

(No Model.)

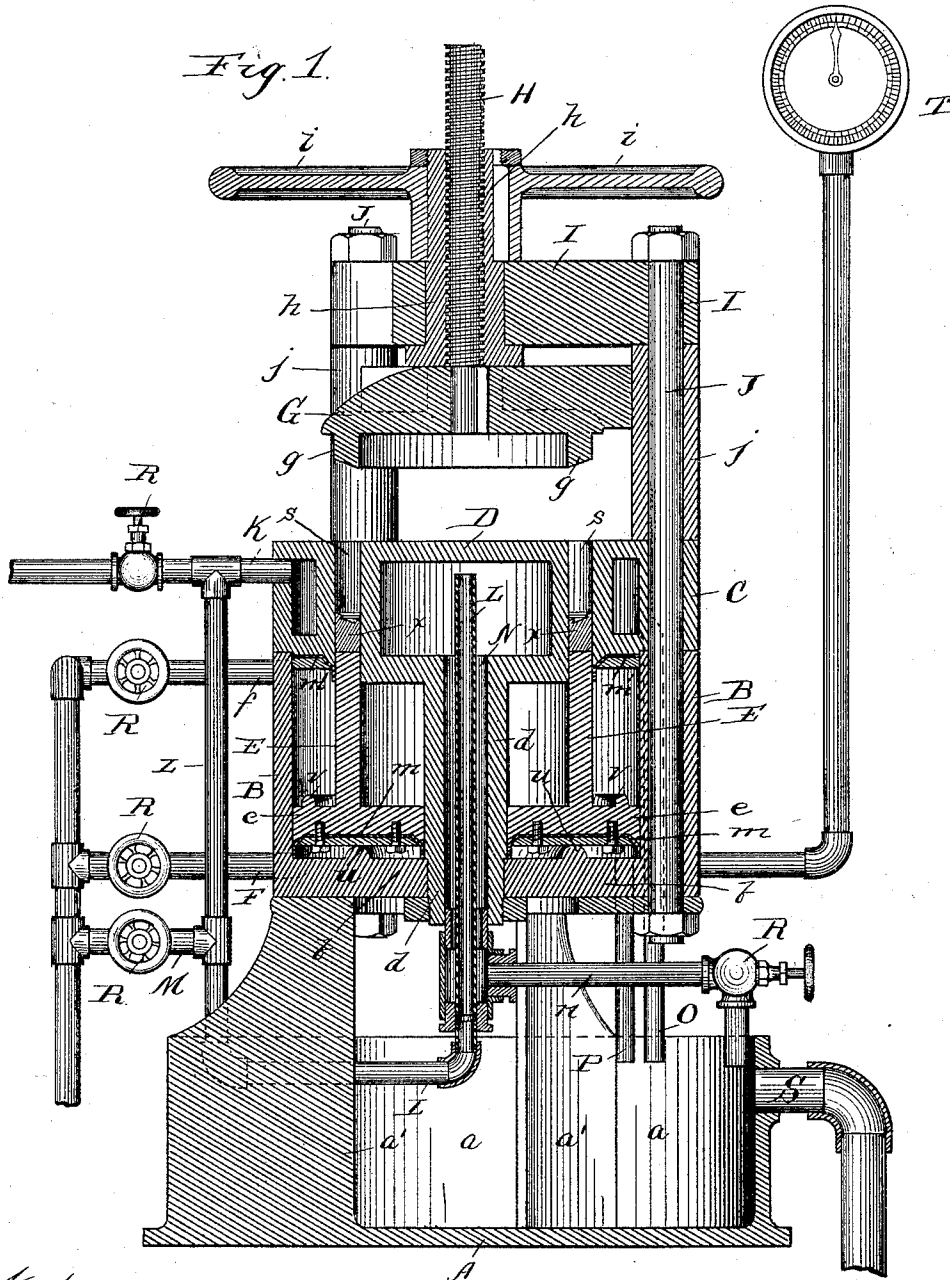
2 Sheets—Sheet 1.

A. JOHNSTON.

PROCESS OF AND MACHINE FOR MAKING EMERY WHEELS.

No. 476,799.

Patented June 14, 1892.



Witnesses:
Sew. C. Curtis.
Emma Hack.

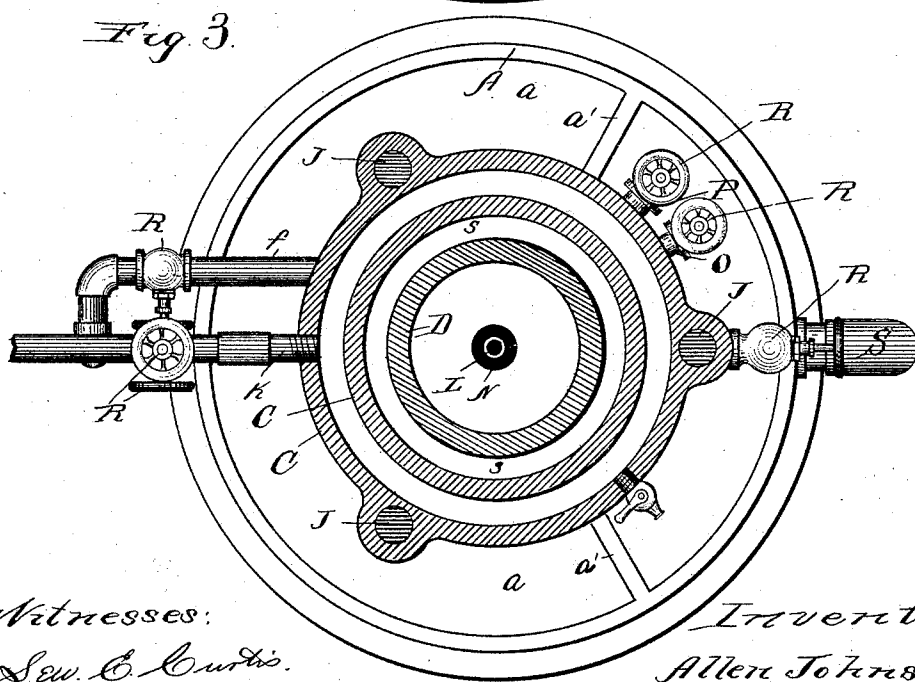
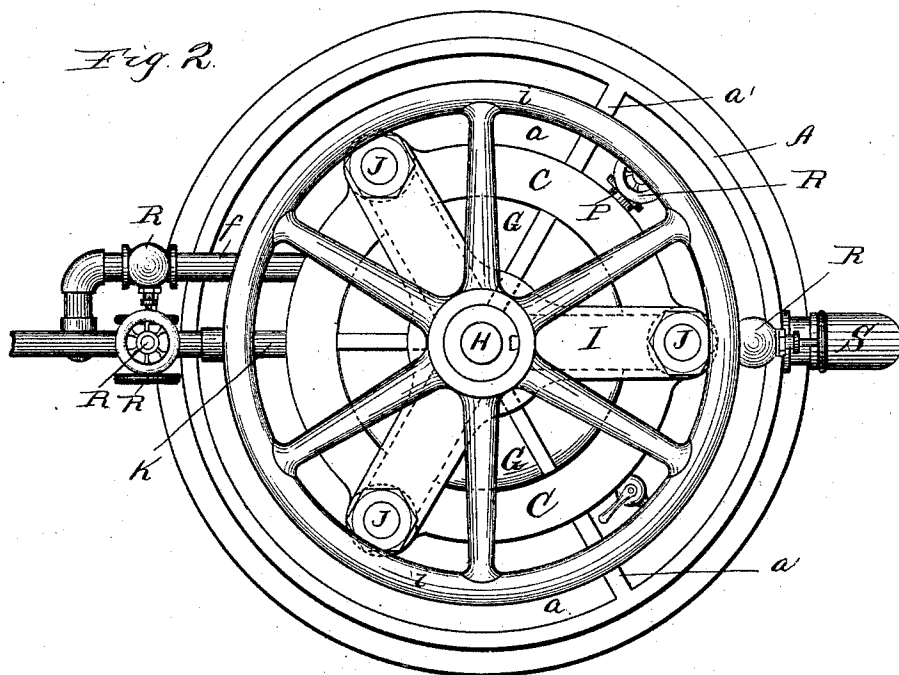
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UNITED STATES PATENT OFFICE.

ALLEN JOHNSTON, OF OTTUMWA, IOWA.

PROCESS OF AND MACHINE FOR MAKING EMERY-WHEELS.

SPECIFICATION forming part of Letters Patent No. 476,799, dated June 14, 1892.

Application filed July 5, 1889. Serial No. 316,609. (No model.)

To all whom it may concern:

Be it known that I, ALLEN JOHNSTON, a citizen of the United States, residing in Ottumwa, in the county of Wapello and State of Iowa, have invented a new and useful Improvement in Presses for Manufacturing Emery-Wheels, of which the following is a specification.

This invention relates to a press to be used in the manufacture of ring-shaped emery-wheels, such as are now used in grinding table-cutlery, &c.

The machine is adapted to receive a metallic ring and to cast or unite the emery to such ring. It consists of an annular mold, in which the metallic ring may be positioned, a movable follower adapted to close the top of the mold, and a plunger forming a bottom to the mold and which is actuated by hydraulic or other adequate pressure and thus adapted to compress the emery and shape it, while at the same time it forces the emery into the locking groove or spaces of the metallic ring. The mold is provided with means whereby it may be first heated both inside and out to the proper degree, thereby enabling the filling of the mold without prematurely chilling the plastic emery, which is supplied while hot, and the same feature allows the mold to be cooled after the pressure has been applied to bring the material to the requisite shape and size by admitting a cooling fluid instead of the heating agent. All these features will be fully understood by reference to the accompanying drawings wherein—

Figure 1 is a central vertical section of my improved press. Fig. 2 is a plan thereof, and Fig. 3 is a horizontal section of the same.

In the said drawings, A represents a suitable base having an interior chamber *a*, with its walls strengthened at proper intervals by interior ribs *a'*. Mounted upon this base is a cylinder B, having a close bottom *b*.

Resting upon the cylinder B is a hollow ring C, and located centrally within said ring is a core D, having a depending stem *d*, passing through and secured in the bottom *b* of cylinder B. Between the exterior surface of this core and the interior surface of the hollow ring is the space *s*, wherein the emery-wheel is molded and pressed. Moving vertically in said space *s* and forming a bottom to such

space is an annular plunger E, provided with a base *e*, which fills the space within the chamber B, exterior to the stem *d* of the core D. This plunger is actuated upward when the wheel is to be compressed by water admitted to the under side of its base through the pipe F, and it is returned to its normal position after the compressing operation by water admitted to the interior of the cylinder B, above the base *e*, through the pipe *f*. In order that the plunger may be used to drive the finished emery-wheel outwardly from the mold, it is given a considerable range of movement, as will be understood from Fig. 1.

Above the ring C is suspended the follower G, having a bottom flange *g*, adapted to enter the mold-spaces and form a top thereto. This follower is actuated by means of a non-rotating screw H, keyed to the follower and actuated up and down by an elongated rotating nut *h*, driven by hand-wheel *i*, keyed to said nut, said nut being confined in a stationary three-armed cross-head I. The face or edge of the flange *g*, which enters the mold-space, is beveled, as shown, in order to impart a like bevel to the edge of the wheel.

The parts B, C, and I are united together firmly by means of tie-rods J, thimbles *j* being interposed between the ring C and cross-head I.

In order that the mold may be heated before the plastic emery is placed in it, and thus avoid any premature chilling of the latter, steam is admitted to the hollow of the ring C by means of the pipe K, and also to the interior of the core D by means of the pipe L, which extends down to a sufficiently low point to enable it to pass up through the stem of the core, and both the ring and core are heated to a temperature not exceeding 400° Fahrenheit. When it is desired to cool the mold, the steam is shut off from these pipes K and L, and water is admitted thereto by means of the branch M, which connects with the pipe L, as shown, pipe L being joined to pipe K, as also indicated. The water is thus enabled to take the place of steam and reduce the temperature of the mold both inside and out. The water may be drawn off from the interior of the core by the annular passage N, surrounding that portion of pipe L, which

passes through the core-stem and through a pipe *n*, connecting with such annular passage N, said pipe *n* emptying into the chamber *a* of the base. The discharge from the hollow of ring C is through pipe O, and that from the interior of cylinder B below the follower-head is through pipe P.

R R indicate the various valves for controlling the steam and water and discharge pipes.

An overflow for the base A is shown at S, and a gage connecting with the water-space under the follower head and adapted to show the pressure put upon the plunger is shown at T.

A packing *m* is applied to the under side of the plunger-base, and a similar provision is applied to close the joint between the plunger and the ring C, as shown at *m'*.

At *u* and *v*, respectively, are annular ribs which come in contact with said packings at the extreme limits of the movements of which the plunger is capable. Such ribs are not likely to adhere to the packing as would a surface corresponding to the contour of the packing and coextensive with it in dimension.

This being the construction of the apparatus, the mode of operation is as follows: A metallic ring *x*, adapted to be united with the emery-wheel by the provision, for instance, of a dovetail groove upon its upper surface, being placed in the mold-space *s* in the position indicated at Fig. 1, steam is admitted by means of the pipes K and L to the interior of ring C and core D until they are sufficiently heated to prevent any chilling of the emery prior to the compressing of the same. Care should, however, be taken not to heat the ring or core above 400° Fahrenheit where dealing with emery containing a binding material, because a greater degree of heat is liable to burn the binding material and produce an inferior wheel. The hot plastic emery with its admixture of binding material is then placed in the mold-space and the cap or follower G is lowered to cover such space. The water under pressure being now admitted under the bottom of the plunger, said plunger is caused to rise and compress the emery within the mold, causing the latter thereby to enter the dovetail of the ring *x*, and also to receive the bevel conformation of the flange *g*. This pressure is recorded upon the gage and is carried to a proper point and continued long enough to insure suitable action upon the wheel. The steam is shut off and water admitted in its stead to the interior of the ring and core whenever the wheel has been sufficiently compressed. After a sufficient chilling the follower G may be raised and such pressure put upon the plunger as will cause it to force the now formed wheel with its attached metallic ring up and out of the mold. As these wheels are liable to become stuck in the mold, so that it is very difficult to dislodge them, I reheat the

ring and core quickly by withdrawing the water and readmitting steam. This results in softening the surface of the wheel, if the material of which it is composed is such as will become plastic with heat, and renders its removal easy. The facility with which this reheating may be done is an important advantage attending my invention.

Instead of introducing the heat through pipes, as shown, the heating of the press may be accomplished in other ways—as, for instance, by heating the entire machine in a hot chamber to a degree sufficient to keep the emery plastic while it is being pressed into form.

I claim—

1. The press for the manufacture of emery-wheels, consisting of the hollow ring and hollow core, both having provision for the admission of a heating agent, a follower closing one end of the space between said ring and core, and a plunger actuated by hydraulic or other suitable pressure moving in said space and closing the other end thereof, substantially as set forth.

2. The press for the manufacture of emery-wheels, consisting of a cylinder B, a hollow core D *d*, a hollow ring C, and pipe connections for supplying said core and ring with heating and cooling agents, in combination with the follower and plunger, substantially as set forth.

3. The press for the manufacture of emery-wheels, consisting of the hollow ring and hollow core, both provided with pipe connections for the admission of heating and cooling fluids to their interior, a follower having a beveled flange *g*, and a pressure-actuated plunger, all combined and operating substantially as set forth.

4. The combination, with the plunger and its cylinder B, of the core D, having a stem *d*, receiving the pipe L and also giving discharge to the water, said pipe L and the discharge-pipe connecting with said stem, whereby the core is supplied with and exhausted of the heating and cooling fluids, substantially as set forth.

5. The combination, with the plunger and its packing, of the rib or ribs *u v*, substantially as and for the purpose set forth.

6. The process of making emery-wheels which are composed of a compound of emery and binding material rendered plastic by heat, which consists of the following successive steps, namely: first, placing the heated compound in a mold that is heated to such degree as to prevent the chilling of the compound; second, applying pressure to the compound in the mold while it is still hot, and, third, cooling the mold and its contents until the latter are solid, substantially as specified.

ALLEN JOHNSTON.

Witnesses:

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A. G. HARROW.