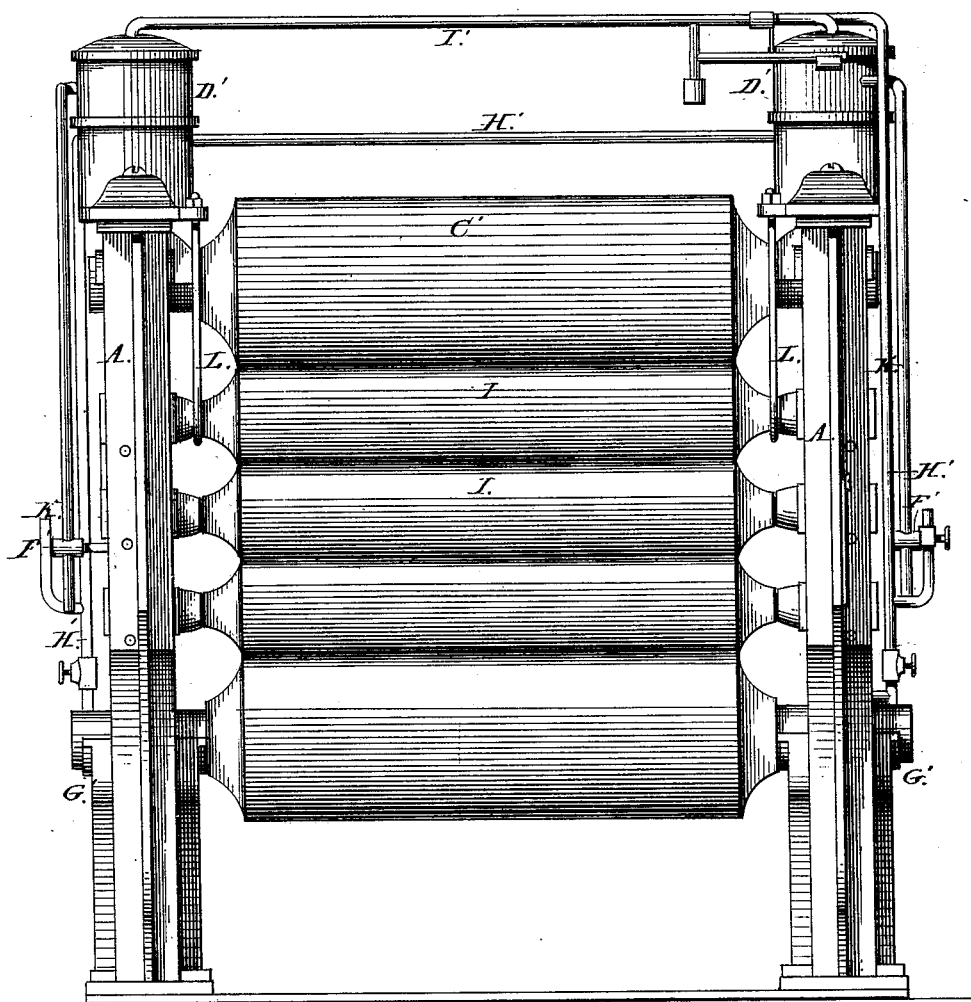


G. E. MARSHALL.  
Calendering-Machine.

No. 218,756.

Patented Aug. 19, 1879.

*Fig. 1.*



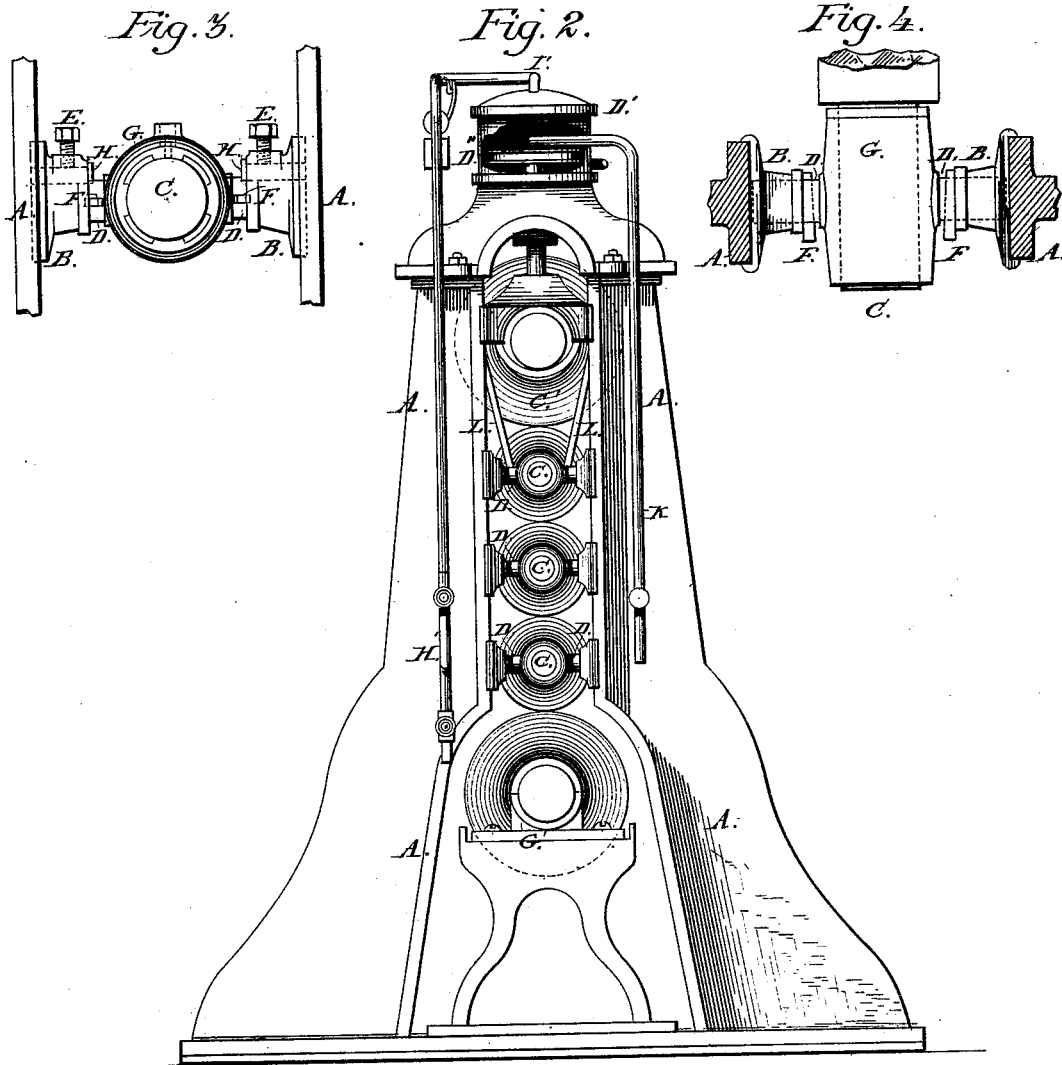
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# UNITED STATES PATENT OFFICE.

GEORGE E. MARSHALL, OF TURNER'S FALLS, MASSACHUSETTS.

## IMPROVEMENT IN CALENDERING-MACHINES.

Specification forming part of Letters Patent No. **218,756**, dated August 19, 1879; application filed April 18, 1879.

*To all whom it may concern:*

Be it known that I, GEORGE E. MARSHALL, of Turner's Falls, in the county of Franklin and Commonwealth of Massachusetts, have invented a new and useful Improvement in Calendering-Machines, of which the following is a specification.

This invention relates to that class of machinery used in paper, calico-printing, and other manufactories where the material is passed through calender-rolls for compression, drying, glossing, and finishing; and consists in so making the housing of the "stack" of calender-rolls as to admit of the easy removal and replacement of the rolls when necessary, and also to apply the pressure on the rolls in a new and efficient manner.

Heretofore calender-rolls of wood, paper, or metal used in a stack, as it is called, or a series placed one above another, have been kept in place within the frame, which is made open from the bottom roll to the top, the opening only large enough to receive the journal-boxes of the rolls, which are perhaps from four to five inches in diameter, while the roll itself is from six to fifteen inches in diameter.

The pillow-block is always solid, with the open-sided frame cast with it, and holds the bearings in which the lower and usually largest cylinder runs, and to which the power is applied, and by the friction of which upon the one next above and resting on it gives motion to the whole composing the stack.

Calender-housings having been constructed in this way, it became necessary, whenever it was required to remove rolls for "turning-off" or for any purpose, to hoist them up and out at the top one by one, even to the last one at the bottom, which is the driving-roll, and very heavy, weighing often several tons, making the removal of any of the lower ones especially a long, tedious, and expensive operation, and not unaccompanied with danger.

The pressure upon the rolls has usually been applied by a screw or weighted lever working upon the upper roll, and I propose to use, instead of this device, a cushion of steam or water or some other fluid, to be forced to any extent needed into a tight cylinder having a piston the rod of which, bearing upon the

cap of the upper journal-box when the cylinder is charged, shall hold the rolls firmly down, and at the same time allow a little recoil if anything of an improper thickness passes between the rolls.

In the accompanying drawings, Figure 1 is a front view of the stack of cylinder-rolls. Fig. 2 is an end view of the same. Fig. 3 is a front view of the journal-box. Fig. 4 is a plan view of the same.

A represents the frame, of heavy cast-iron, holding the rolls, having between the sides an opening wide enough to allow the withdrawal of the rolls; and these sides, near the bottom, are expanded in their breadth, and correspondingly in the opening, wide enough to allow of the withdrawal of the bottom or driving roll. This frame has cast on it a base of sufficient width and thickness to sustain solidly the rolls, when it is bolted to the floor.

G shows the boxes, each pair of which holds the journals of the respective rolls, and are of a peculiar construction, made in several parts, so that they can be taken to pieces and removed from the frame without disturbing the roll.

In Figs. 3 and 4, B B are the sides of the adjustable boxes, which fit closely on the sides of the frame A, and with flanges on them which gripe around the edges of the frame, giving a firm hold and bearing, the faces and sides of the frame and the boxes both being truly planed.

The boxes in which the journal runs have on their sides trunnions D, which enter the adjustable sliding sides of the boxes B, and are there secured as follows: The upper side of each trunnion is faced, and upon that is seated a key, H. A set-screw, E, passing through the upper side of the sliding box B' is made to turn down on this key H, thus holding the trunnion from turning round. To prevent or to regulate any lateral movement of the trunnions keys F are driven through them having a bearing on the sliding boxes B, which the trunnions enter. C represents the end of the journal, and G the trunnion-box; I, the roll, having between it and the trunnion-box steel rings or washers.

It will be seen that by starting the set-

screws E and driving out the keys F, the trunnion-box G can be turned and adjusted in any way or removed with ease by slipping the sliding boxes on the trunnions.

Through the sides of the frame holes are drilled under each box, to allow a pin to be put in to sustain the boxes when it is necessary to remove any roll below them.

C' is the upper roll, larger than the others, and upon the boxes of which the pressure is applied from the cylinders and pistons and piston-rods above them, to keep the rolls to a close pressure.

D' is a steam-tight cylinder, one over each end of the rolls, into the top of which steam is forced by a pipe, I'. Within each cylinder is a piston, D'', both having on their under sides piston-rods, which, when steam is let into the cylinders above the pistons, are forced down upon the boxes of the upper roll, thus giving the desired pressure. The steam is let on through the pipe I', and the pressure is controlled by steam-cocks and any of the well-known devices for regulating the pressure of steam. Entering the side of each cylinder D' about midway is a discharge-pipe, K, for taking off the water of condensation through a steam-trap, F'.

H' is a pipe, with a trap, for drawing off any water that by leakage may accumulate under the piston.

L L are yokes bolted into the caps and passing down under each roll as it is required to be raised.

G' is a pillow-block, which sustains the lower or driving roll in the stack. This is bolted to the base of the frame of the calender-stack, but so that it can be removed by relieving it of the pressure of the rolls, the frames holding the rolls being spread much

wider at the bottom, and the opening between the two end housings made correspondingly large, so that when the pillow-block is removed the large bottom roll can be dropped down and drawn out, if necessary, the rolls above being held in their places by the pins running in and across the frames and under the boxes. So any one of the rolls from the bottom to the top one may be withdrawn in a similar manner.

The operation of my invention in the machine is as follows: When it is necessary to take out any roll except the bottom one, all above that one are raised a little by jackscrews or the yokes L, and supported by the pins thrust in through the frame and under the boxes. The box of the roll to be removed is then taken out, as before described, and the roll is drawn straight out between the sides of the frame, which could never be done in the former mode of construction.

What I claim, and desire to secure, is—

1. In a stack of calender-rolls, the housings composed of boxes G, provided with trunnions D, in combination with the adjustable boxes B, adapted to slide in the upright ways of the frame A, said adjustable boxes being provided with keys H and set-screws E, as and for the purpose set forth.

2. In combination with the stack of calender-rolls, the steam-cylinders D', located at opposite ends of the frame, provided with pistons, and rods extending therefrom, adapted to bear, through the journal-boxes, on the journal-roll C' and supply-steam pipe I', as and for the purpose specified.

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