

June 29, 1926.

1,590,353

G. H. EKSTROM

RUBBING MACHINE

Filed June 11, 1923

2 Sheets-Sheet 1

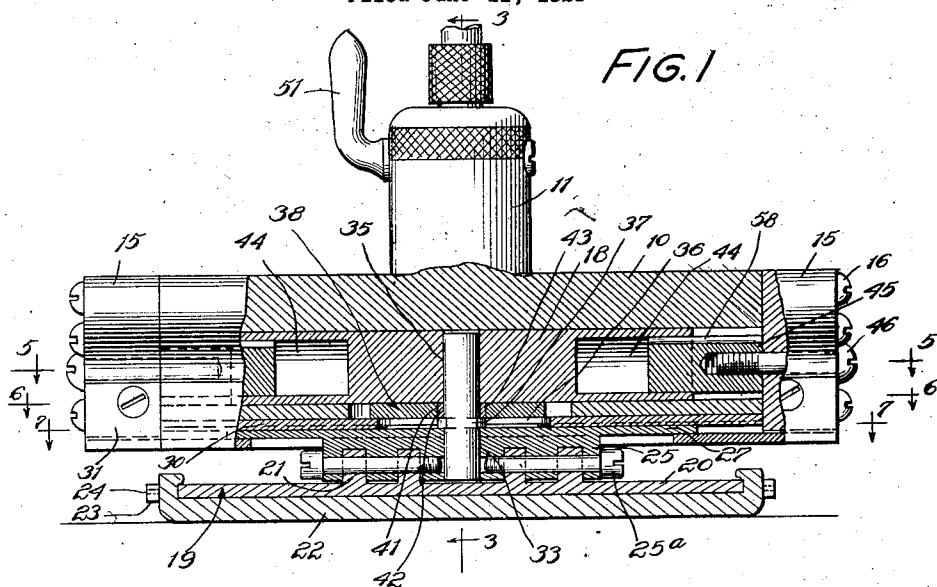


FIG. 2

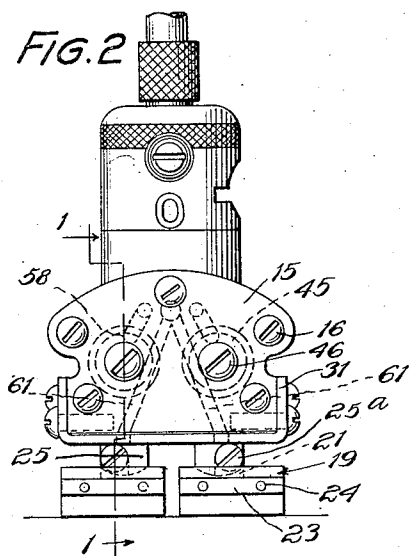
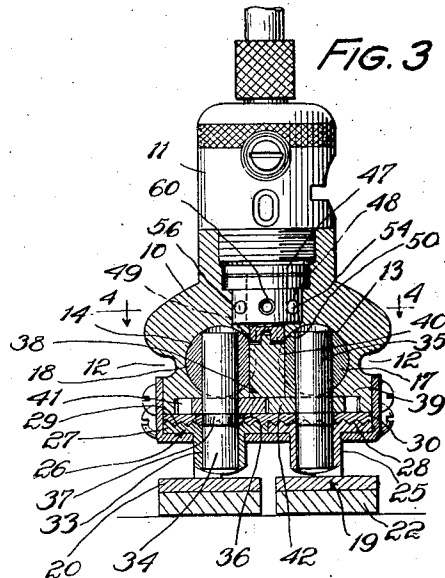


FIG. 3



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2 Sheets-Sheet 2

FIG. 4

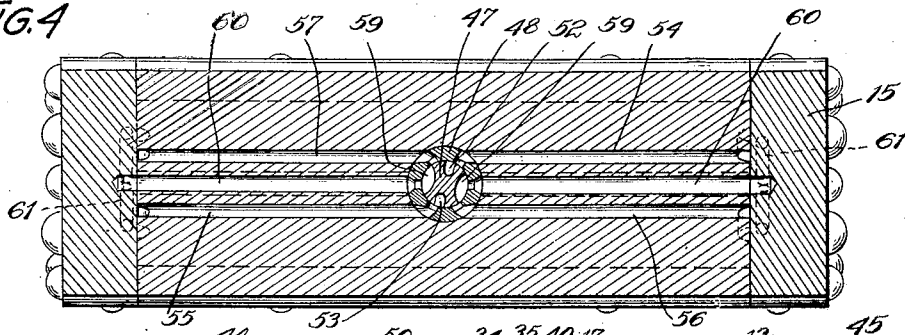


FIG. 5

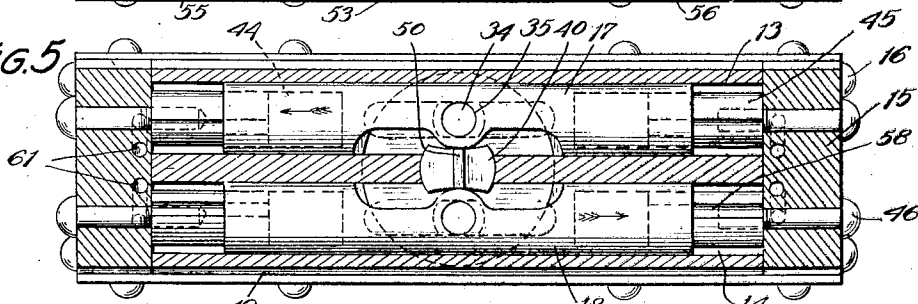


FIG. 6

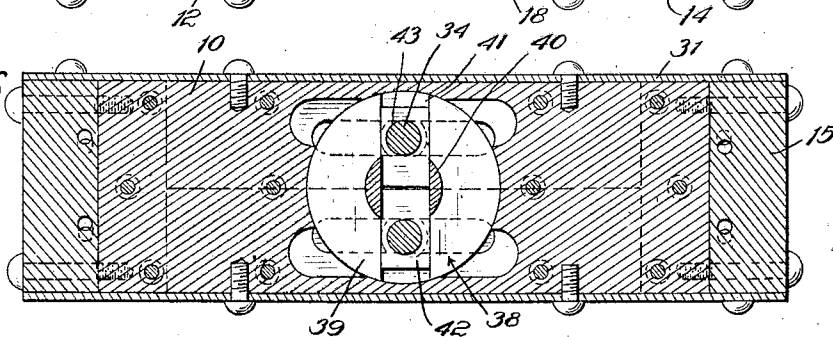
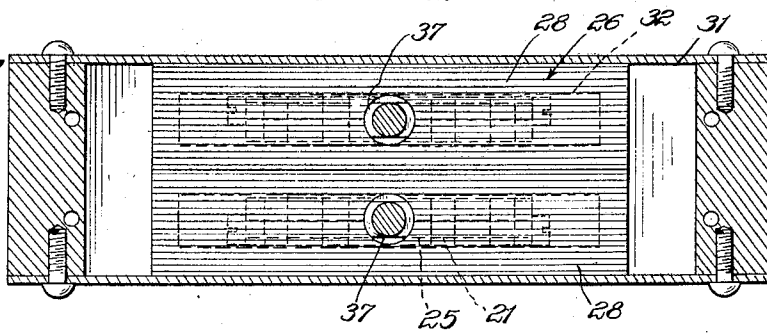


FIG. 7



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UNITED STATES PATENT OFFICE.

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RUBBING MACHINE.

Application filed June 11, 1923. Serial No. 644,566.

The invention relates to rubbing and polishing machines, and more particularly to machines operated by a pressure fluid and having a plurality of laterally spaced pistons for reciprocating a corresponding number of pad holders.

The primary object of the invention is to provide an improved rubbing machine adapted for a wide range of use which is free from objectionable vibration and side wobble when in operation.

Machines in which the rubbing pads are arranged to reciprocate side by side and in which each pad moves with and in the same direction as the piston directly above it, are particularly subject to such vibration. This condition has been ameliorated in certain prior machines by connecting each pad holder slide to the piston above the opposite slide, thereby making the construction more complex and increasing the internal friction of the machine. An object of the present invention is to provide a rubbing machine which is free from objectionable vibration, and in which the rubbing pads are reciprocated side by side respectively by the pistons directly above them.

A further object is to provide a novel pad holder slide and enclosing guideway therefor which is simple in construction, and which materially reduces the distance between the pistons and the rubbing pads, as found in prior machines of this type, whereby the efficiency of operation and the stability of the machine are increased.

Further objects and advantages will become apparent as the description proceeds.

In the accompanying drawings, Figure 1 is a longitudinal sectional view on line 1—1 of Fig. 2 through a rubbing machine embodying the features of my invention. Fig. 2 is an end view. Fig. 3 is a transverse sectional view taken on line 3—3 of Fig. 1. Fig. 4 is a horizontal sectional view taken on line 4—4 of Fig. 3. Fig. 5 is a horizontal sectional view taken on line 5—5 of Fig. 1. Fig. 6 is a horizontal sectional view taken on line 6—6 of Fig. 1. Fig. 7 is a horizontal sectional view taken on line 7—7 of Fig. 1.

In the exemplary form of my invention shown in the drawings, a cylinder body 10 of elongated rectangular shape is provided with an upstanding handle 11 whereby the

machine can be easily carried from place to place. The lateral walls of the body preferably are grooved as at 12 to facilitate gripping the machine and holding it against the work. Cylinders 13 and 14, in parallel horizontal relation, extend through the body 10 from end to end, and are closed by weighted end plates 15 which are secured to the body by screw bolts 16. Two double acting pistons 17 and 18 are positioned in cylinders 13 and 14 respectively. Mounted on the underside of the cylinder body are two pad holders 19 arranged to be reciprocated side by side.

The pad holders 19, while they may be of any suitable construction, are herein shown as comprising elongated rectangular plates 20 with upstanding lugs 21. Rubbing pads 22 underlie the plates 20 and are clamped thereto at their ends by straps 23 and pins 24. The lugs 21 mesh with or overlap downwardly extending projections 25 formed on pad holder slides 26, and are pivoted thereto by screw bolts 25^a passing through the alternating projections and lugs. This pivotal attachment allows a lateral rocking of the pad holders, which is desirable when working on curved surfaces. Since the pad holders are also arranged to reciprocate side by side, the machine is particularly adapted for work on curved surfaces.

Each pad holder slide 26 consists of a horizontal rectangular plate 27 preferably of the same length as that of the pistons. The top of the plate 27 is formed with a serrated or saw-tooth bearing surface 28 throughout its length which engages a complementary serrated bearing surface 29 formed on the underside of the cylinder body 10. In the present instance, the serrated surface 29 is formed on a bearing plate 30 secured in any suitable manner to the underside of the cylinder body and having the same horizontal dimensions. A gib plate 31, having its sides bent up to form a channel, is secured to and fits over the lower portion of the cylinder body 10 and weighted ends 15, and encloses the plate 30 and slides 26, thereby keeping foreign matter away from the bearing surfaces. The lugs 25 on the slides 26 extend through and reciprocate in elongated rectangular slots 32 in the gib plate 31 (see Fig. 7).

Each slide 26 is centrally bored as at 33 for the reception of the lower end of a connecting pin 34, the upper end of which enters a medial bore 35 in the piston directly above said slide. Each pin extends through a separate slot 36 in the bearing plate 30, and has an enlarged central portion 37 which reciprocates therein.

Any suitable means may be employed to keep the reciprocating parts in balanced relation. I have herein shown an oscillating wobbler 38 having a peripheral flange bearing 39 and a reduced shank 40 extending upwardly therefrom. The wobbler 38 is mounted within the hollowed lower portion of the cylinder head 10 and just above the bearing plate 30, and is pivotal about an axis between the pistons and substantially midway of their ends. The flange portion 39 has a diametrical guideway 41 in which are slidably disposed two bearing blocks 42, one below each piston. The connecting pins 34 pass through openings 43 in the bearing blocks before entering the bores 35 in the pistons. Reciprocation of the pistons effects an oscillation of the wobbler 38 and causes the pins 34 to move the bearing blocks 42 radially in the diametrical guideway 41, thereby maintaining a balanced relation between the reciprocating parts at all times.

The pistons 17 and 18 are hollowed at their ends as at 44 to reduce their weight. Central balancing plugs 45 secured to the inner sides of the weighted ends 15 by screw bolts 46 extend into the open ends of the pistons.

Any suitable means may be employed for governing the alternate admission of pressure fluid to opposite ends of the cylinders for reciprocating the pistons. I have herein shown an oscillatory valve 47 seated in a bushing 48 co-axially above the reduced shank 40 of the wobbler 38. The valve is provided with a bifurcated lower end 49 fitting loosely over a projection 50 on the end of the shank 40 so as to be oscillated by the latter. The loose connection between the bifurcated end 49 and the projection 50 results in a lost motion, so that the pistons must travel a certain portion of their return stroke before the valve is oscillated. Pressure fluid is admitted to the valve 47 through a passage (not shown) in the handle 11 which is under the control of a fluid valve lever 51. The fluid passes downwardly through passages 52 and 53 in the valve, and by oscillation of the latter will be admitted either through passages 54 and 55 or through passages 56 and 57 to diagonally opposite ends of the cylinders 13 and 14. Longitudinal grooves 58 on the periphery of the balancing plugs 45 admit the fluid to the inside of the hollowed ends of the pistons. On the exhaust strokes, the fluid in the respective cylinders will be discharged through valve ports 59, exhaust passages 60 in the

cylinder body, and downwardly extending passages 61 in the end plates 15 and gib plates 31, opening above the pad holders.

The pistons, slides and enclosing structure for the latter have been made as light in weight as possible, while the ends of the rubbing machine have been increased in weight by use of heavy end plates and balancing plugs. Thus the total weight of the machine, without being materially increased over that of prior constructions, is distributed to those points where it is most effective in preventing the side wobble and vibration, ordinarily due to the reciprocation of the pistons and slides. A rubbing machine free from objectionable vibration is therefore obtained in which the pad holder slides are connected to and move in the same direction as the pistons directly above them.

The simple and novel construction of the pad holder slides and their enclosing structure is such that the vertical dimension of the machine and the distance between the pistons and the rubbing pads is materially less than in prior machines of this type, thereby increasing the efficiency of the machine by increasing its stability and by reducing the leverage of the pad resistance on the pistons. The machine because of the rocking pad holders which are arranged to reciprocate side by side is particularly adapted for work on curved surfaces. A rubbing machine is therefore obtained which is adapted for a wide variety of uses, and which is simple in construction and efficient in operation.

While I have described the preferred embodiment of my invention with considerable particularity for purposes of illustration, it is to be understood that various changes and modifications can be made by those skilled in the art without departing from the spirit and scope of the invention as expressed in the appended claims.

I claim as my invention:

1. A portable rubbing machine having, in combination, a motor body having a plurality of laterally spaced cylinders, a pair of pistons, one reciprocable in each cylinder, said pistons having open hollow ends, weighted end members mounted on the ends of said body, and plugs mounted on said end members and extending into said hollow end of said pistons, said weighted end members and said plugs serving to reduce side wobble and peripheral vibration resulting from reciprocation of said pistons.

2. A portable rubbing machine having, in combination, a motor body having a plurality of laterally spaced cylinders, a pair of pistons, one reciprocable in each cylinder, said pistons having open hollow ends, weighted end members mounted on the ends of said body, each member serving to close the ends of both cylinders at each end of said

body, and plugs mounted on said end members and extending into said hollow ends of said pistons, said weighted end members and said plugs by reason of their weight and location serving to oppose side wobble and vibration.

3. A rubbing machine having, in combination, a motor body having a plurality of laterally spaced cylinders, a pair of pistons, one reciprocable in each cylinder, weighted end members mounted on the ends of said body, pad holder slides mounted on the underside of said body, means operatively con-

necting said pistons and said pad holder slides, and a relatively thin gib plate fitting over the underside of said body and the undersides of said weighted end members and serving to hold said pad holder slides against said body, the distribution of weight resulting from the construction of said heavy weighted ends and said gib plate serving to oppose vibration and side wobble.

In testimony whereof, I have hereunto affixed my signature.

GUSTAF H. EKSTROM.