Feb. 28, 1967 C. J. A. KELLARD 3,305,977

VIBRATORY BARREL FINISHING MACHINES

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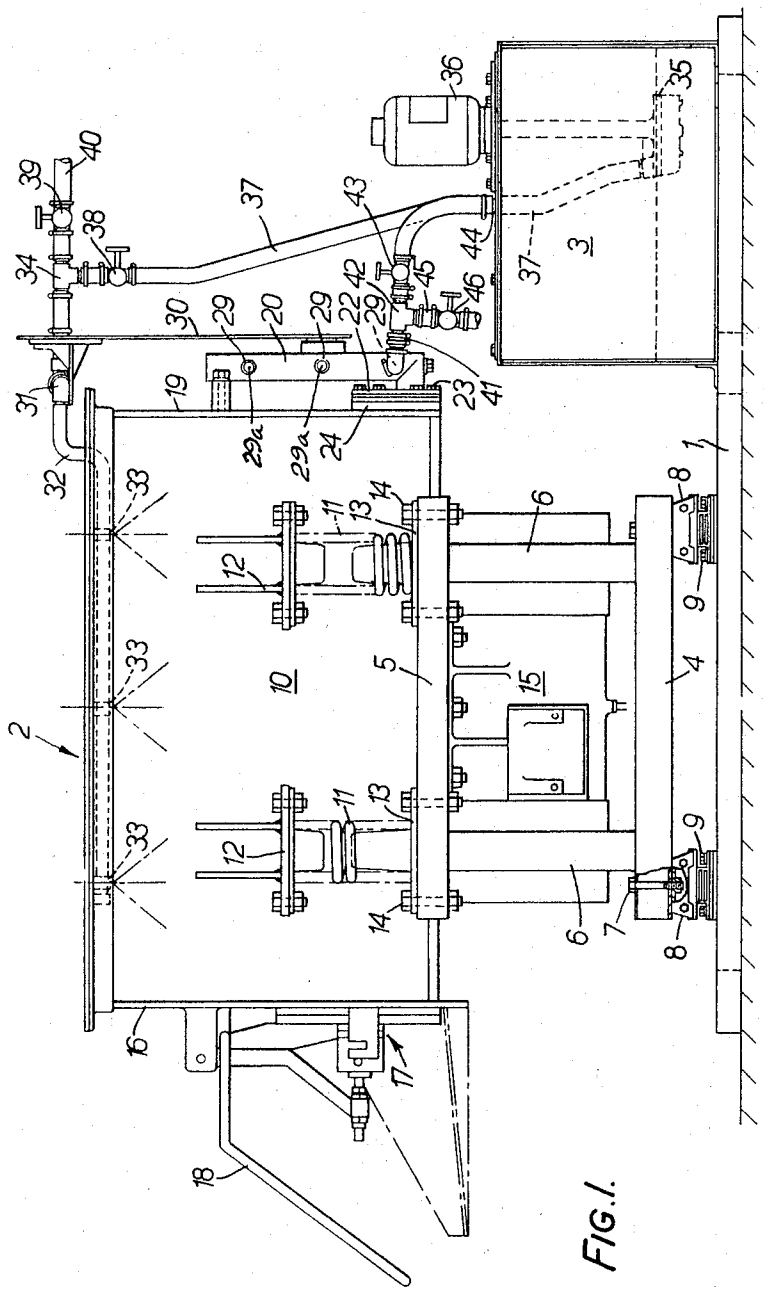


FIG. 1.

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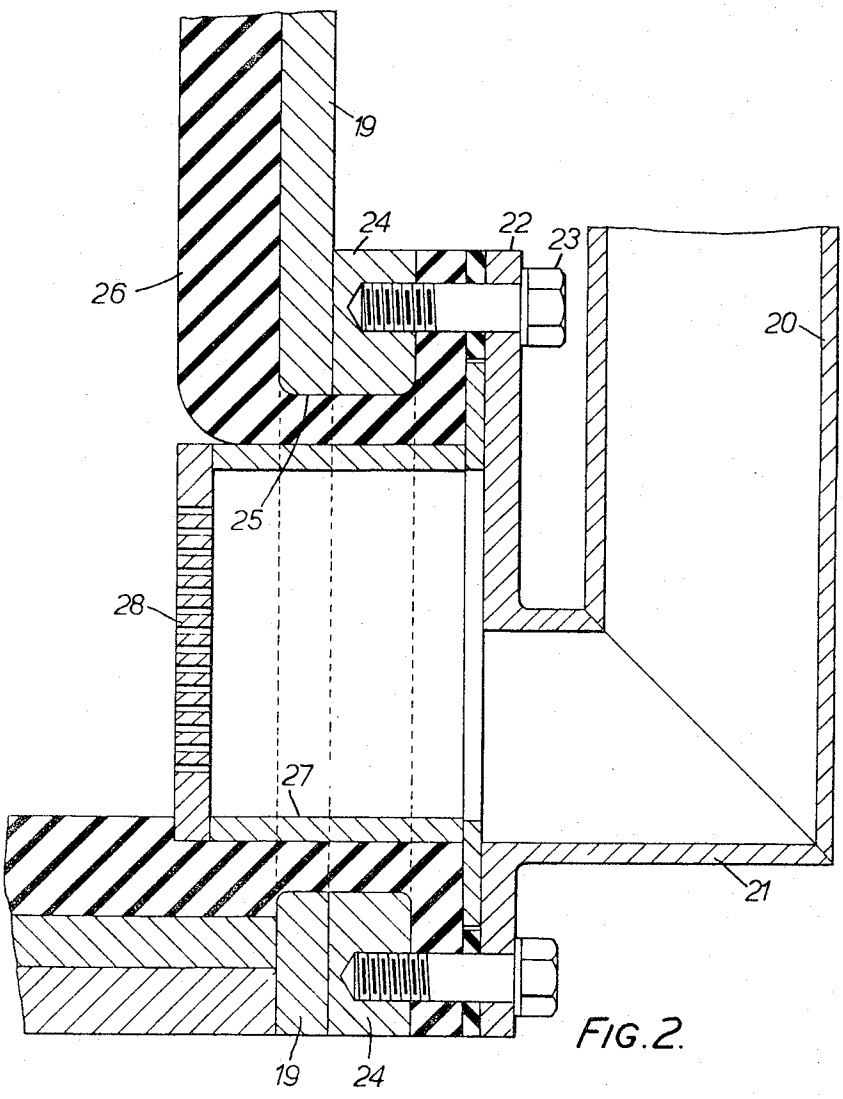


FIG. 2.

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VIBRATORY BARREL FINISHING MACHINES

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4 Claims. (Cl. 51—163)

The present invention relates to vibratory barrel finishing machines and has for an object to provide an improved such machine.

In vibratory barrel finishing machines the components or articles to be processed are vibrated in the barrel of the machine together with suitable deburring or abrasive media and a liquid compound. At the termination of the finishing operation on a batch of components, the compound is drawn from the barrel and the contents of the barrel washed with water.

It is necessary that the compound be circulated through the barrel while the operation proceeds and it has heretofore been proposed to spray the compound into the top of the barrel and allow it to drain by gravity through a discharge in the bottom of the barrel and into a tank. This method of operation is not entirely satisfactory because, depending upon the type of component being processed, it is desirable to maintain a "flood" of compound in the barrel and the desired level of the compound in the barrel varies with different classes of components.

According to the present invention the barrel of a vibratory barrel finishing machine is provided with a plurality of vertically spaced discharge outlets. In this manner and by connecting the return pipe of the compound circulating system to a selected one of said discharge outlets, the compound is maintained in the barrel at a level corresponding to the level of the selected outlet.

According to a further feature of the invention a compound circulating system for a vibratory barrel finishing machine comprises a reservoir or tank for containing a supply of the compound, a pump for delivering compound from the reservoir to a supply pipe at the top of the barrel, and means for returning the compound to the reservoir from a selected one of a plurality of vertically spaced discharge outlets in the barrel.

According to a still further feature of the invention the said compound circulating system includes valve means whereby the compound supply pipe can be selectively connected to the pump or to a water supply, and the barrel discharge outlet can be selectively connected to the reservoir or to drain. In this manner and when it is required to wash out the barrel, the valve means are operated so that water is supplied to the top of the barrel and is discharged through the selected one of the outlets to drain.

A vibratory barrel finishing machine embodying the invention will now be described with reference to the accompanying drawings in which:

FIG. 1 is a side elevation of the machine and

FIG. 2 is a detail drawn to an enlarged scale.

As shown in FIG. 1 a base **1** mounts the vibratory barrel finishing machine indicated generally at **2** and a reservoir or settling tank **3** for containing compound to be circulated through the barrel of the machine.

The machine **2** comprises a supporting structure having a frame at each side of the machine and formed by lower and upper longitudinal box section frame members **4** and **5** respectively secured together by vertical frame members **6**. The lower frame members **4** are secured by bolts **7** to shock absorbing mountings **8** fixed to the base **1** by bolts **9**.

A tub or barrel **10** in which parts to be surface finished are placed together with suitable finishing media, is resiliently supported on the frame members **5** by means of compression springs **11** at each side of the barrel, the compression springs being interposed between brackets **12** secured to the corresponding side wall of the barrel and spring supports **13** secured by bolts **14** to the corresponding upper frame member **5** of the supporting structure.

The barrel **10** is open at the top and has secured to the under side of its bottom a rotary vibrator unit **15** of known construction in which an electric motor drives a rotary out of balance mass to produce rotary vibrations which are transmitted to the barrel.

One end wall **16** of the barrel is provided in known manner with a discharge gate **17** operable to the open position by means of a handle **18** for discharging the finished parts and media from the barrel at the termination of a finishing cycle. The other end wall **19** of the barrel has secured thereto an external stack pipe **20** extending upwardly from the bottom of the barrel and communicating at its lower end with the interior thereof.

As more clearly shown in FIG. 2 the stack pipe **20** is formed at its lower end with an elbow **21** having a flange **22** which is secured by bolts **23** to an annular boss **24** surrounding an opening **25** in the end wall **19**, the rubber lining **26** of the barrel being extended through the opening **25** and secured between the flange **22** and the boss **24**. A cylindrical member **27** is disposed within the extended rubber lining and supports a perforated plate **28** which prevents the parts and the media from passing into the stack pipe **20**.

The stack pipe **20** is open at its upper end and is provided with three discharge outlets **29** spaced lengthwise thereof for discharging compound from the barrel in the manner hereinafter to be described.

A support member **30** extending upwardly from the stack pipe **20** mounts at its upper end a rotary valve coupling to which is connected a sprinkler pipe **32** extending across the top of the barrel and provided with downwardly directed spray nozzles **33** spaced along its length. Also connected to the coupling **31** is a T junction **34** for the purpose hereinafter described.

The tank **3** is positioned below the level of the bottom of the barrel as shown in FIG. 1 and a pump **35** position in the tank adjacent the bottom thereof is supported from the top of the tank upon which is mounted a motor **36** drivingly connected to the pump **35**.

A pipe **37** extends from the outlet of the pump **35** and through the top of the tank to a valve connected to the T junction **34**, the T junction also providing a connection through a valve **39** to a water supply pipe **40**.

A flexible pipe **41** adapted to be connected to a selected one of the discharge outlets **29** and shown in the drawing as connected to the lowermost outlet, connects through a T junction **42** and valve **43** to an inlet **44** of the tank **3**. The T junction **42** also connects through a pipe **45** and valve **46** to drain. Suitable closure plugs **29***a* are of course provided for closing the discharge outlets not connected to the pipe **41**.

In operation of the system described, the flexible pipe **41** is connected to a selected one of the outlets **29** to give a required level of compound in the barrel **10**. Valves **39** and **46** are closed, valves **38** and **43** are opened and the pump **35** set in operation. The compound then circulates from the tank **3** through the pipe **37** and open valve **38** to the sprinkler pipe **32** and through the nozzles **33** into the barrel. When the level of compound in the barrel reaches the level of the selected outlet **29** the compound flows through the stack pipe **20** and selected outlet **29** through the flexible pipe **41** and open valve **43** to the tank inlet

44. The compound is thus continuously circulated while at the same time maintaining a required level of the compound in the barrel.

At the termination of a finishing operation the pump **35** is stopped, valves **38** and **43** are closed and valves **46** and **39** are opened. Water is then supplied from the water-supply pipe **40** through the open valve **39** to the sprinkler pipe **32** and into the barrel **10**, the water being discharged through the stack pipe **20**, flexible pipe **41**, pipe **45** and valve **46** to drain. The barrel and its contents are therefore effectively flushed out with water after which the finished components together with the media are removed through the discharge gate **17**.

The provision of the stack pipe discharge is of considerable advantage when abrasives are employed in addition to the compound because since abrasives are comparatively heavy there is less probability of them being washed out of the barrel by the circulating compound flowing upwardly through the stack pipe, than in the case in which the compound is discharged directly at the bottom of the barrel. Furthermore by employing a "flood" of compound according to the invention and even when abrasives are not added, a much superior surface finish is obtained.

I claim:

1. A vibratory barrel finishing machine comprising a finishing barrel, a reservoir for containing a supply of compound, means for feeding compound from the reservoir into the barrel, a conduit formed with a plurality of discharge outlets situated at different levels and in communication with the interior of the barrel below said outlets and with the atmosphere above said outlets, means for connecting a selected one of said discharge outlets to said reservoir for returning compound thereto and closure means for closing each of said outlets below said selected outlet whereby the level of compound in the barrel is maintained at a height corresponding to that of said selected outlet.

2. A vibratory barrel finishing machine comprising a finishing barrel having an open top, a reservoir for containing a supply of finishing compound, sprinkler means positioned above the open top of the barrel, pump means for pumping compound from said reservoir, first conduit means providing communication between the pump means and the sprinkler means for supplying pumped compound to the sprinkler means, an external stack pipe extending upwardly from the level of the bottom of the barrel and communicating at its upper end with the atmosphere and at its lower end with the interior of the barrel, a plurality of vertically spaced discharge outlets formed in said stack pipe, openable closure means for each of said discharge outlets, and second conduit means adapted to be connected to any selected one of said discharge outlets and communicating with the reservoir.

3. A vibratory barrel finishing machine as claimed in claim **2**, and further comprising first valve means in said first conduit means for shutting off the flow of compound to the sprinkler means, means for supplying flushing liquid to the first conduit means downstream of said first valve means when the said first valve is closed, second valve means in said second conduit means for shutting off the return of compound to the reservoir and a closable drainage outlet communicating with said second conduit means upstream of said second valve means.

4. In a vibratory barrel finishing machine having a finishing barrel and means for supplying finishing compound to the barrel, and for withdrawing it therefrom, the provision of an upwardly extending external stack pipe communicating at its upper end with the atmosphere and at its lower end with the interior of the bottom of the barrel, a plurality of vertically spaced discharge outlets formed in said stack pipe for discharging compound from the barrel through a selected one of said outlets, and openable closure means for closing each outlet below said selected outlet.

References Cited by the Examiner

UNITED STATES PATENTS

248,573	10/1881	Burkhardt	137—577 X
2,997,814	8/1961	Brandt	51—163 X
3,253,369	5/1966	Reichert et al.	51—163

FOREIGN PATENTS

934,150	8/1963	Great Britain.

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