

(No Model.)

S. R. CAMPBELL.

2 Sheets—Sheet 1.

WARP SLASHER.

No. 310,790.

Patented Jan. 13, 1885.

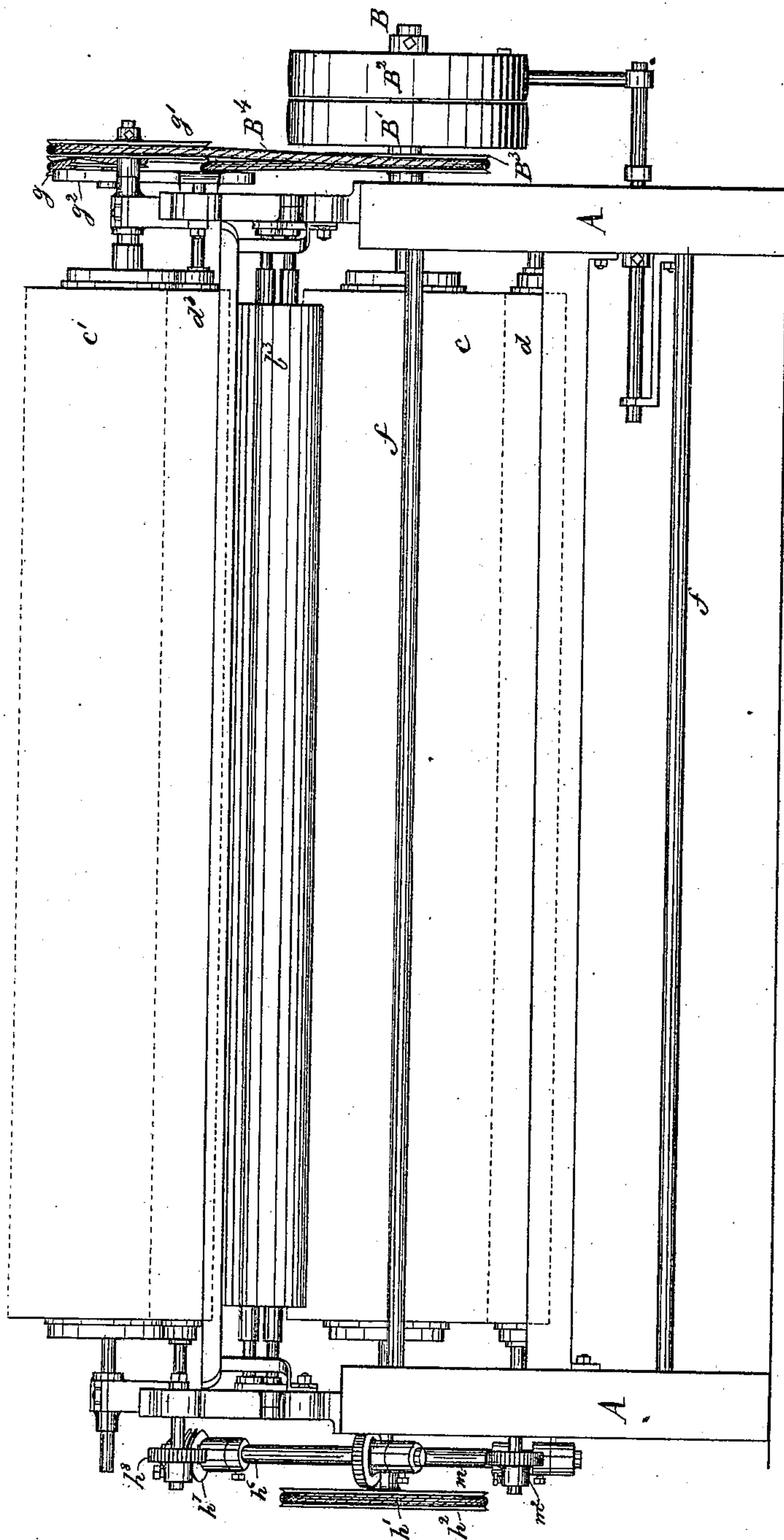


Fig. 1.

Witnesses.

Fred A. Powell

John F. C. Prentiss

Inventor

Samuel R. Campbell

By Crosby & Gregory attys

(No Model.)

2 Sheets—Sheet 2.

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Fig. 3.

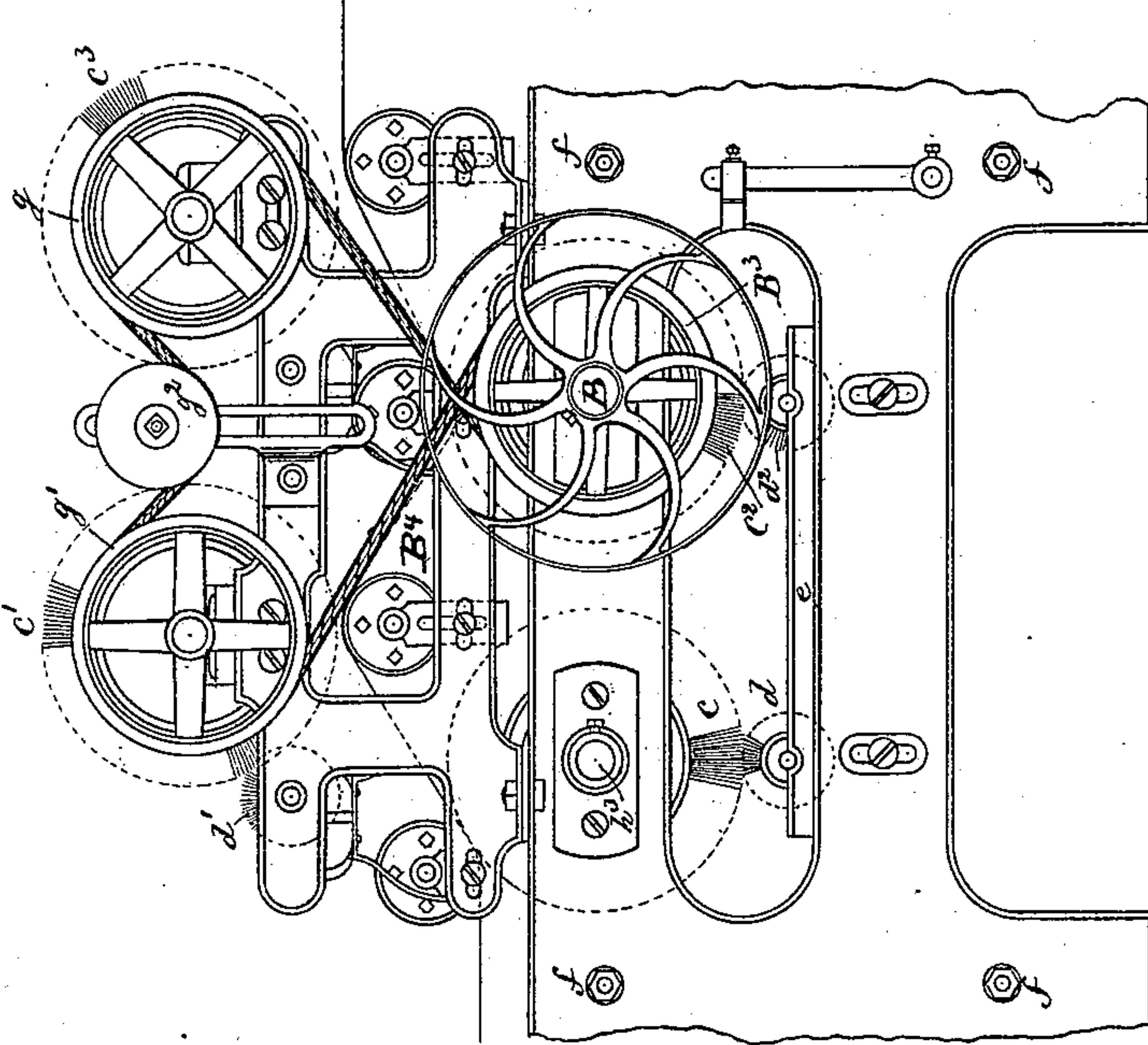
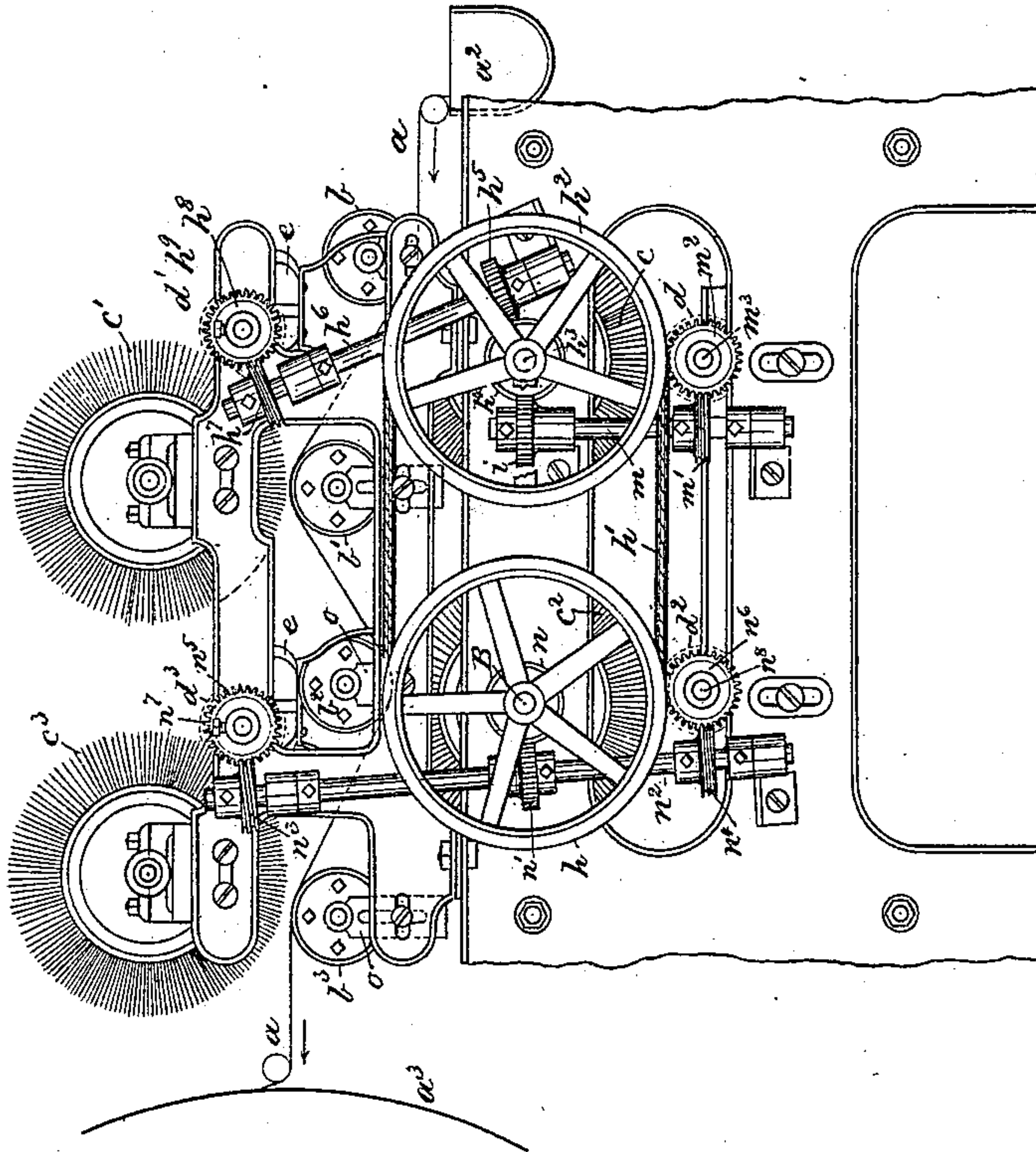


Fig. 2.



Witnesses.  
Fred A. Powell,

John F. C. Prindler

Inventor

Samuel R. Campbell

by Crosby & Morgan attys



# UNITED STATES PATENT OFFICE.

SAMUEL R. CAMPBELL, OF NEW YORK MILLS, NEW YORK, ASSIGNOR OF  
ONE-HALF TO GEORGE DRAPER & SONS, OF HOPEDALE, MASS.

## WARP-SLASHER.

SPECIFICATION forming part of Letters Patent No. 310,790, dated January 13, 1885.

Application filed March 19, 1883. (No model.)

*To all whom it may concern:*

Be it known that I, SAMUEL R. CAMPBELL, of New York Mills, county of Oneida, State of New York, have invented an Improvement in Warp-Slashers, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

Before slashers were brought into operation, machines called "dressers" were employed to dress or size warps, (a preparation necessary to the process of weaving.) In the dresser it is necessary to pass the threads from a number of yarn beams or reels through reeds, thence through their respective size-boxes, after passing through which each thread of the warp is run by itself through an eyelet in a copper or brass plate, and the threads are thus kept separate and in sheets or layers, to thus make it possible to brush them, for which purpose a brush is used for each sheet or layer, and the brushed warp-threads then pass over or through the drying apparatus, after which the sheets or layers brought together into the same plane are wound on the loom-beam. In slashers, instead of taking the yarn through reeds, separate size-boxes, and "coppers," (so called,) to keep each thread separate from the others, as in dressers, they are run together in one sheet through one size-box, reeds, coppers, and other devices to separate the threads being omitted. In consequence of the yarn being thus altogether in one sheet, all attempts to brush it have proved futile, resulting in so much breakage to the yarn, by its being brushed into strands and twisted into cords or strings by the action of the brushes, that all subsequent attempts to separate it have been unavailing, thus making it impossible to use brushes in the ordinary way on slashed yarn, for it is absolutely necessary that the yarn should be separated, or in a condition to be easily separated, before it can be woven. In my experiments I have discovered that warps may be successfully brushed in slashers, and without the slightest breakage, stranding, lapping, twisting, or other difficulty, and this I have done by supporting the warp-threads

which are to be brushed upon a roller, about 50 which the warp is bent, directly opposite the point of contact of the brush with the said warp-threads, the said roller being located between the size-box and drying apparatus, and supporting the warp so that the brush 55 cannot pass through the layer or sheet of warps. Supporting the warp as herein described and provided for entirely prevents the difficulties already enumerated, and gives to the slasher, in addition to all its great advantages over the old style of dressing, the 60 added advantage of a complete and practicable brushing-machine. By the method of brushing herein described, the warp-threads in one sheet or layer may be brushed as many times 65 on one or both sides as may be thought desirable, the number of times depending upon the number of supporting-surfaces and brushes employed. For the best results I support the sheet of warp upon a series of rollers, about 70 which the warp is bent, and brush it at opposite sides by means of roller-brushes.

Figure 1 represents in end elevation a sufficient portion of a slasher to illustrate my invention, the part shown being that located between the usual size-box and the usual drying 75 mechanism, both of which are omitted from the said figure, because such parts of the machine are not of my invention, and also to save space on the drawings. Fig. 2 is a side elevation of Fig. 1, with a part of the usual size-box and drying apparatus common to slashers added to show the location of the same; Fig. 3, an elevation of the opposite side of Fig. 1.

The warp  $a$ , after leaving the usual size-box, 85  $a^2$ , (shown partly in Fig. 2, and common to slasher-frames,) is passed under the first roll,  $b$ , of a series of warp-supporting rolls,  $b\ b'\ b^2\ b^3$ , and thence over and under the succeeding rolls of the said set of supporting-rolls, as in 90 Figs. 2 and 3, and from thence to the usual drying mechanism, usually a drum,  $a^3$ , as partially indicated in Fig. 2, and thence to the usual loom-beam, (not shown,) on which the warps will be wound, as usual. The support- 95 ing-rollers  $b\ b'\ b^2\ b^3$  have co-operating with them, respectively, the rotary brushes  $c\ c'$ , &c., the said brushes acting successively on the



upper and under sides of the sheet of warp only just at the point of contact of the yarn with the rollers, thus making it impossible for the bristles to extend through and beyond the opposite side of the sheet of warps, so as to strain or fray and break the same.

In my experiments I found it practically impossible to brush a sized sheet of warps with a rotary brush, except when the brush touches the warps exactly opposite the roller-rest over which the warps pass, the brush touching the warp only at its exact point of support on the roller, for if the bristles pass entirely through the sheet of warps they act to comb, as it were, the warps, and strain and break the threads rapidly, thus spoiling the warp. The brushes, acting directly on the warp upon the roller, are enabled to effectually strike against and brush the sheet of warp without straining and breaking the individual threads or yarns, and by employing rollers instead of non-rotating surfaces to support the warp the sizing is kept from baking or hardening on the rolls and friction on the warp is obviated. Next the brushes  $c\ c'\ c^2\ c^3$ , and set closely to them, is a series of slowly-rotating clearers or brushes,  $d\ d'\ d^2\ d^3$ , which, by their action against the brushes  $c\ c'\ c^2\ c^3$ , remove from the latter the lint and other foreign particles taken by them from the yarn. The clearers are set to run in a pan,  $e$ , of water or other liquid, to clean them and keep them moist, so as to properly clean the brushes  $c\ c'\ c^2\ c^3$ . The side frames,  $A$ , are held together by suitable tie-rods,  $f$ . The main shaft  $B$  is herein shown as having a fast and loose pulley,  $B'\ B^2$ , to receive a belt or band to drive it at proper speed. The shaft  $B$  carries the brush  $c^2$ , and also a belt-pulley,  $B^3$ , which receives a belt,  $B^4$ , which is crossed, as shown in Fig. 3, and extended over belt-pulleys  $g\ g'$ , fast on the shafts of the brushes  $c^3\ c'$ , and under an adjustable tension-pulley,  $g^2$ . At its opposite end the shaft  $B$  has a pulley,  $h$ , which is connected by belt  $h'$  with a pulley,  $h^2$ , of same size, on the shaft  $h^3$  of the brush  $c$ . (See Fig. 2.) The shaft  $h^3$  of the brush  $c$  has a worm,  $h^4$ , which engages a worm-gear,  $h^5$ , on a shaft,  $h^6$ , having a worm,  $h^7$ , which in turn engages a worm-gear,  $h^8$ , on the shaft  $h^9$  of the clearer or brush  $d'$ . The worm  $h^4$  also engages a worm-gear,  $i$ , (see Fig. 1,) where one of the arms of the pulley  $h^2$  is broken out, on a shaft,  $m$ , having a second worm,  $m'$ , which engages a worm-gear,  $m^2$ , on the shaft  $m^3$  of the clearer  $d$ . The shaft  $B$  has a worm,  $n$ , which engages a worm-gear,  $n'$ , on shaft  $n^2$ , having two worms,  $n^3\ n^4$ , which respectively engage the worm-gears  $n^5\ n^6$  on the shafts  $n^7\ n^8$  of the clearers  $d^3\ d^2$ , thus rotating them. The roller-like supporting-surfaces  $b\ b'$ , &c., for the warp-threads have their journals mounted in suitable bearings,  $o$ , made adjustable on the frame of the machine; but in the drawings I have shown the rolls  $b'\ b^3$  so adjusted that the brushes  $c'\ c^3$  will not touch the warp, thus avoiding confusion of lines on the draw-

ings; but it will be understood in practice that the said rollers hold the warp close up in contact with the said brushes. The warp  $a$  comes into the size-box from several warp-holding beams, as common in slashers such as used in the United States, and made by Atherton Brothers, of Preston, England, the said machine being fully illustrated in No. 98, volume 9, of the journal called "The Textile Manufacturer," dated February 15, 1883, published by Emmott & Co., of Manchester, England, among advertisements.

I am aware that it has been proposed in a slasher to pass the warp under a bar held rigidly between the ends of two pivoted arms made adjustable and adapted to press the sheet of warp down into the bristles of which the brush is composed; but I am not aware that warp-threads have ever been supported at opposite sides and been brushed at its points of support by roller-brushes.

I am also aware that it has been proposed to support the warps upon a bar or "clearer" made in the form of a bar or of a roller, the said clearer being located in front of the brush, so that the brush will act upon the sheet of thread forward of the clearer; but prior to this my invention the warp-threads have never been supported directly opposite the point at which the brush strikes them, and consequently in all other sizing or brushing apparatus heretofore used, so far as I am aware, the bristles were free to penetrate and pass through and beyond the sheet of warps, which arrangement I expressly disclaim, for in accordance with my invention the bristles of the brush must not pass through and beyond the opposite side of the said threads upon which the brush acts.

I claim—

1. A brush and means to operate it, combined with a warp-supporting roll, about which the warp is bent to support the sheet of warp exactly opposite the points where the brush touches the said warp, whereby the bristles of the brush are prevented by the roll from penetrating or passing entirely through and beyond the side of the sheet of warps next the roll and opposite the point acted upon by the brush, thus obviating breakage of the warp, substantially as described.

2. A series of warp-supporting rolls, combined with a series of brushes arranged to brush the warp-threads at their points of contact with the said rolls, both above and below the series of rolls, and with suitable means to move the said brushes, substantially as set forth.

3. A brush and a roller about which the warp is bent to support it exactly at the points where it is acted upon by the said brush, combined with a brush to clean the brush which acts upon the warp, and with means to move the said brushes, substantially as described.

4. A size-box to apply size to a sheet of warps, and a drying apparatus to dry the same,



combined with a series of rotating brushes  
arranged above and below the sheet of warps,  
and with a series of supporting-surfaces for  
the warp-threads immediately opposite the  
5 brushes, to support the warp-threads when  
acted upon by the brushes, substantially as  
shown and described.

In testimony whereof I have signed my name  
to this specification in the presence of two sub-  
scribing witnesses.

SAMUEL R. CAMPBELL.

Witnesses:

JOHN CALDER,  
CHARLES M. WILSON.