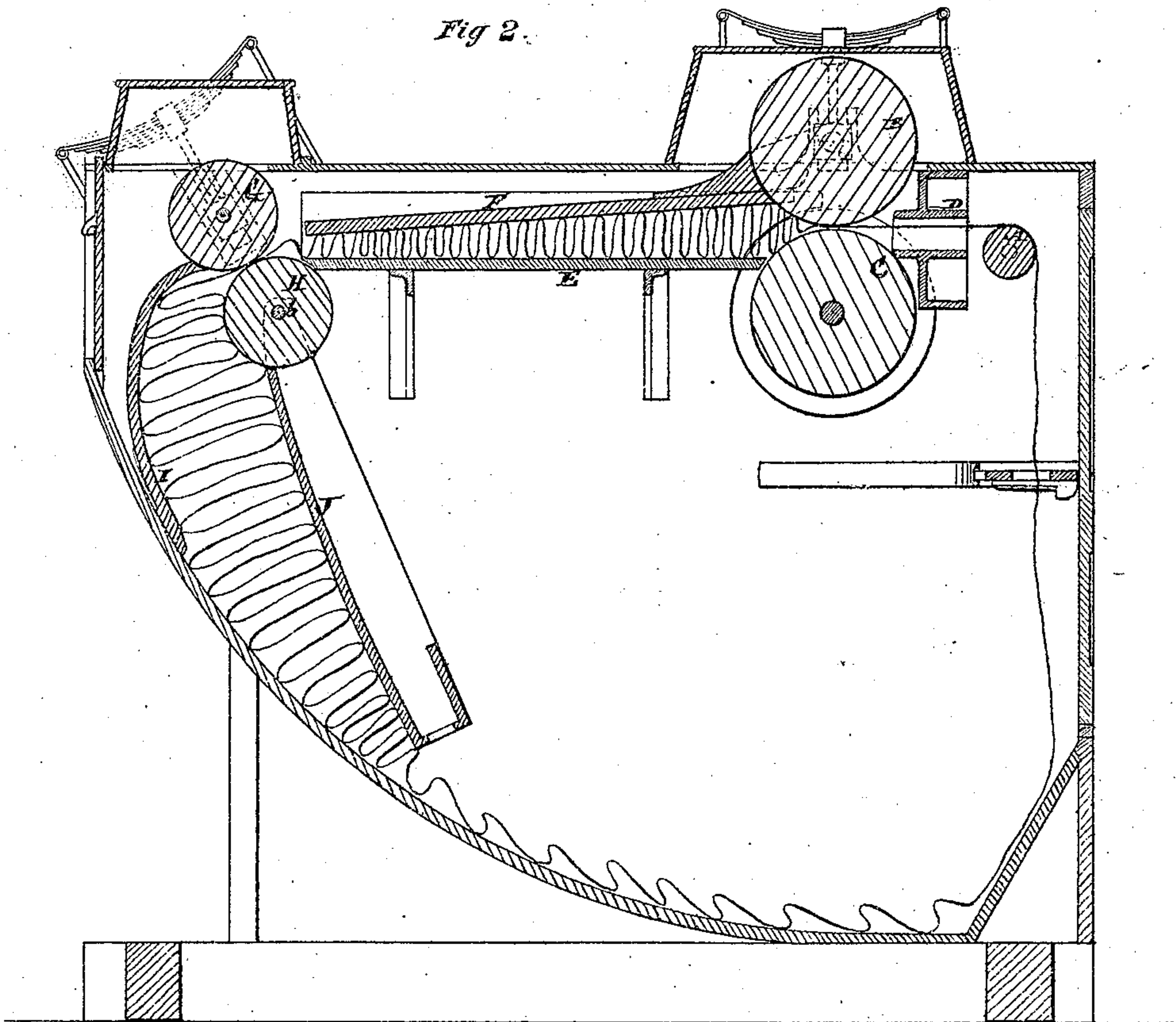


*William Bates & Frederick Bates. Imp<sup>t</sup> in Fulling Mills.*

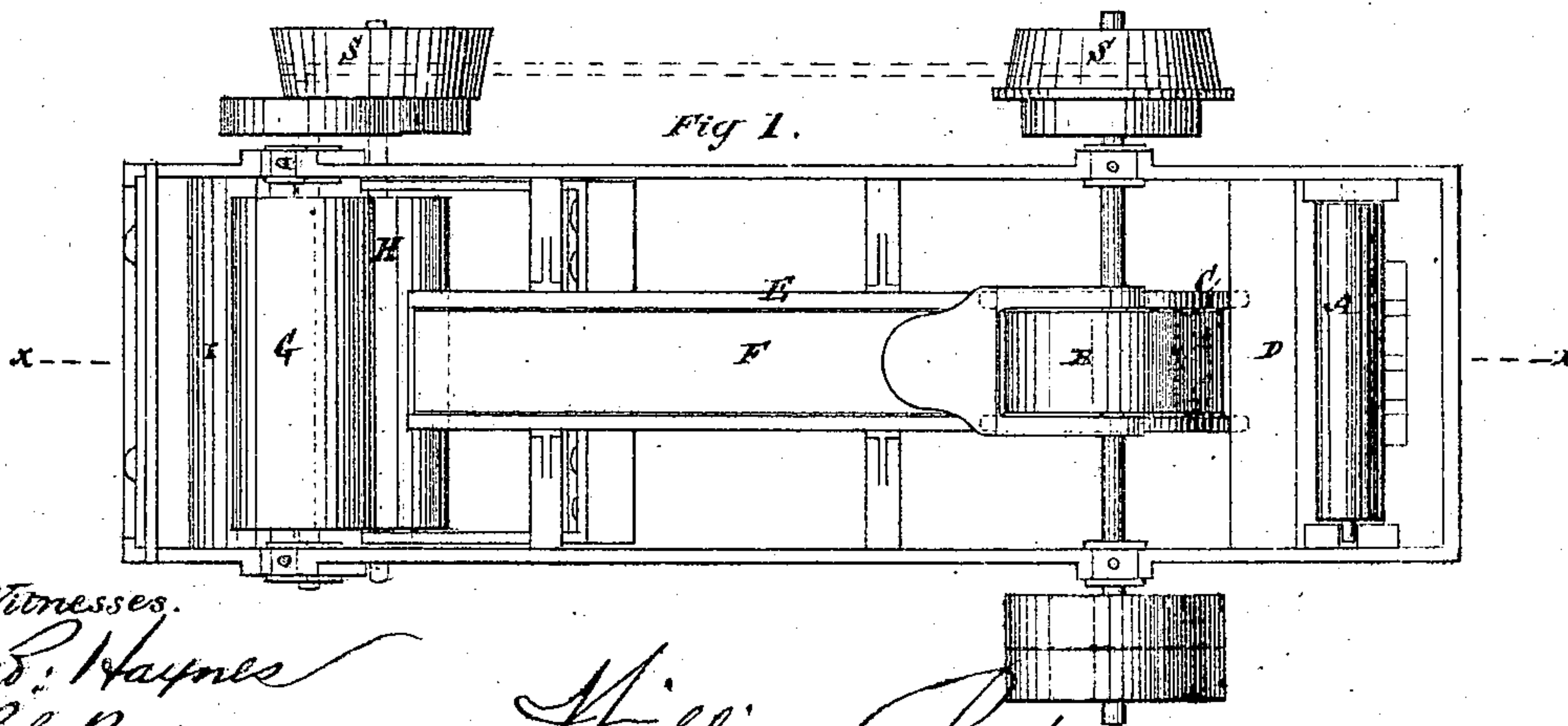
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PATENTED JUN 28 1870

*Fig 2.*



*Fig 1.*



*Witnesses.*

Fred. Haynes  
R. E. Kabeac

William Bates  
Frederick Bates  
per John Coombs & Attorneys



# United States Patent Office.

WILLIAM BATES AND FREDERICK BATES, OF SOWERBY BRIDGE, NEAR HALIFAX, ENGLAND.

*Letters Patent No. 104,819, dated June 28, 1870; patented in England March 16, 1866.*

## IMPROVEMENT IN FULLING-MILLS.

The Schedule referred to in these Letters Patent and making part of the same

*To all whom it may concern:*

Be it known that we, WILLIAM BATES and FREDERICK BATES, both of Sowerby Bridge, near Halifax, in the county of York, England, have invented a new and useful Improvement in Fulling-Mills, of which the following is a full, clear, and exact description, reference being had to the accompanying drawing forming part of this specification, and in which—

Figure 1 represents a plan of a fulling-mill, constructed in accordance with our improvement, with the tops or covers removed, and

Figure 2, a vertical longitudinal section, taken as indicated by the line *x x* in fig. 1.

Similar letters of reference indicate corresponding parts.

This invention relates to machines employed in fulling or milling woolen fabrics; and

Our improvement consists in the application of an additional pair of nipping or squeezing rollers, arranged at or near the delivery-end of the trough which conducts the fabric from the ordinary rollers.

Also, the invention consists in constructing or providing a curved back or curved surface of the lining of the machine, behind or opposite to the delivery-side of the additional rollers.

These rollers are driven at a suitable speed to receive the fabrics from the trough without producing draft or pull, but exerting a pressure on and forcing them against the curved back, by which means the creases previously produced are removed, and a further fulling effect is produced on the fabrics.

Referring to the accompanying drawing—

A, B, and C are the ordinary rollers of the mill, and

D, a guide for the fabric to the rollers B and C, or, instead of said guide, vertical rollers may be used.

E is the trough or fulling-box, with its weighted flap or lid F, for pressing and retarding the fabrics as they are forced into the trough by the rollers.

These several parts and the frame-work are constructed and arranged as in other mills or machines for the like purpose.

G and H are the additional pair of nipping or squeezing rollers, which it is preferred to make fluted. These rollers are applied near the delivery-end of the trough, and are driven or receive motion by belt and pulleys from the ordinary rollers B and C, and at the same surface speed, or thereabout. They are made considerably longer than the rollers B and C, and may extend wholly across the interior of the machine, and

serve to receive the fabrics from the trough at the same speed as they enter; consequently the trough is always kept full, and the fabrics are forced or pushed forward by said rollers against a curved back or curved surface of the lining I, and between it and another weighted flap, J, hinged to the frame as at *b*, by which the fabrics are again pressed and retarded in their passage in a similar manner as when they are passing through the trough E.

By means of these improvements a further fulling effect, or an increased action on the fabrics, is produced at each passage through the machine, thereby greatly facilitating the process of fulling or milling woolen fabrics.

Also, the fulling effects produced thereon are much better than heretofore, as, by the action of the ordinary rollers B and C, the fabrics are very much creased in their longitudinal direction, and which creases are not by the machine, as heretofore constructed, afterward sufficiently removed, and the fulling is effected more in the breadth than in the length of the fabric, whereas, by our improvement, the creases formed by the first or narrow rollers B C, and usual flange on the lower one of them, are removed by the second and longer or wider rollers G H, and by the aid of the curved surface I and flap J, of suitable width to correspond with the rollers G H, the extra or further fulling effects are produced more in the length than in the breadth of the fabrics, which are desirable attainments, but the difference in this respect may be varied, that is, action on the fabric be increased or diminished in direction of its length, relatively to its width, by means of taper-pulleys S S and a suitable belt-shifter, operating to change the velocity of the rollers G H as desired.

What is here claimed, and desired to be secured by Letters Patent, is—

The combination of the compressing rollers B C and spreading or widening rollers G H, with their fulling-troughs E I, provided with flaps F and J, all arranged substantially as and for the purpose set forth.

WILLIAM BATES.  
FREDERICK BATES.

Witnesses to signature of WILLIAM BATES:

WM. TASKER,  
W. YATES SELLECK.

Witnesses to signature of FREDERICK BATES:

FRED. HAYNES,  
M. J. SHANLY.