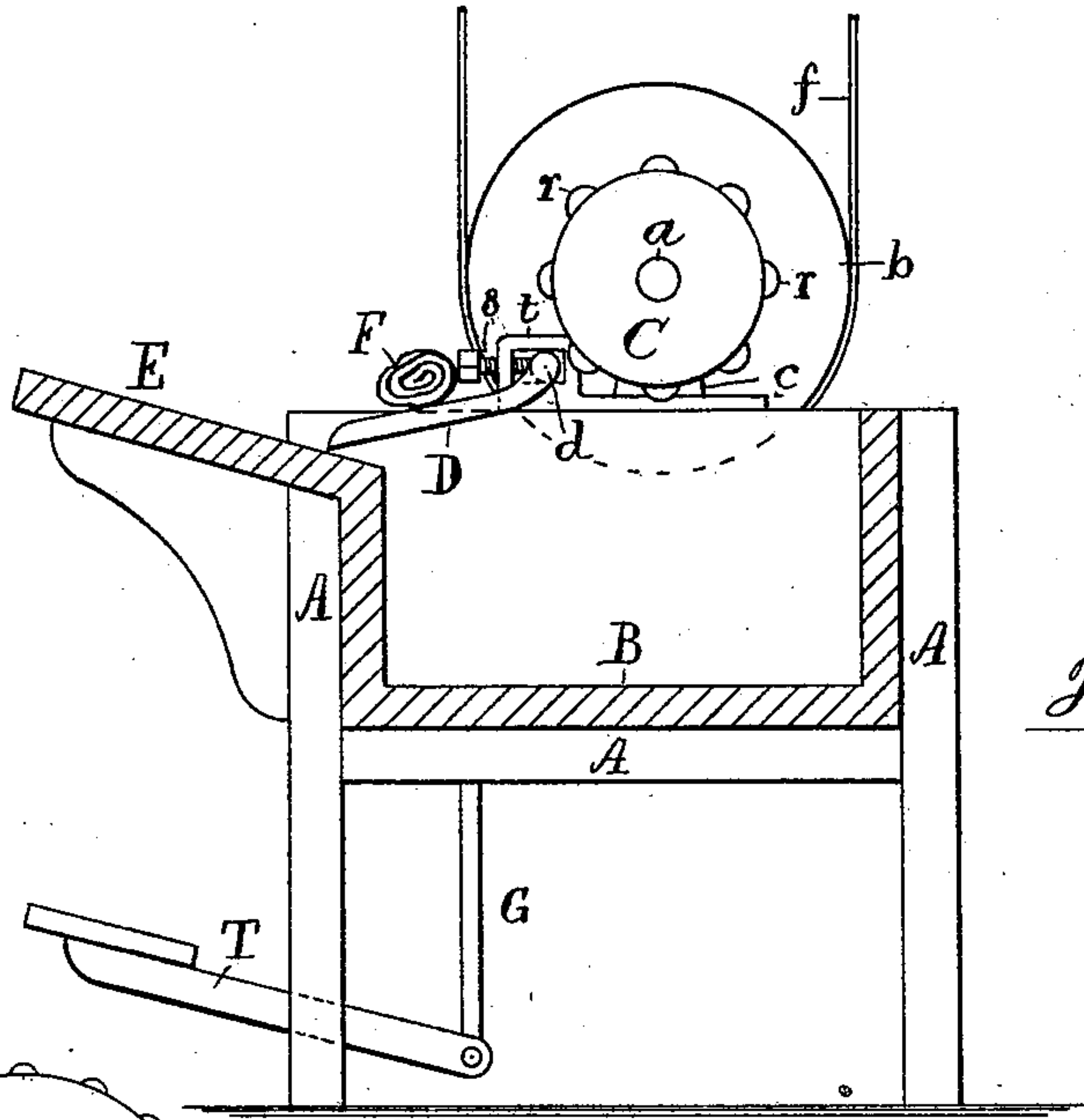


(No Model.)

G. YULE  
FELT HARDENING MACHINE.

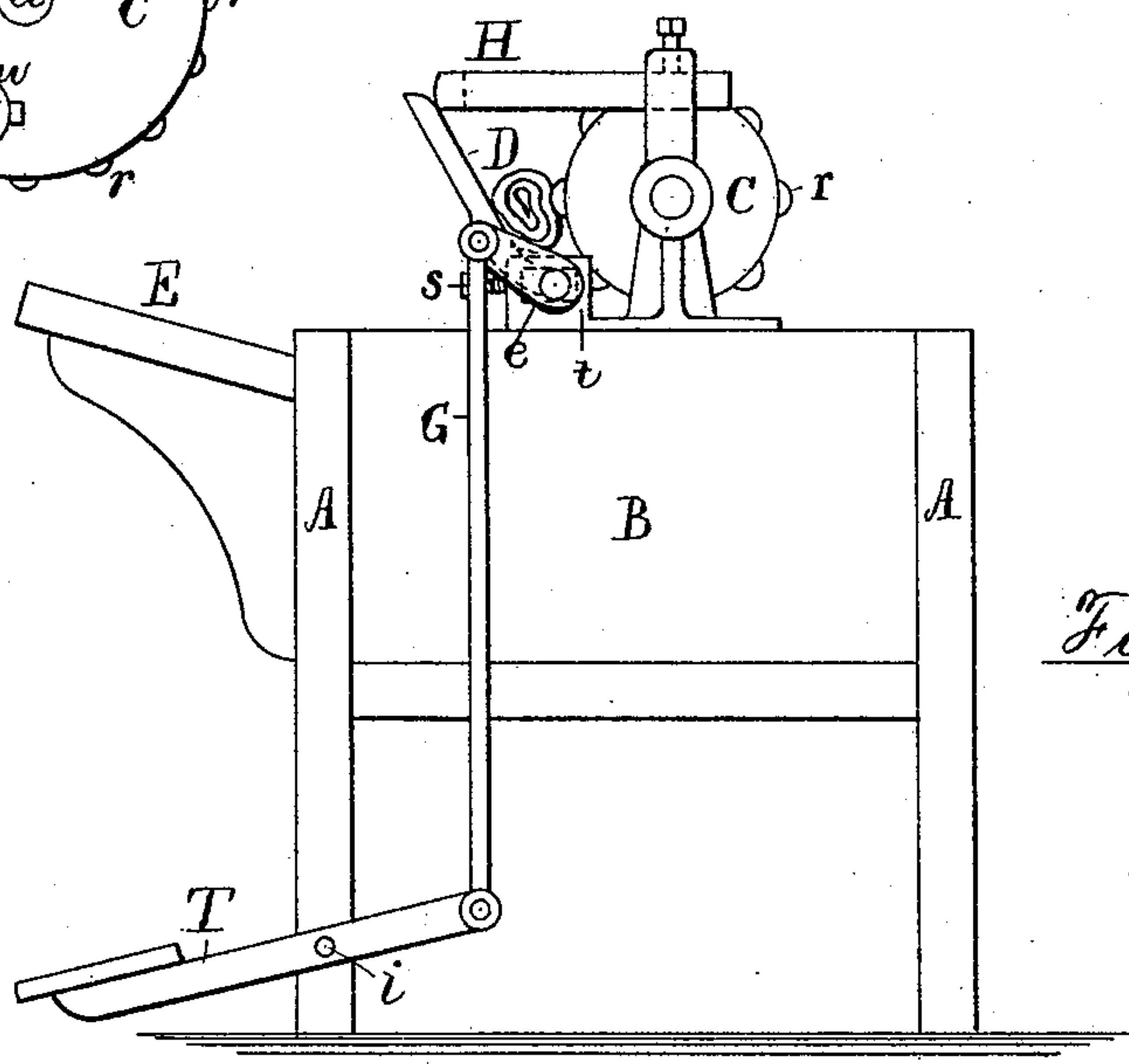
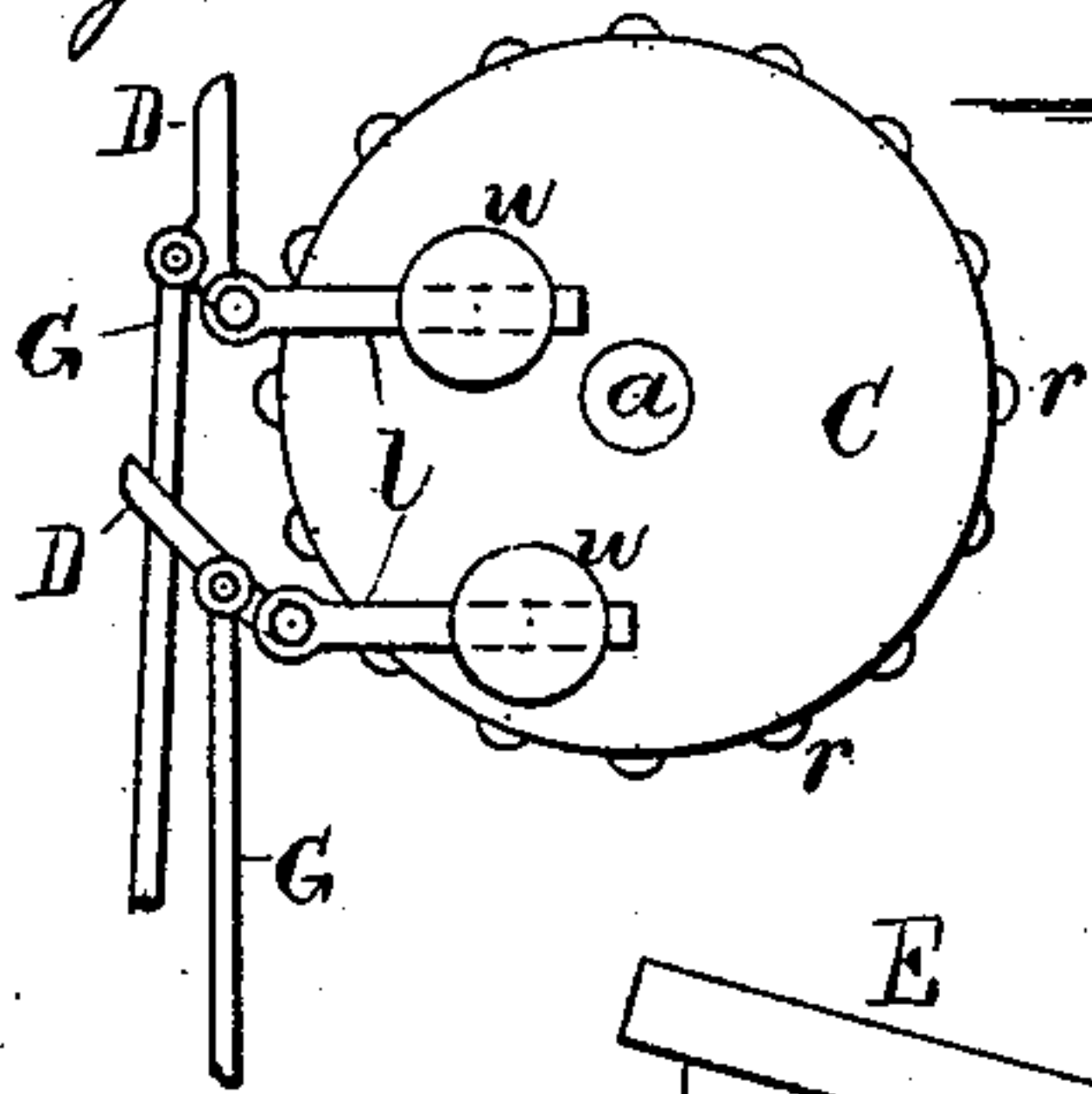
No. 250,411.

Patented Dec. 6, 1881.



*Fig. 1.*

*Fig. 3.*



*Fig. 2.*

Attest:

James N. Hall  
H. Thibault.

Inventor.

Geo. Yule, per  
Thos. S. Crane, Atty.

# UNITED STATES PATENT OFFICE.

GEORGE YULE, OF NEWARK, NEW JERSEY.

## FELT-HARDENING MACHINE.

SPECIFICATION forming part of Letters Patent No. 250,411, dated December 6, 1881.

Application filed October 1, 1881. (No model.)

*To all whom it may concern:*

Be it known that I, G. YULE, a citizen of the United States, residing in the city of Newark, county of Essex, and State of New Jersey, have  
5 invented certain new and useful Improvements in Felt - Hardening Machines, fully described and represented in the following specification and the accompanying drawings, forming a part of the same.

10 My invention relates to an improvement in machines for hardening hats; and it consists, first, in the combination of a roller with an adjacent pressing-board, their adjoining surfaces being arranged to form a tapering cavity, into  
15 which the felt roll is laid and rolled by the combined operation of the roller's surface and the gravity of the felts.

It further consists in the combination, with the pressing-board, of pivots and bearings  
20 adapted to support the board at various angles with the surface of the revolving roller.

It also consists in the combination, with the pressing-board and its pivots, of an adjustable stop; and it further consists in the combina-  
25 tion, with the roller and the pivoted pressing-board, of a treadle and connections for moving the board by the foot of the operator, the whole being combined with and mounted upon a tank of water for wetting and crozing the felt in  
30 the usual manner.

In the drawings annexed, Figure 1 is a transverse section of a machine constructed with my improvements. Fig. 2 is an end elevation of the same, and Fig. 3 is an alternative mode  
35 of constructing and operating the boards.

A is the frame of the machine; B, the tank; C, the roller, mounted upon standards or bearings *c* upon the tank. D is the pressing-board; *d*, the pivots of the same; E, the plank upon  
40 which the felts are prepared, and F the felts. (Shown in a roll or bundle in the cavity of the machine in Fig. 2.) The shaft of the roller is indicated at *a*, and a pulley, with belt *f* applied thereto, is shown at *b*. T is the treadle, pivoted  
45 to the frame of the machine at *i*, and G are the connections from the same to the pressing-board, the latter being shown provided at the end with a crank or arm, *e*, which is secured to the pivots outside the bearings in which  
50 they rotate.

The pressing-board is shown hinged near the

lower front part of the felting-roller C, inclined slightly away from it, so that the opposed surfaces of the board and roller form a tapering cavity, into which the felts are wedged by their  
55 own weight when laid therein. The distance of the board from the roller can be varied to suit the sizes of various bundles of felts by means of adjusting-screws *s*, applied behind the pivots, which are mounted in slotted bear-  
60 ings *t* for that purpose. The angle assumed by the board can also be thus varied, and the effect of gravity upon the same bundle modified at pleasure. In Fig. 1 the board is shown tipped entirely backward, with its outer end  
65 resting upon the plank. In this position any felt previously laid in the cavity would be discharged and rolled out upon the plank toward the operator. To facilitate such discharge the inner edge of the board is curved toward the  
70 roller C, so that it becomes elevated when the board is tipped outward.

The operation of the machine is to roll the felts over and over in the cavity; and to secure this movement of the felts, and to act upon them  
75 more effectively as a presser, I provide the roller C with ribs *r*, projecting from its surface longitudinally or transversely, and rotate the roller, so that it tends to lift the felts upward from the bottom or sides of the cavity, into  
80 which they fall again as they slip from the roller's surface. By this lifting and falling, as well as by the intermittent pressure of the ribs, the felts receive nearly the same kind of rolling and kneading as if hardened by hand, while  
85 they are preserved from any severe pressure or concussion.

My machine is therefore peculiarly adapted to operate upon new felts which are too tender to bear any violent treatment. The degree of  
90 pressure to which they are subjected is regulated by the adjustment of the screws *s* and by the pressure of the foot upon the treadle, as it is found in practice that the more the board is tipped away from the roller the less  
95 the felts are wedged into the cavity as they fall from the ribs upon the roller.

By means of the stop shown at H the distance of the board from the roller can be adjusted, the stop being secured to the frame by  
100 a slot and bolt to permit the required movement. The effect upon the felts can also be



judged by the pressure of the practiced operator's foot, as is common in other felting - machines. The treadle is preferably so proportioned that the weight of the board will over-  
5 balance it, and the felts will therefore be discharged from the machine when the foot is removed from the foot - board of the treadle, which is made to extend all the way across the front of the machine, and has a connection, G,  
10 attached to it at each end for moving the pressing-board.

The mode of constructing the tank, treadle, and plank upon felting - machines is so well known that no plan of the machine is given  
15 showing both of the connections G or pivots d in one view.

Having discovered the utility of the mechanism described for acting upon a new hat-felt, I do not limit myself to the precise mode of  
20 construction described above, but show in Fig. 3 another way in which the pressing-board and roller may be combined. In this view two boards, D, are shown applied to the roller C, and provided with pressing-weights w, attached  
25 to levers l, secured upon the ends of the boards. The effect of the weights is to determine the pressure of the boards upon the felts F, and the connections G are used to pull the boards  
30 backward sufficiently to permit the removal of the felts.

Having devised the above-described mechanism, I do not limit myself to its use for any single part of the felting process, but design it to be used at any stage where it is desirable.

I therefore claim my invention as follows: 35

1. In combination, the felting - roller C, mounted upon bearings and revolved in the manner set forth, and the pressing - board D, arranged and operated to form a cavity for  
40 rolling and pressing hat - felts by their own gravity, substantially as herein shown and described.

2. In combination, the ribbed roller mounted and rotated as described, and the pressing-board pivoted in adjustable bearings, substan-  
45 tially as and for the purpose set forth.

3. In combination with the roller C and pivoted pressing-board D, arranged and operated as described, the treadle T and connections  
50 G, or equivalent pressing mechanism, substantially as and for the purpose set forth.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

GEORGE YULE.

Witnesses:

CHARLES A. McLARTY,  
THOS. S. CRANE.