United States Patent [19]

Portal

[11] **3,800,475**

[45] **Apr. 2, 1974**

[54] **MACHINE FOR POLISHING A SURFACE, PARTICULARLY THE SURFACE OF A SPOOL FLANGE**

[75] Inventor: **Pierre Portal,** Chaumont, France

[73] Assignee: **Societe Anonyme des Forges de Bologne,** Bologne, France

[22] Filed: **Jan. 24, 1972**

[21] Appl. No.: **220,317**

[30] **Foreign Application Priority Data**

Jan. 28, 1971 France 71.02865

[52] **U.S. Cl.** **51/62,** 51/67

[51] **Int. Cl.** **B24b 7/02**

[58] **Field of Search** ..... 51/62, 67, 170 TL

[56] **References Cited**

UNITED STATES PATENTS

2,315,859	4/1943	Indge	51/67
3,045,399	7/1962	Sloan	51/62 X
2,758,424	8/1956	Meredith	51/56
2,715,804	8/1955	Wickes	51/170 TL
1,573,609	2/1926	Jenkins	51/67 X

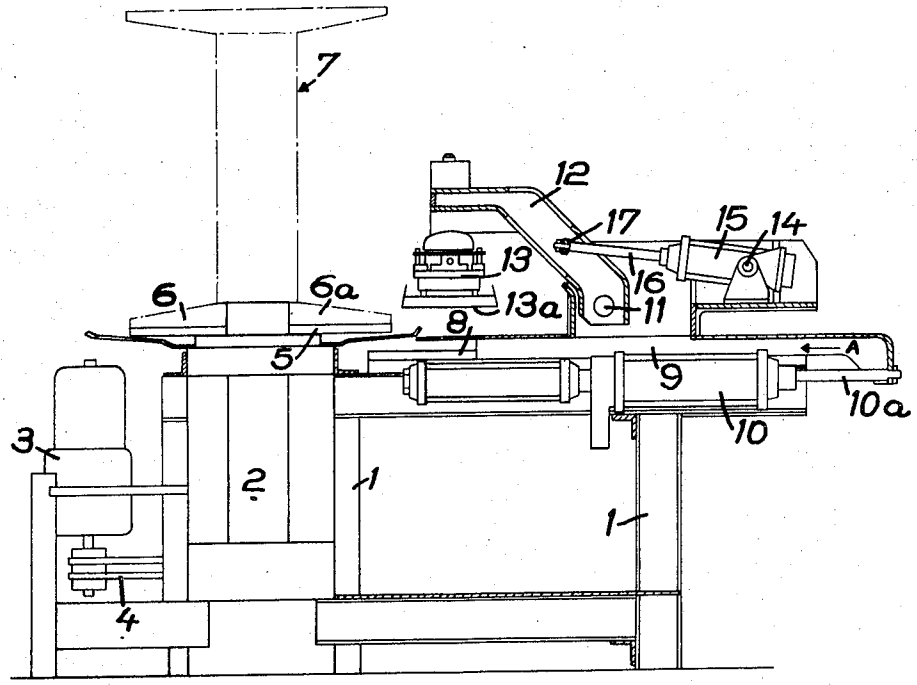
Primary Examiner—Harold D. Whitehead

Attorney, Agent, or Firm—Fitzpatrick, Cella, Harper & Scinto

[57] **ABSTRACT**

In a machine for polishing a surface, particularly the surface of a spool flange, a frame has mounted thereon a spigot which is rotatable by a suitable motor means and arranged to support a surface to be polished. An abrasive surface on at least one polishing head is arranged to be brought into contact with the surface and this head is hinged to an arm that is mounted to pivot on a carriage about an axis perpendicular to a plane passing through the axis of a spigot. The carriage is itself mounted to slide on the frame along a plane perpendicular to the axis of a spigot and is reciprocably movable, e.g. by a jack system.

4 Claims, 6 Drawing Figures



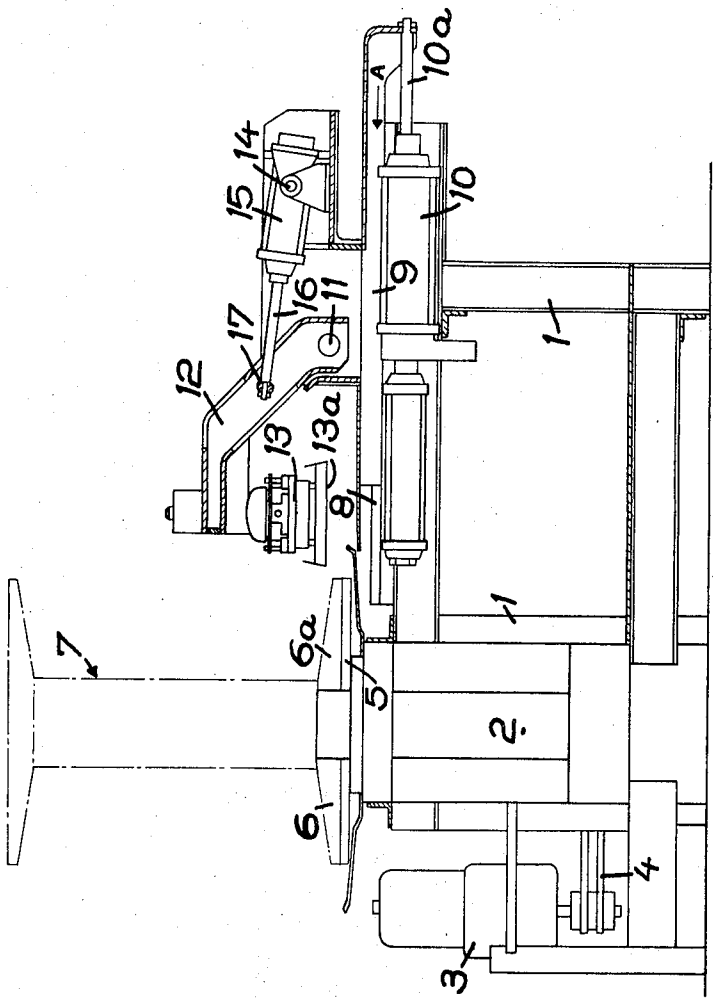


FIG. 1

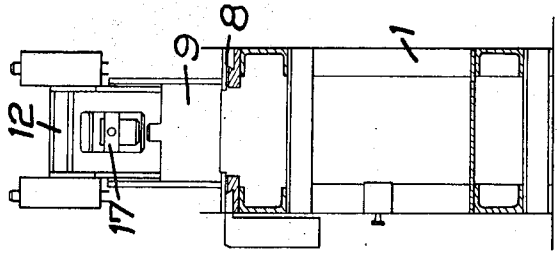


FIG. 2

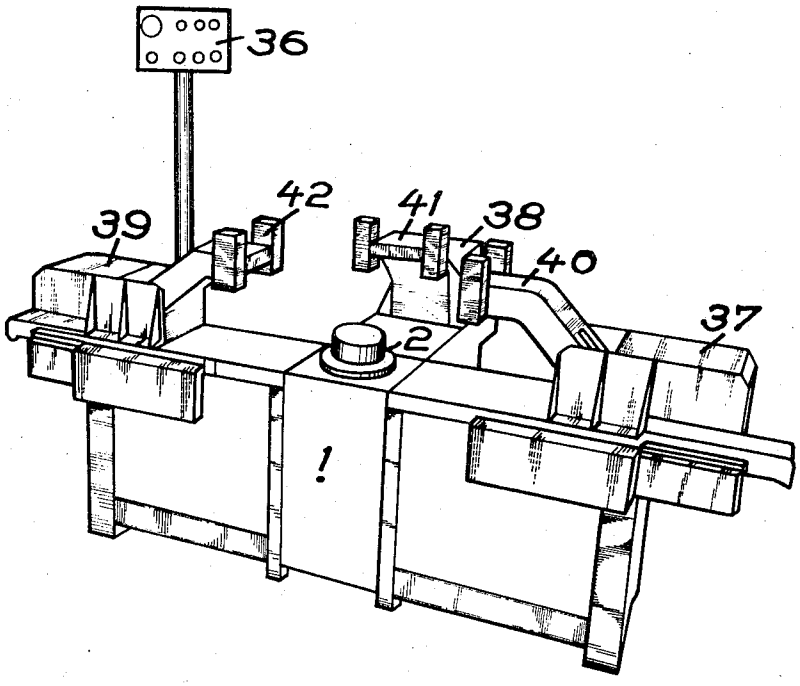


FIG.3

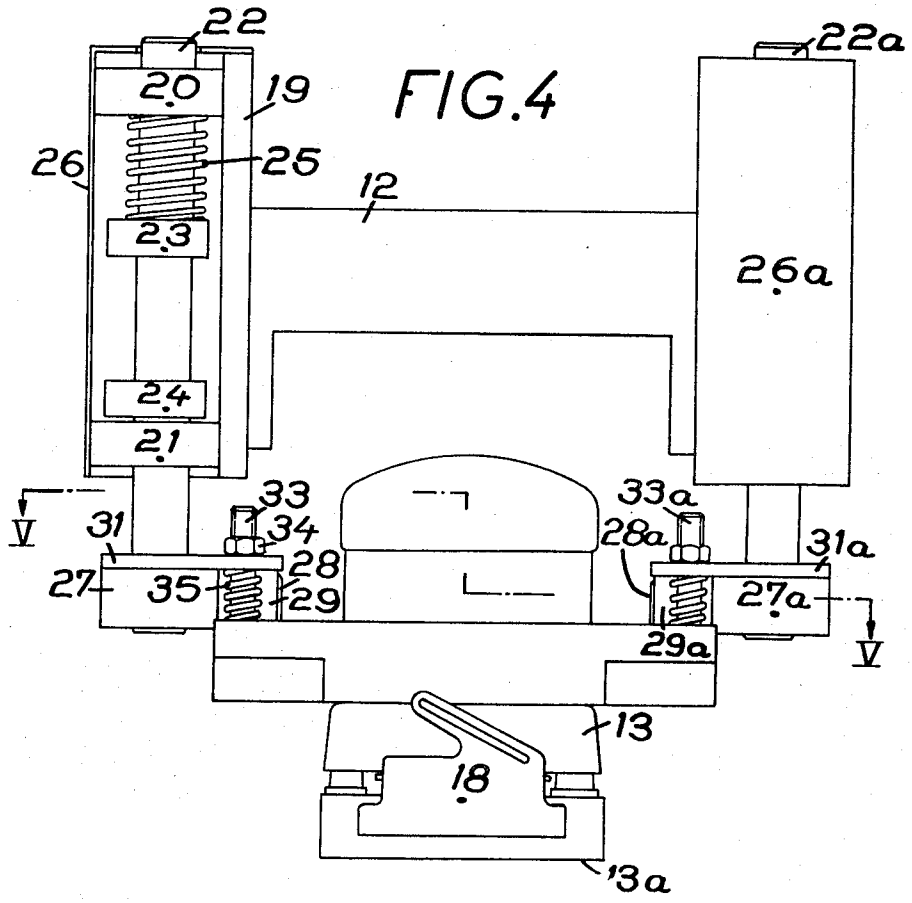

22
22a
20
19
26
25
12
23
26a
24
21
V
33
33a
31
34
28a
31a
27
35
28
29
27a
V
29a
13
18
13a

FIG.4

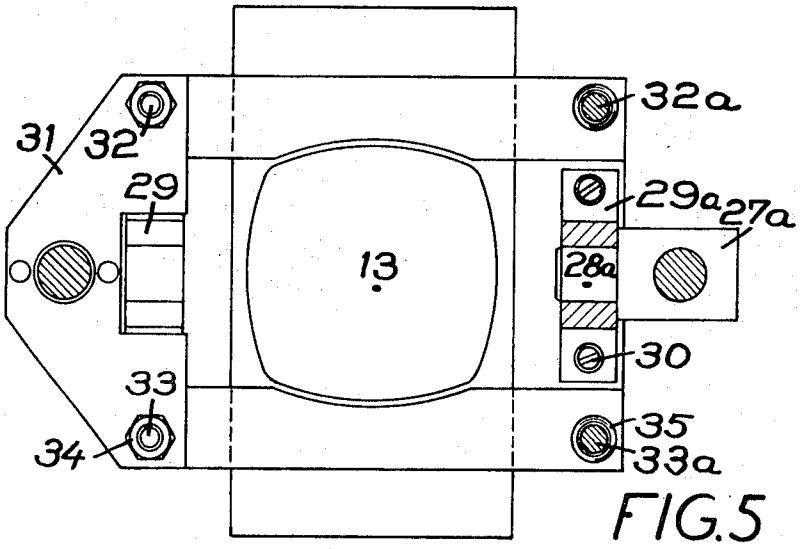
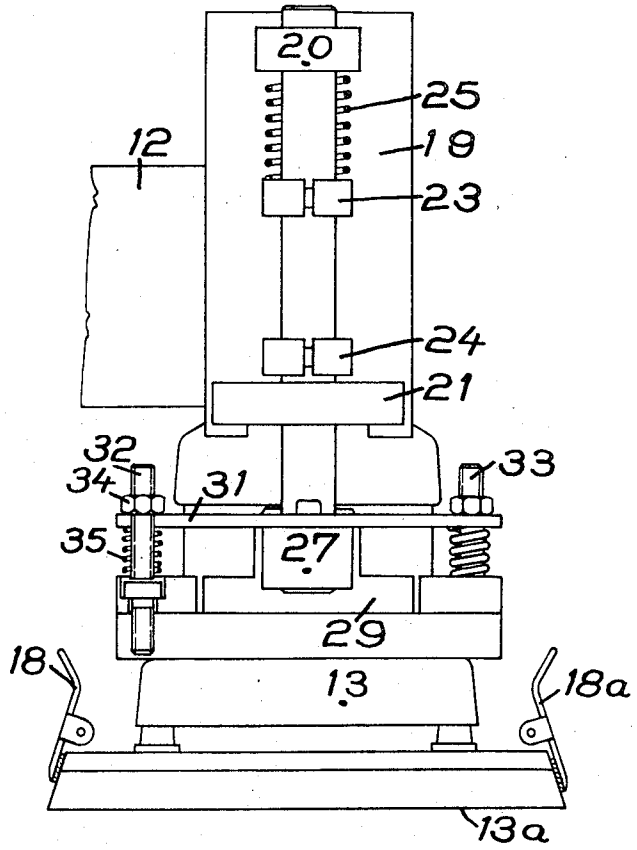

32a
31
32
29
29a
27a
13
28a
30
33
35
34
33a

FIG.5

FIG 6



MACHINE FOR POLISHING A SURFACE, PARTICULARLY THE SURFACE OF A SPOOL FLANGE

The present invention relates to a machine or polishing surfaces, more particularly of spool flanges.

The polishing of metal spool flanges is effected most frequently manually by a workman who uses a vibratory polishing head haing an abrasive surface. However, it is apparent that this method takes a long time and does not always give satisfactory results.

In order to remedy or minimise these drawbacks, the invention has for an object a machine enabling polishing of surfces to be effected and more particularly of spool flanges of all kinds, whether they are of the flat or straight type, have protuberances, or are double tapered.

According to the invention, the machine comprises a frame on which is mounted a shaft rotatable by a drive member, the shaft supporting a surface to be polished and with which is adapted to come into contact an abrasive surface on at least one polishing head hinged to an arm mounted to pivot on a carriage about an axis perpendicular to a plane passing through the axis of the shaft, said carriage being mounted to slide on the frame along a plane perpendicular to the axis of the shaft and being reciprocably moveable.

The surface finish obtained depends on a number of factors, primarily the polishing time and more particularly the number of runs of the abrasive tool over the surface to be polished. This machine enables the polishing time and rates of production to be considerably reduced, more particularly where a plurality of polishing heads is used.

Other characteristics and advantages of the invention will be better understood by reading the following description of several embodiments thereof and with reference to the accompanying drawings, in which:

FIG. 1 shows an elevaton of one embodiment of a machine,

FIG. 2 shows an end view, in partial section, of the machine shown in FIG. 1,

FIG. 3 shows a perspective view of an embodiment that includes a plurality of polishing heads,

FIG. 4 shows an elevation of one method of assembling the polishing head on the arm,

FIG. 5 shows a view, in section, along the line V—V of FIG. 4, and

FIG. 6 shows a view in side elevation of the assembly of the polishing head on the arm.

Referring now to the drawings, FIGS. 1 and 2 show an embodiment of a machine for polishing circular surfaces, which comprises a frame 1 on which is mounted a shaft 2 rotatably driven by a motor and reduction gearing 3 by means of a belt drive 4. The upper part of the shaft 2 is provided with a plate 5 on which rests one of the flanges 6 of a metal spool 7, the surface 6*a* of which is to be polished.

The frame 1 is provided with slideways 8 on which is mounted to slide along a plane perpendicular to the axis of the shaft 2, a carriage 9 which is subjected to the action of a double acting ram 10, the body of which is fixed to the frame 1 and the control rod 10*a* of which is securely connected at one of its ends to the carriage 9 for reciprocation of the latter along the axis of the arrow A.

On the carriage 9 is mounted an arm 12 pivotable about an axis 11 perpendicular to a plane passing through the axis of the shaft. This arm 12, which has a cranked shape, hingedly carries at its free end, a vibrating polishing head 13.

A ram 15 is hinged on the carriage 9 about an axis 14, the rod 16 of the ram being securely connected by one end to a shaft 17 mounted to pivot between the flanges of the arm 12, the said pivot shaft 17 being situated between the pivot shaft 11 and the end of the arm 12 carrying the polishing head.

FIGS. 4, 5 and 6 show in detail the method of assembling the vibrating polishing head 13 on the free end of the arm 12. As regards the actual polishing head, the latter is of a well known type and has a surface 13*a* on which can be applied in known manner a covering sheet of abrasive material held by clips such as 18, 18*a*.

At the end of the arm 12 are fixed flanges such as 19 which carry lugs 20, 21 in which rods 22, 22*a* slide and on which rods are fixed stops 23, 24. Between the upper lug 20 and the stop 23 is mounted a resilient member constituted by a spring 25 which tends to urge the rod 22 downwardly. The assembly is arranged in a protecting housing 26, 26*a*. The same arrangement used for the assembly of the rod 22*a* is concealed by a housing 26*a*.

At their lower end, the sliding rods 22, 22*a* carry bushes 27, 27*a* which have journals 28, 28*a* pivoting in bearings 29, 29*a* fixed by screws 30 to the polishing head 13. Plates 31, 31*a* are also fixed to the rods 22, 22*a*, said plates having at their ends threaded holes in which are screwed threaded rods 32, 33 and 32*a*, 33*a* provided with a nut 34. Helical springs 35 are arranged coaxially to the threaded rods 32, 33 and 32*a*, 33*a*, said springs resting on one side against the plates 31, 31*a* and on the other against the polishing head 13.

The machine according to the invention operates in the following manner:

The spool 7 being placed on the plate 5 of the shaft 2 and the appropriate adjustments of the polishing head 13 with respect to the surface 6*a* of the flange 6 being effected, the motor and reduction gearing 3 is started up to rotate the shaft 2 and the spool 7.

The sliding carriage 9, driven by the ram 10, advances in the direction of arrow A, and the arm 12 under the action of the ram 15 is lowered so that the surface 13*a* covered by an abrasive sheet comes into contact with the surface 6*a* to be polished which is under rotation.

The moving carriage thus effects a series of movements in and against the direction of the arrow A so as to obtain a plurality of runs of the polishing head 13 over the surface 6*a* during a predetermined time or according to a predetermined number of runs.

When the desired surface condition is obtained, the polishing head 13 is raised by means of the arm 12 controlled by the ram 15 even though the shaft 2 and the spool 7 are still being rotated. Then the carriage 9 is driven in the reverse direction to arrow A so as to ensure its release from the surface 6*a*.

When the release action is terminated and the arm 12 is completely raised, the shaft 2 stops and the polishing head 13 is no longer subjected to vibrations. The cycle is terminated and the machine may carry out a new polishing operation.

The control of the different rams **10** and **15** is ensured automatically by an hydraulic or pneumatic circuit under the control of an electric device, the control board **36** of which is shown in FIG. **3**.

The embodiment of the machine shown in FIG. **3** comprises a single shaft **2** about which are mounted three carriages **37, 38, 39** on the frame **1**, bearing arms **40, 41, 42**, on which are hinged polishing heads **13**, not shown on the drawing. The latter arrangement enables the polishing time of a spool flange to be considerably reduced by multiplying the number of polishing heads.

Naturally, various modifications can be made by the man skilled in the art to the devices or methods which have just been described solely by way of non-limiting example, without departing from the scope of the invention as defined by the appended claims.

I claim:

1. A polishing machine comprising a frame, a shaft mounted on said frame and rotatable by a drive member, said shaft adapted to support a surface to be polished, a carriage mounted on said frame for reciprocating sliding movement relatively thereto in a plane perpendicular to the axis of said shaft, means for reciprocating said carriage, an arm mounted on said frame for

pivotal movement about an axis perpendicular to a plane in which the axis of said shaft lies, at least one polishing head hinged to said arm, for universal movement relatively thereto an abrasive surface on said head, and means for bringing said abrasive surface into contact with the surface to be polished when said carriage is moved towards said surface to be polished.

2. A polishing machine according to claim **1**, wherein said pivoting arm is connected to said carriage by a ram having a rod hinged to said arm, and also having a body hinged on said sliding carriage, and said sliding carriage being under the control of a ram connected to said frame.

3. A polishing machine according to claim **1**, wherein a plurality of arms, each bearing a polishing head, is arranged about said shaft.

4. A polishing machine according to claim **1**, wherein two rods are mounted at the end of said arm to slide vertically against the action of resilient members, said two rods bearing at one of their ends two pivots engaged in two bearings of said one polishing head, said end of said sliding rods also carrying a plate having two ends resting against said one polishing head through resilient members.

* * * * *