April 1, 1958 S. MESSERSCHMIDT 2,828,582

MAGAZINES FOR LAPPING MACHINES

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FIG. 1

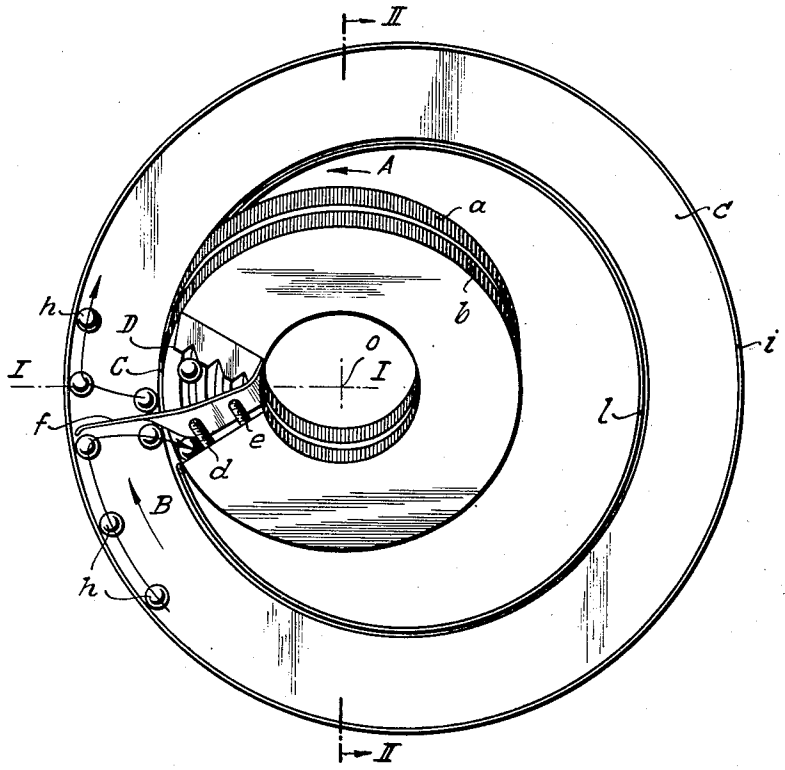
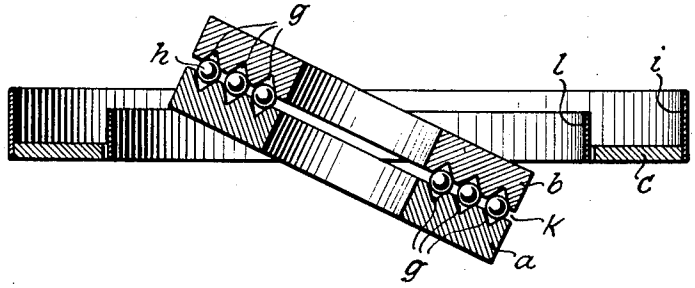


FIG. 2



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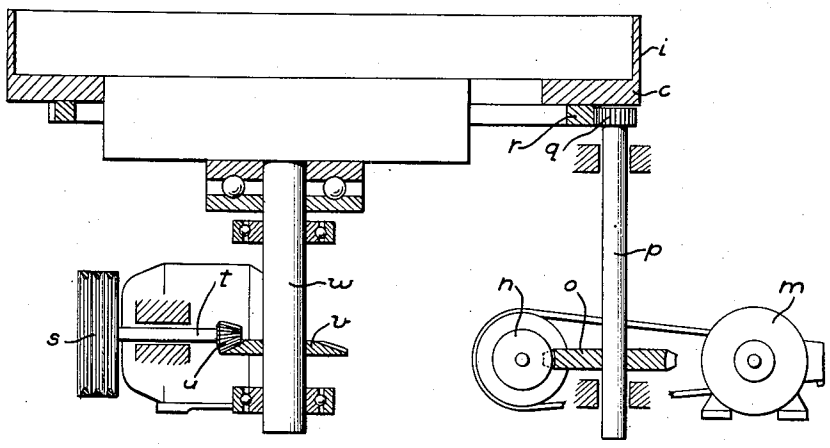
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Fig. 3.



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MAGAZINES FOR LAPPING MACHINES

Sebastian Messerschmidt, Schweinfurt, Germany

Application January 14, 1955, Serial No. 481,926

Claims priority, application Germany February 15, 1954

4 Claims. (Cl. 51—3)

The invention relates to a magazine for lapping machines of the type described in the specification of my Patent 2,766,556, dated October 16, 1956, wherein the magazine rotates with the lapping wheel, the workpieces being fed from the lapping wheels by means of a scraper.

The present invention is an improvement over my aforesaid prior copending patent, the disclosure of which is incorporated herein by reference.

To facilitate the running in and out, particularly of spherical workpieces, it is proposed according to the invention to relatively incline the lapping wheels and the workpiece magazine about an axis preferably passing through the centre of the lapping wheels. The angle of inclination should be so chosen that the gravitational force of the balls accelerates their running in movement. The inclination of the lapping wheel relatively to the magazine ring can be up to an angle of 90°.

By this relative inclination of the magazine and the lapping wheels, slipping or sliding movements are avoided during the running in and out of the spherical workpieces and instead thereof a rolling movement is imparted. Consequently, the balls run smoothly into the gap between the lapping wheels. The conditions prevailing during the running out of the balls are similarly favorable because here the sliding movement is also prevented.

As for lapping balls the lapping wheel must always be grooved, the balls can only leave by the aperture in the upper lapping wheel provided for the running in and out.

An embodiment of the invention is illustrated by way of example in the accompanying drawing, in which:

Fig. 1 shows the magazine in plan view,

Fig. 2 is a section on line II—II of Fig. 1, and

Figure 3 shows the respective driving mechanisms for the lapping wheel *a* and the magazine ring *c*.

The lapping wheels *a* and *b* of which the lapping wheel *b* is stationary while the lapping wheel *a* rotates relative to the lapping wheel *b* are surrounded by the magazine ring *c*. The diameter of this ring is considerably greater than that of the lapping wheels *a* and *b*. At the running in and out point C the distance between the lapping wheels *a* and *b* and the magazine ring *c* is as short as possible. A stripper *f*, fixed on the upper stationary lapping wheel *b* by means of bolts *d* and *e*, projects into the channel of the magazine ring *c* through the aperture C. The lapping wheel *a* is rotatable in the direction of the arrow A. The magazine ring *c* can also rotate, its direction of rotation being indicated by the arrow B. The lapping wheels *a* and *b* are provided with grooves *g* for guiding the balls *h* and are inclined to the common axis I—I which extends from the running in and out point C to the centre O of the lapping wheels.

The lapping wheel *a* and the magazine ring *c* can be driven in any conventional manner. For example, as shown in Figure 3 of the drawing, the rotatable lapping wheel *a* is driven by a mechanism which includes a pulley *s*, driven from a suitable source of power, for driving

shaft *t*, which in turn drives bevel gearing *u*, *v* and shaft *w*, to which the rotatable lapping wheel *a* is suitably connected. The magazine ring *c* is driven by a mechanism which includes a motor *m* belt-connected to a worm *n* meshing with a worm gear *o* on shaft *p* which in turn drives pinion *q* meshing with gear ring *r* secured to the magazine ring *c*.

When the lapping machine is running, the balls *h* are carried along by the rotating magazine ring *c* in the direction of the arrow B. They then encounter the wiper or stripper *f*, are deflected thereby and run on to the lower lapping wheel *a*. As soon as they reach this wheel their force of gavity causes an acceleration in the running in movement so that they automatically enter the grooves *g* and can be carried along by the lower rotating lapping wheel *a*. When the balls reach the cut-away portion D of the lapping wheel *b*, they roll under the influence of the centrifugal force caused by the rotary movement of the lapping wheel *a* and their integral force of gravity, on to the stripper *f* by which they are deflected so that they run on to the magazine ring *c*. The magazine ring *c* catches and conveys them back to the running in side of the wiper or stripper *f* for the purpose of returning them into the lapping wheel.

The balls *h* are prevented from falling out of the magazine ring *c* by an edge *i* provided on this ring *c*. A similar edge *l*, which, however, does not participate in the rotary movement but remains stationary, is also provided on the inner side of the magazine ring.

The lapping wheels *a* and *b* and the magazine ring *c* may be supported in any suitable conventional manner and the lapping wheel *a* and the magazine ring *c* may be driven in the direction indicated by the arrows A and B respectively in any suitable conventional manner, as shown and described, for example, in my copending application mentioned above.

I claim:

1. In a machine for lapping workpieces having spaced lower upper lapping wheels arranged in parallel planes essentially coaxial with one another and in spaced relation one above the other, said lower lapping wheel being rotatably mounted and said upper lapping wheel being stationary and provided with a cut-out portion to receive and discharge the workpieces, a workpiece magazine ring mounted to rotate in an essentially horizontal plane, means for rotating said lower lapping wheel and said workpiece magazine ring, and means including a stripper interposed into said cut-out portion and projecting outwardly from said lapping wheels into the path of the workpieces on said magazine ring and secured to said stationary upper lapping wheel to guide the workpieces during removal from and feeding between the lapping wheels whereby the workpieces are continuously fed between the lapping wheels and removed therefrom in essentially the same succession, said parallel planes being inclined with respect to said essentially horizontal plane about an axis extending through the center of said lapping wheels and said cut-out portion.

2. In a lapping machine the combination according to claim 1 wherein the inclination of said two parallel planes is such that in case of spherical workpieces the force of gravity of these workpieces accelerates the running-in movement thereof into the gap between the lapping wheels.

3. In a lapping machine the combination according to claim 2 wherein said inclination is such that in the case of spherical workpieces the centrifugal and gravitational force of the workpieces aids in the running-out movement thereof from the gap between said lapping wheels.

4. In a lapping machine the combination according to

claim 1 wherein said lower lapping wheel and said magazine ring rotate in opposite directions.

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