July 2, 1929. M. L. JEFFREY ET AL 1,719,806

APPARATUS FOR PACKING ARTICLES WITH MATERIAL

Filed Jan. 8, 1927

Fig. 1

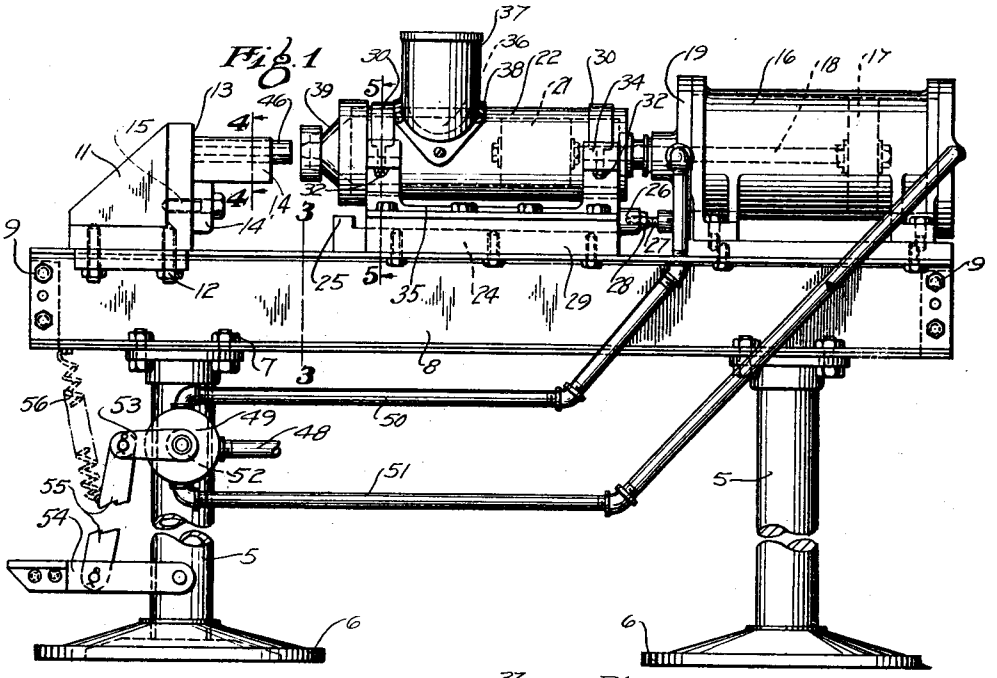


Fig. 2

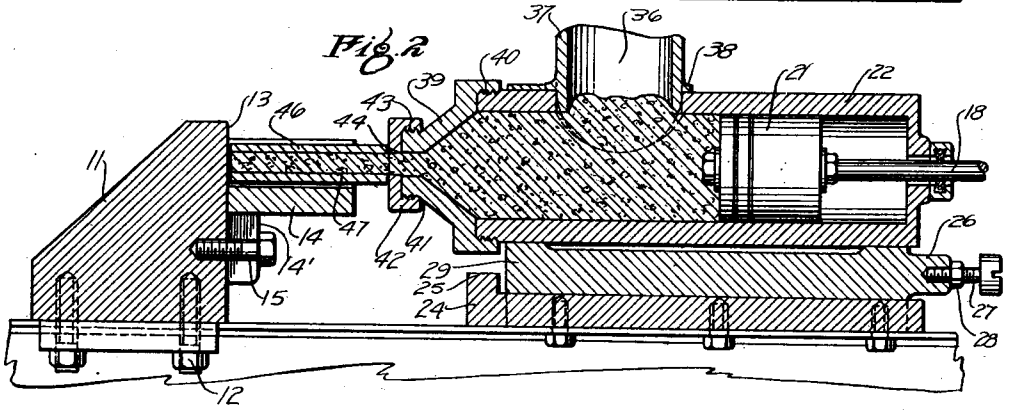


Fig. 5

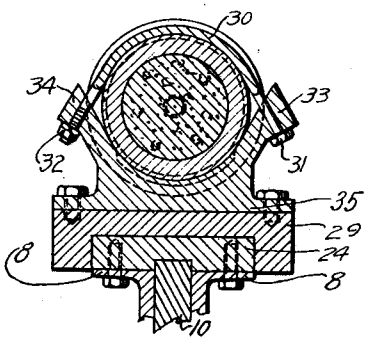


Fig. 3

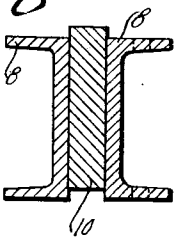
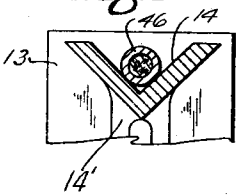


Fig. 4



INVENTOR
MAX L. JEFFREY
FRANK L. SNYDER
BY Richey & Watts
His ATTORNEYS

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UNITED STATES PATENT OFFICE.

MAX L. JEFFREY AND FRANK L. SNYDER, OF CLEVELAND, OHIO, ASSIGNORS TO THE WHITE MOTOR COMPANY, OF CLEVELAND, OHIO, A CORPORATION OF OHIO.

APPARATUS FOR PACKING ARTICLES WITH MATERIAL.

Application filed January 8, 1927. Serial No. 159,928.

Our invention relates to a mcahine for packing articles, such as, wrist pins, spring bolts, or the like, with fire clay prior to the hardening process to which such articles are subjected.

Prior to the hardening of such articles as wrist pins, spring bolts, etc., it has been the practice to pack these articles by hand, with a refractory material such as clay. This method consumed much time and labor in the packing of such articles and limited their production. The hand method of packing was tedious, difficult, and expensive.

One of the objects of our invention therefore, is to mechanically pack such articles as wrist pins, spring bolts, etc. with a refractory material, prior to subjecting such articles to a hardening process.

Another object of our invention is to reduce the cost of packing wrist pins or other articles with refractory material, and to increase their production.

Other objects and advantages of our invention will become more apparent as the description of an embodiment thereof progresses, reference being made to the accompanying drawings in which like reference characters are employed to designate like parts throughout the same.

Fig. 1 is a side elevation of the invention.

Fig. 2 is an enlarged section thru the work, work holder and the refractory material ejecting cylinder and nozzle.

Fig. 3 is an enlarged section on line 3—3 of Fig. 1.

Fig. 4 is an enlarged section on line 4—4 of Fig. 1.

Fig. 5 is an enlarged section on line 5—5 of Fig. 1.

Referring to the drawings which are illustrative of one embodiment of our invention, we have provided a suitable supporting means for the work, and the pressure and ejecting cylinders, such supporting means consisting preferably of suitable standards 5, having enlarged bases 6, upon which are bolted or otherwise secured, as at 7, a pair of channel irons, 8. These irons are secured together at their ends in substantial parallel relation, by means of bolts or rivets 9. To provide a greater supporting area along the upper and lower longitudinal surfaces of the channel irons, we may secure the irons together in spaced relation by interposing a spacer 10 extending substantially the entire length of the channel irons 8 and secured thereto by the bolts or rivets 9.

We have provided suitable means for holding the work or article to be filled with the refractory material, which consists preferably of a block 11, bolted or otherwise secured at its base, as at 12, to the upper surfaces of the channel irons adjacent one end thereof. Adjustably secured to the vertical wall 13, of the block 11, is a substantially V-shaped horizontal work centering support 14, and extending outwardly from the vertical wall 13 and having a downwardly projecting forked portion 14′. This is illustrated in enlarged section in Figs. 2 and 4. The work support is held in its adjusted position by a bolt 15 passing between the fingers of the forked portion 14′. It will be seen therefore that the work support 14 is easily adjustable and is detachable so that other supports of varying shapes and sizes may be substituted therefore, according to the size and the nature of the work to be supported.

We have provided means for ejecting refractory material from a suitable chamber, or cylinder, and injecting it into an opening in the work, which consists of a fluid pressure cylinder, means for controlling the pressure within the cylinder, and means for holding and ejecting the refractory material into the work.

A fluid pressure chamber 16 may be mounted adjacent to the other end of the channel irons 8, its longitudinal axis extending substantially parallel with that of the irons. A suitable plunger or piston 17 is reciprocable within the cylinder and is carried on one end of a connecting rod 18. The opposite end of the connecting rod extends thru and is movable within a suitably packed opening in an end plate 19 of the cylinder and extends thru another suitably packed opening 20 in one end of the refractory material containing chamber 22. A plunger 21 is secured to the other end of the connecting rod to reciprocate within the chamber 22. Although we have not shown packing means between the plungers 17 and 21 and the respective internal walls of the chambers 16 and 22, it is to be understood that we may use any suitable structure constituting such means.

The refractory carrying and ejecting chamber or cylinder 22 is slidably mounted to permit longitudinal adjustment of the cylinder with respect to the work and the pressure

chamber 16. It will be noted in this connection that the longitudinal axes of the work, the ejecting chamber and the fluid pressure chamber are in substantial alignment in the embodiment of my invention shown in the drawing. To permit relative longitudinal movement between the ejecting chamber and its support, we have provided means which preferably consist of a guide block 24 having an upturned forward end 25 constituting a stop to limit the movement of the chamber 22 in one direction, and having an extended portion or shoulder 26 formed on another end. A suitable stop is provided for adjustably limiting the movement of the ejecting chamber in the other direction and consists of a screw 27 having an enlarged head, the screw extending into the extended shoulder 26 and being capable of being locked in adjustable axial position with respect to the extension by means of a lock nut 28. A second guide block 29, is provided with longitudinal overhanging edges which slidably engage the longitudinal walls of the block 24. The chamber 22 is securely held in place upon the block 29 by means of bands or straps 30 which are preferably strapped over the chamber adjacent its respective ends. These bands may be headed on one of their respective ends as at 31, the other end of each strap being screw threaded to receive a nut 32. The headed ends of the straps are held in the respective forked members 33, while the screw threaded ends project thru openings formed in the arms 34. The arms 34 and the forked head members 33 are formed preferably integrally with the base 35 their cylinder supporting walls being shaped to conform to the contour of the cylinder 22.

The refractory material receiving and ejecting chamber 22 is provided with an enlarged opening 36 intermediate its ends to provide for charging the chamber with refractory material. A suitable hopper 37 which serves to guide the material into the chamber is secured to the chamber as at 38.

We have provided means whereby the refractory material may be ejected from the chamber through a restricted outlet. This means may consist of a construction as illustrated in the accompanying drawings which shows a nozzle having a main body portion 39 preferably screw threaded internally so that it may be detachably secured to the ejecting end of the chamber 22 as shown at 40. The body portion 39 is preferably frusto-conically formed and terminates at its smaller end in a screw threaded apertured shoulder 41. A cap 42 internally screw threaded as at 43 is adapted to be screwed onto the threaded end 41 of the body 39. This cap is provided with an opening 44, which preferably conforms in contour with the aperture in the work which is adapted to be engaged by the outer face of the cap. The cap 42, being detachably secured to the body 39, is interchangeable with other caps having discharge openings of various shapes and sizes, so that a cap having an opening of certain shape and size may be used in filling work having a refractory receiving opening of like shape and size. When pressure is exerted against the mass of refractory material within the chamber 22, a portion of the material will be forced against the converging wall of the body 39, thence through the opening at the forward end of the body 39 and finally discharged through the opening 44, in the cap.

Referring more particularly to Fig. 2, it will be noted that the work 46, held in the work holder 14 extends beyond the outer end wall of the holder sufficiently so that when the chamber 22 is moved to the left (Fig. 2) the outer face of the cap 42 will abut the adjacent end wall of the work in intimate contact, and in such a manner that the opening 44 of the cap will register with the opening 47 in the work, thus permitting the extruded refractory material to be forced into the opening 47 under pressure and without danger of leakage between the abutting surfaces of the work and the cap.

We have also provided means for actuating the piston or plunger 17 in the fluid chamber 16, which may comprise a suitable valve or other control to the chamber 16. Referring more particularly to Fig. 1, we provide a conduit 48 leading from the source of fluid pressure and connected to a suitable valve mechanism 49. In the present instance, valve 49 may comprise a three-way valve having an outlet leading into a conduit 50, which is connected at its other end to one end of the chamber 16. A conduit 51 communicates with another outlet of the valve 49 and with the opposite end of the chamber 16. The valve rotating or operating member 52 is provided with a crank arm 53, which in turn is connected to a manually operated lever 54, through a connecting link 55. In the present showing of our invention we have illustrated the manually operated lever 54, as a foot lever, although it is to be understood that we may operate the valve by a hand lever if desired. A spring 56 connects the lever 54 with the beam structure 8 under tension so that normally the source of fluid pressure is connected through the valve and conduit 50 to maintain the piston or plunger 17 to the right as in Fig. 1. When the foot lever 54 is depressed extending the spring 56, the valve is actuated to connect the fluid pressure source through the conduit 51, whereby the piston 17 is caused to move to the left in the cylinder 16, simultaneously moving the connecting rod 18 and the plunger 21 to the left, in the chamber 22. As the plunger 21 begins its movement toward the left in Fig. 1, its forward end engages the mass of refractory material within

the chamber and further movement of the plunger in this direction will cause the chamber 22 and its supporting base to move to the left along the guide block 24 until the work engaging face of the cap 42 abuts an adjacent face of the work. Further movement of the plunger 21 will operate to bring the abutting faces of the cap 42 and the work into more intimate contact, forming a substantially sealed connection between the nozzle and the work. Under such pressure as is now being exerted through the piston 21 to the refractory material and with the nozzle and work abutting each other, a portion of the material will be extruded through the restricted opening 45 under pressure of the piston 21 and will be injected into the opening 47 in the work. When it is desired to relieve causing the valve to connect the fluid pressure source with the opposite side of the plunger 17 or through the conduit 50, the piston 21 will be pulled to the right and the chamber 22 will be moved to the right as in Fig. 1, along the guide block 24 until the end of the adjustable stop 27 abuts with the rigid wall of the cap 19. Since the piston 21 has been forced against the refractory material under great pressure in the ejecting stop just described, sufficient suction will be created between the material, the chamber walls and the piston 21 to cause the chamber to move to the right in Fig. 1 when the foot lever is released. The cap 42 is thus brought out of engagement with the work and the refractory material is relieved of the pressure which has been applied to it. The work may now be removed from its holder and a new piece of work inserted therein and the operation of the apparatus continued as before.

Due to the extreme simplicity in the construction and the ease of operation of the entire apparatus, we have materially increased the output and have greatly reduced the cost of filling articles with refractory material.

Various changes in the details of construction may be made without departing from the spirit of the invention or the scope of the subjoined claims.

What is claimed is:

1. An apparatus for filling articles with refractory material, comprising a support for said articles, a refractory material holding cylinder having an opening in an end thereof and means for ejecting the material within the cylinder through said opening under pressure, said cylinder being movable when pressure is applied to the material therein, the movement of the cylinder being limited in one direction by the article to be filled.

2. An apparatus for filling articles with refractory material comprising a support for said articles, a refractory material holding cylinder having a restricted opening in an end thereof and means for ejecting the material within the cylinder through said opening under pressure, said cylinder being movable when pressure is applied to the material therein, the movement of the cylinder being limited in one direction by the article to be filled and means for retracting the cylinder upon completion of the filling operation.

3. An apparatus for filling articles with refractory material comprising a support for said articles, a refractory material holding cylinder having a restricted opening in an end thereof, and means for ejecting the material within the cylinder through said opening under pressure, said cylinder being movable when pressure is applied to the material therein, the movement of the cylinder being limited in one direction by the article to be filled and means for retracting the cylinder upon completion of the filling operation and means whereby the retracted movement of the cylinder is limited to a predetermined distance.

4. An apparatus for filling articles with refractory material comprising a base, a work holder secured to said base, a refractory material containing cylinder slidably mounted on said base, the movement of said cylinder in one direction being limited by the work in said work holder, a fluid pressure cylinder, a plunger reciprocable within the said last named cylinder, and means for selectively applying pressure to either side of this plunger, and means actuated by said plunger for moving said material holding cylinder into engagement with an article, whereby a portion of the refractory material within the cylinder may be transferred under pressure to the article.

In testimony whereof we hereunto affix our signatures this 17th day of December, 1926.

MAX L. JEFFREY.
FRANK L. SNYDER.