewith, the rate of vibration of the suction hose, and comprising said adjusting means.

6. A structure as defined in claim 2, an internal annular reinforcement provided in said larger end conical portion and extending to a plane above the break point between the larger end and the conical portion, to limit valve action to a predetermined length of cylindrical portion to maintain a uniform cycle of operation of the valve, diametrically opposite ears projecting from the top edge of said larger portion and each having a passage with its axis coincident with the said top edge, and said combined spreader and reaction device having a journal at each end frictionally fitting in the respective passages, said reinforcement causing said intervening portions to overhang the periphery of the combined spreader and reaction device at an angle of approximately 45 degrees with respect to the axis of the housing for cooperation at points approximately 45 degrees from said axis for more uniform relationship and more efficient operation of the valve.

7. A vibratory valve for inducing vibration in a suction hose comprising, a housing formed of live rubber and having one end attachable to the suction hose with the other end having an elongated opening having an ear at each end and a passage provided through each ear, a combined spreader and reaction device located in said elongated opening and comprising two cylindrical members each having a journal at one end to frictionally fit in the passages in the respective ears, one of said members having an axial cylindrical threaded extension at its other end, and the other of said members having an axial threaded bore and a coaxial counterbore providing a thin wall rotatably fitting said one of said members and having a diameter slightly less than the diameter of said other of said members, said counterbore having a depth substantially equal to the length of said one member exclusive of said threaded extension, and with the walls of said elongated opening closely spaced with respect to the periphery of said device, whereby said walls vibrate at a predetermined speed when subjected to suction and said members are adjusted to a predetermined length.

8. A vibratory valve for inducing vibration in a suction hose comprising, a housing formed of live rubber and having one end attachable to the suction hose with the other end having an elongated opening having an ear at each end and a passage provided through each ear, a combined spreader and reaction device located in said elongated opening with the walls of said elongated opening slightly spaced from the periphery thereof, and having a journal at each end to fit in said passages, whereby said walls vibrate at a predetermined speed when subjected to suction, said combined spreader and reaction device comprising a pair of telescopic members threadably adjustable as to length, with one of said journals having a diametric screw driver slot formed in the end thereof for operation by a coin or screwdriver for manual adjustment of one member relative to the other, for varying the spacing between the periphery of said combined spreader and reaction device and said walls for varying the speed of operation of said vibratory valve for controlling the rate of vibration induced in the suction hose.

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