

J. WORRALL.

APPARATUS FOR WASHING AND DYEING.

No. 323,095.

Patented July 28, 1885.

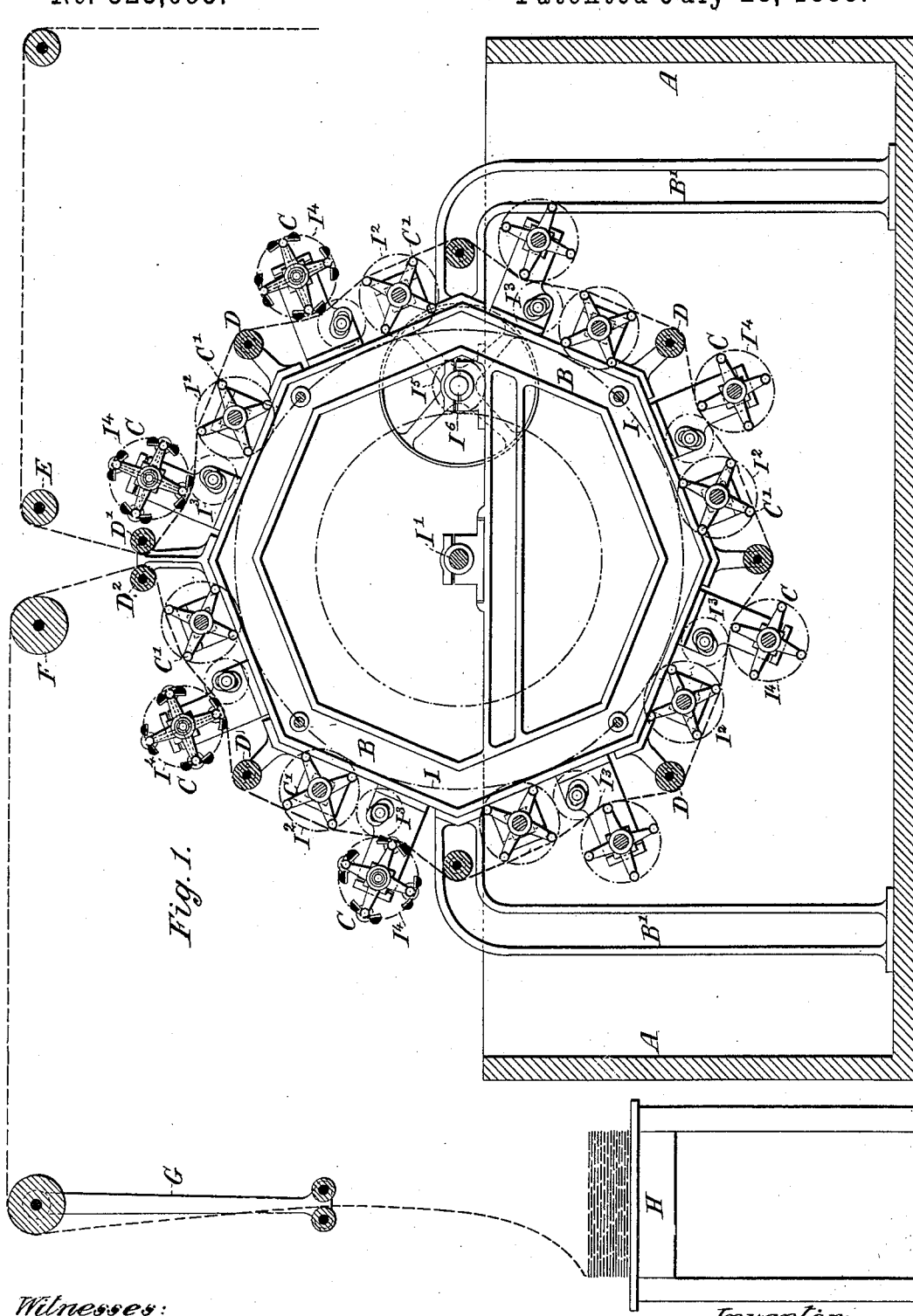


Fig. 1.

Witnesses:  
*O. Sundgren*  
*Matthew Solbeck*

Inventor:  
*James Worrall*  
*By his attorneys*  
*Brown & Bull*

J. WORRALL.

APPARATUS FOR WASHING AND DYEING.

No. 323,095.

Patented July 28, 1885.

Fig. 4.

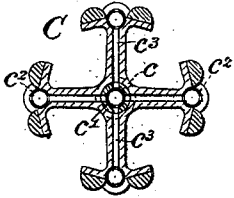


Fig. 3.

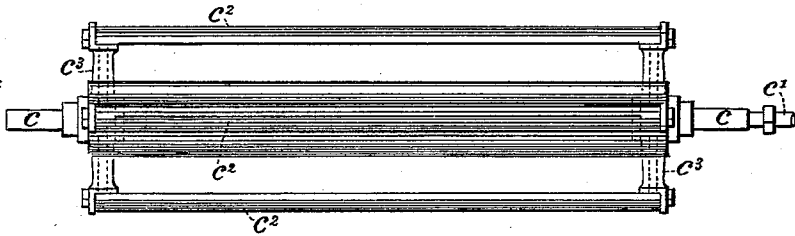
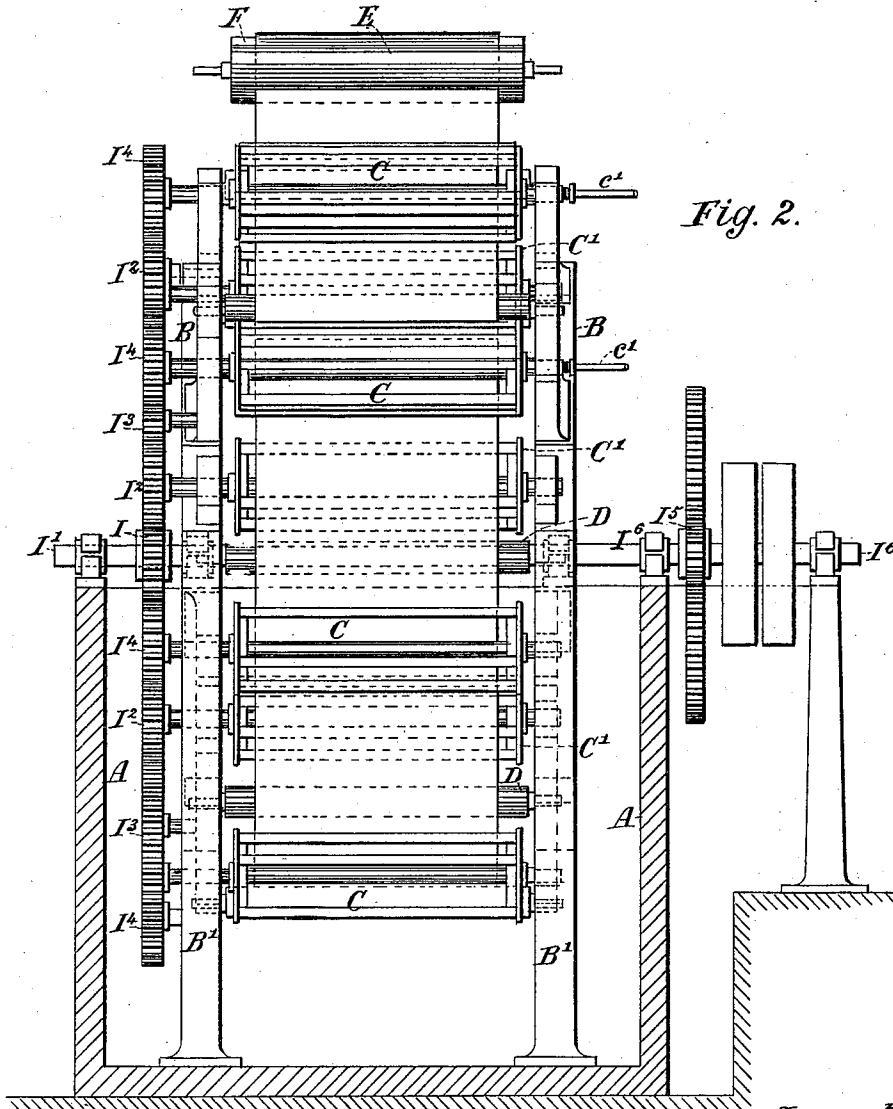


Fig. 2.



Witnesses:  
*Ol. Sunagren*  
*Matthew Pollock*

Inventor:  
*James Worrall*  
 by his attorneys  
*Prout & Ball*

# UNITED STATES PATENT OFFICE.

JAMES WORRALL, OF ORDSALL, SALFORD, COUNTY OF LANCASTER,  
ENGLAND.

## APPARATUS FOR WASHING AND DYEING.

SPECIFICATION forming part of Letters Patent No. 323,095, dated July 28, 1885.

Application filed December 29, 1884. (No model.)

*To all whom it may concern:*

Be it known that I, JAMES WORRALL, of Ordsall, Salford, in the county of Lancaster, England, dyer, have invented certain new and useful Improvements in Washing and Dyeing Machinery, of which the following is a specification.

This invention relates to a novel arrangement of machinery for subjecting pile fabrics to a beating action while being washed or dyed, such beating action serving, as is well known, to prevent the lay of the pile.

In the machines hitherto constructed on the most approved plan much difficulty has been found in getting access to the parts, and the cost of constructing and working such machines has been considerable. By the present arrangement, which simplifies the construction of the machine without detracting from its efficiency, a material economy in space is secured, and all the parts are readily accessible to the attendant.

In the accompanying drawings, Figure 1, Sheet I, shows in longitudinal sectional elevation my improved machine for washing and dyeing pile fabrics. In Sheet II, Fig. 2 is a transverse vertical section of the machine; and Figs. 3 and 4 are detached views of one of the winces or beaters drawn to an enlarged scale.

A A are a tank, which is to receive the cleansing or the dyeing liquor, and B B are a pair of octagonal standards, which are braced together by cross-stays and set up on the bottom of the tank. These standards, with their transverse braces and vertical supports B' B', constitute a frame for carrying the bearings for a series of winces or beaters, C C, and a series of guide-rollers, D D.

The bearings for the guide-rollers consist of short pedestals set at the angles of the octagonal frame. At the uppermost angle, however, the standard is branched to carry two guide-rollers, D' D'', under which the cloth to be operated upon, respectively, passes when entering and leaving the machine.

The winces or beaters are arranged in two concentric rings, C C and C' C', around the octagonal framing, and their bearings are carried by standards made fast to the flat edges of the octagon standards. The standards car-

rying the winces or beaters of the external ring are higher than the standards carrying the guide-rollers, and those carrying the bearings of the inner ring of winces are shorter than the guide-roller standards.

The fabric to be operated upon is led down from an elevated guide-roller, E, into the machine under the roller D', then under the first of the winces C, and over the first of the winces C' to the second guide-roller D, over which it passes, and so on through the whole series of beaters and rollers until it comes to the guide-roller D'', whence it passes to the card-roller F, to which rotary motion is imparted for the purpose of drawing the cloth through and out of the tank. From this drawing-off roller the cloth is led past a guide-roller, and thence to the folder G, which deposits it in folds upon a table, H, ready for removal from the machine.

The winces or beaters C C' receive rotary motion from a spur-wheel, I, keyed to a central shaft, I', the bearings of which are carried by the tank A and the octagon framing. Gearing into this spur-wheel I are pinions I'', keyed on the axles of the winces C'. These pinions drive through pinions I' spur-pinion I' on the axles of the winces or beaters C.

For driving the spur-wheel I at the requisite speed, a pinion, I<sup>s</sup>, is used for transmitting the motion thereto. This pinion is keyed to a short shaft, I<sup>s</sup>, mounted in suitable bearings, and carrying fast and loose band-pulleys which receive a strap from overhead-gearing.

The tank, it will be seen, is of such a depth that when fully charged with liquor one-half only of the winces will be submerged. When, however, it is thought desirable, the depth of the tank may be sufficiently increased to submerge all the winces or beaters. In such case the winces used will be of the ordinary construction; but when, as in the present instance, one-half of the winces only are submerged, some or all of those above the tank are made to discharge liquor onto the fabric under treatment. For this purpose I make the winces, say, of the outer circle, as shown in side elevation and transverse section at Figs. 3 and 4, where *c* is a hollow axle receiving the detergent or other liquor from a fixed pipe, *c'*, inserted into a gland fitted in the end of the axle.

The bars  $c^2$  of the wince or beater are made hollow, and connected by hollow arms  $c^3$  with the axle  $c$ , which arms serve as channels for conducting the liquor from the axle to the bars  $c^2$ . These hollow bars are slit nearly from end to end to provide a passage for the discharge of the liquor onto the cloth as it passes over them, and to prevent the closing of the slit by the cloth while held at tension over each bar of the wince in succession, ribs are formed on opposite sides of the slit to take the strain of the cloth and cause it to bridge over the slit.

The wince or beater is intended to discharge liquor from each bar  $c^2$  in succession, and only at the time that the bar is in contact with the cloth. To provide for this, the fixed pipe  $c'$ , which passes from end to end of the hollow axle  $c$ , is provided with vents situate in the plane of the revolving arms  $c^3$ . Thus, as the arms severally come into coincidence with these vents, they will be supplied with liquor under pressure, which will be ejected from the slits of the bars  $c^2$  onto the cloth in the form of intermittent jets.

Supposing, now, the cloth to have been led through the machine in the manner above explained, its cut pile face being outward, and rotary motion to have been imparted to the machine through the driving-pulley and spur-gearing above described, the rotary beaters  $C'$  acting upon the inner side or back of the traveling fabric, and the rotary beaters  $C$  acting on the face of the fabric, will impart to it a rapid vibratory motion, and thereby give the pile a tendency to stand upright from the base of the fabric. As the beaters  $C$  and  $C'$  rotate in opposite directions they will neutralize the drag which they severally put upon the traveling fabric, and thus protect the fabric from any undue strain.

In some cases I propose to use only one series or ring of rotary beaters, which will then act upon the back of the fabric like the beaters  $C'$ .

The agitation imparted to the cloth will so effectually separate the fibers of the pile as to render unnecessary much of the brushing which is at present required to raise the laid pile and to give the required finish to the fabric.

In the machine just described, washing or detergent liquor or a dye-liquor may be indifferently used, so far as the action of the machine is concerned; but the manufacturer will readily understand that it is necessary to limit the use of his machinery to either the washing or dyeing operation.

Having now particularly described and ascertained the nature of my said invention, and in what manner the same is to be performed, I declare that what I claim is—

In a washing and dyeing machine, the combination of a tank for containing liquor with a frame carrying a ring of guide-rollers and two rings of winces or beaters concentric with the rollers, the guide-rollers serving to present the fabric as it is drawn through the machine to the action of the beaters, such beaters being driven in opposite directions by gearing operated from the central shaft, and serving while the cloth is presented to the action of the liquor to impart to the cloth a rapid vibratory motion, for the purpose above set forth.

JAMES WORRALL.

Witnesses:

WILLIAM SLATER, Jr.,  
Notary Public, Manchester.  
HENRY WORRALL,  
Dyer, &c., Salford.