

No. 654,398.

Patented July 24, 1900.

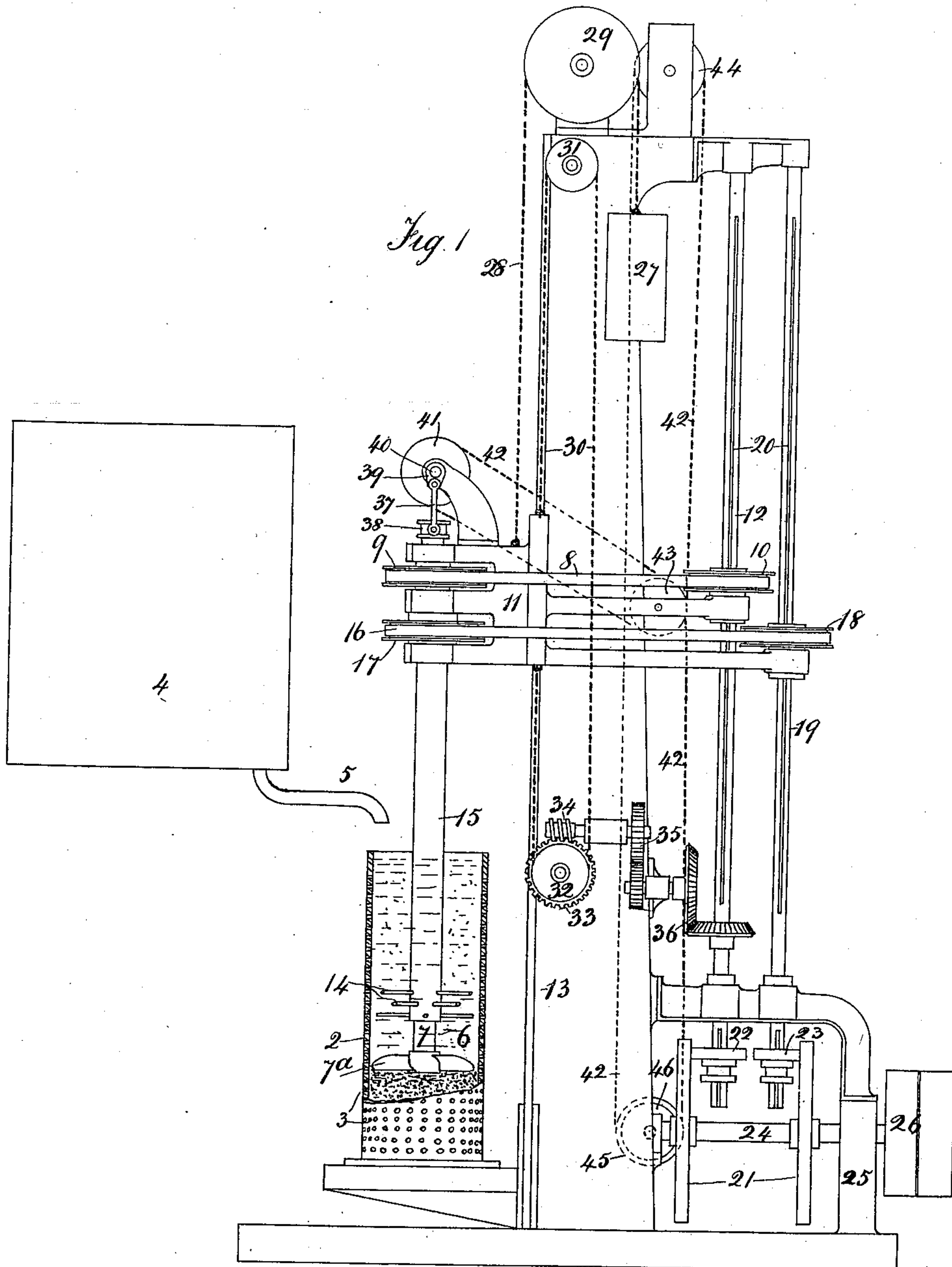
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GUNCOTTON PRESS.

(Application filed Apr. 15, 1899.)

(No Model.)

2 Sheets—Sheet 1.



Witnesses

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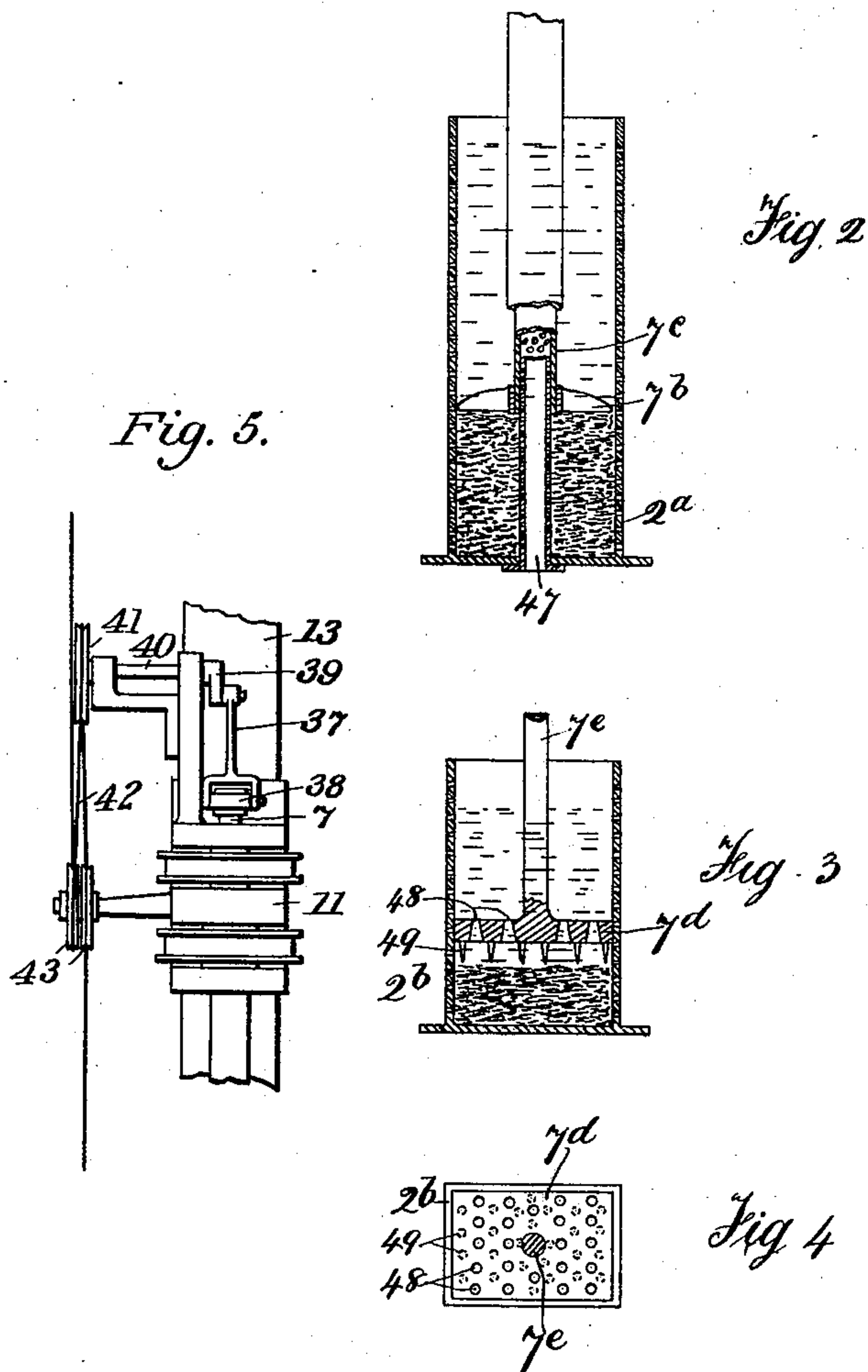
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Witnesses

W. B. Johnson  
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# UNITED STATES PATENT OFFICE.

ERNEST HOLLINGS, OF CHORLTON-CUM-HARDY, ENGLAND.

## GUNCOTTON-PRESS.

SPECIFICATION forming part of Letters Patent No. 654,398, dated July 24, 1900.

Application filed April 15, 1898. Serial No. 713,108. (No model.)

*To all whom it may concern:*

Be it known that I, ERNEST HOLLINGS, a subject of the Queen of Great Britain, and a resident of Chorlton-cum-Hardy, in the county of Lancaster, England, have invented new and useful Improvements in Molding or Forming Guncotton or Similar Materials into Blocks or the Like, of which the following is a specification, reference being had to the accompanying drawings, in which—

Figure 1 is a side elevation of apparatus under my invention, part of the mold being in section. Fig. 2 is a sectional view of a modification of apparatus for making hollow blocks. Fig. 3 is a sectional view of a modification of apparatus for making blocks of square section. Fig. 4 is a plan view of Fig. 3. Fig. 5 is an enlarged detail view of part of the mechanism shown in Fig. 1.

This invention relates to molding, pressing, or consolidating guncotton or like material into blocks, disks, cylinders, &c.

Hitherto in pressing guncotton into blocks it has been impossible to extract the air contained in the pores or interstices of the cotton, which air on pressure being removed expands and renders the blocks spongy or laminated, and consequently the detonation is often incomplete.

Now the object of my invention is to provide appliances whereby the molding of guncotton into blocks, &c., may be accomplished in such manner that the air is removed and the fibers of the guncotton laid together by gentle pressure, so that a homogeneous mass is formed free from lamination and air-spaces. For these purposes I make use of a mold or like container, preferably with perforated sides, although a solid-sided mold may be used in some cases. The guncotton is mixed with water into a thin pulp, which is fed into the mold from a tank as required. Within the mold I provide means for pressing or laying the fibers of the guncotton closely together and agitators to prevent the fibers settling except where laid by the pressers.

Referring to Fig. 1, 2 is a mold having perforations 3 in the sides thereof.

4 is a tank in which the guncotton is mixed with water into a thin pulp, which is fed into the mold by the pipe 5 as required.

6 is a revolving presser or layer consisting

of a bar 7, provided at the end with screw-blades 7<sup>a</sup> or equivalent devices, which as the bar revolves press or lay the fibers of the guncotton into the lower part of the mold, the water escaping through the perforations 3. If a solid mold is used, the water escapes at the top. The bar 7 is caused to revolve by means of a belt 8, passing around a pulley 9, attached to the bar, and around a pulley 10, carried in a bearing on the slide 11, and caused to rotate by the shaft 12. The bar 7 is also carried in bearings on the slide 11. The slide 11 is free to move up and down in guides on the pillar 13. In order to prevent the fibers in the pulp from settling above the screw-blades 7<sup>a</sup>, I provide agitators to agitate the pulp and prevent settlement.

14 indicates agitators attached to a sleeve 15, surrounding the bar 7, and free to rotate independently thereof and carried in bearings on the slide 11. Motion is given to the sleeve 15 by a belt 16, passing around a pulley 17 on the sleeve and around a pulley 18, carried in a bearing on the slide 11, and caused to rotate by the shaft 19. The pulleys 10 and 18 are provided with keys fitting into keyways 20 on the shafts 12 and 19, so that such pulleys are caused to rotate with the shafts, but are free to slide up and down thereon. The shafts 12 and 19 receive motion from the disks 21 by means of friction-disks 22 23, free to be moved up and down on keyways in the shafts 12 and 19 in any usual manner. The disks 21 are carried on a shaft 24, which rotates in bearings in the framework 25.

26 is the main driving-pulley.

27 is a balance-weight attached to a rope or chain 28, which passes over a pulley 29 and is attached to the slide 11 to balance the weight of such slide and the pulleys and other mechanism carried thereby.

30 is a rope or chain attached to the slide at each end and passing over pulleys 31 32.

33 is a toothed worm-wheel attached to the pulley 32 and receiving motion from the worm 34, driven by wheels 35 and bevel-gearing 36 from the shaft 12. The rope 30 by this means raises the slide and connections as the block of guncotton is formed at the bottom of the mold, but keeps a certain pressure on such guncotton, so as to lay the fibers closely together. Instead of keeping the pressure on



the block by means of the rope 30 and connected gearing the slide 11 or the bar 7 may be weighted. The wheels 35 are change-wheels, so that the speed of raising the slide can be varied as desired. In addition to the revolving motion the bar 7 may also receive a reciprocating motion, which is advantageous to free the screw-blades from fibers. This reciprocating motion is imparted by means of a connecting-rod 37, connecting a collar 38 on the bar 7 to a crank 39 on a shaft 40, carried in bearings on the slide 11. The shaft 40 is driven by means of a pulley 41, which is caused to rotate by a rope 42, passing around pulleys 43 44 45. There are two pulleys at 43, which are carried on the slide 11, one behind the other, as shown in Fig. 5, so as to allow of the slide 11 moving up and down without interfering with the driving of the rope 42. The pulley 44 is driven by means of a friction-disk 46 from one of the disks 21. Any other convenient means instead of those shown for revolving and reciprocating the bar 7 may be used as found convenient. The agitators 14 serve to agitate the pulp and prevent settlement of the fibers before they are laid by the screw-blades. The agitators may, if desired, be attached directly to the bar 7 and be driven therewith.

The pulp fed into the mold is of such consistency and the perforations in the mold are of such size that the water does not escape through the perforations until pressed out of the guncotton fibers by the screw-blades 7<sup>a</sup>.

Referring to Fig. 2, when it is desired to make the blocks of guncotton hollow I provide a perforated tube 47, which projects upward from the bottom of the mold 2<sup>a</sup>. The screw-blades 7<sup>b</sup> are attached to a hollow bar 7<sup>c</sup>, which can be revolved and moved up and down on the tube 47, so that the fibers of guncotton are laid around such tube, thus forming a hollow block. The water escapes through the perforations in the tube 47, as well as through the perforations in the mold 2<sup>a</sup>. The hollow bar 7<sup>c</sup> is operated in a similar manner to the bar 7, as described under Fig. 1.

Referring to Figs. 3 and 4, when it is desired to make the blocks of guncotton of square, hexagonal, or other shape than circular in cross-section, such shape not allow-

ing of revolution of the presser, I prefer to form such presser or layer of a plate 7<sup>d</sup>, fitting the shape of the cross-section of the mold 2<sup>b</sup> and carried by the bar 7<sup>e</sup>. The plate is provided with holes 48, through which the pulp can pass from above to below when the plate rises, the fibers being laid and consolidated when the plate descends. 49 indicates taper pins fitted in the under side of the plate 7<sup>d</sup> for the purpose of pressing the fibers together and interlacing them, so that a solid block of guncotton is formed. The bar 7<sup>e</sup> and presser are operated in a similar manner to the bar 7, as described under Fig. 1, except that the gearing for revolving the bar is not needed.

When the blocks of guncotton have been formed of the desired size by any of the apparatus described, they may, if necessary, be consolidated by hydraulic pressure or in other convenient way.

I claim—

1. In apparatus for making blocks of guncotton, the combination with a mold, of a presser therein, mechanism for reciprocating the same, and mechanism for gradually raising the presser during the reciprocation thereof; substantially as described.

2. In apparatus for making blocks of guncotton, the combination with a mold, of a revolving presser, mechanism for reciprocating the same, and mechanism for gradually lifting the presser while it is rotated and reciprocated; substantially as described.

3. In apparatus for making blocks of guncotton the combination with a perforated mold of a revolving and reciprocating presser adapted to lay the fibers of guncotton into the mold, movable agitators adapted to prevent settlement of fibers and mechanism driving the agitators independently of the presser substantially as described.

4. In apparatus for making blocks of guncotton the combination with a perforated mold of a central perforated tube and a hollow revolving and reciprocating presser all adapted to make a hollow block of guncotton substantially as described.

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