

(No Model.)

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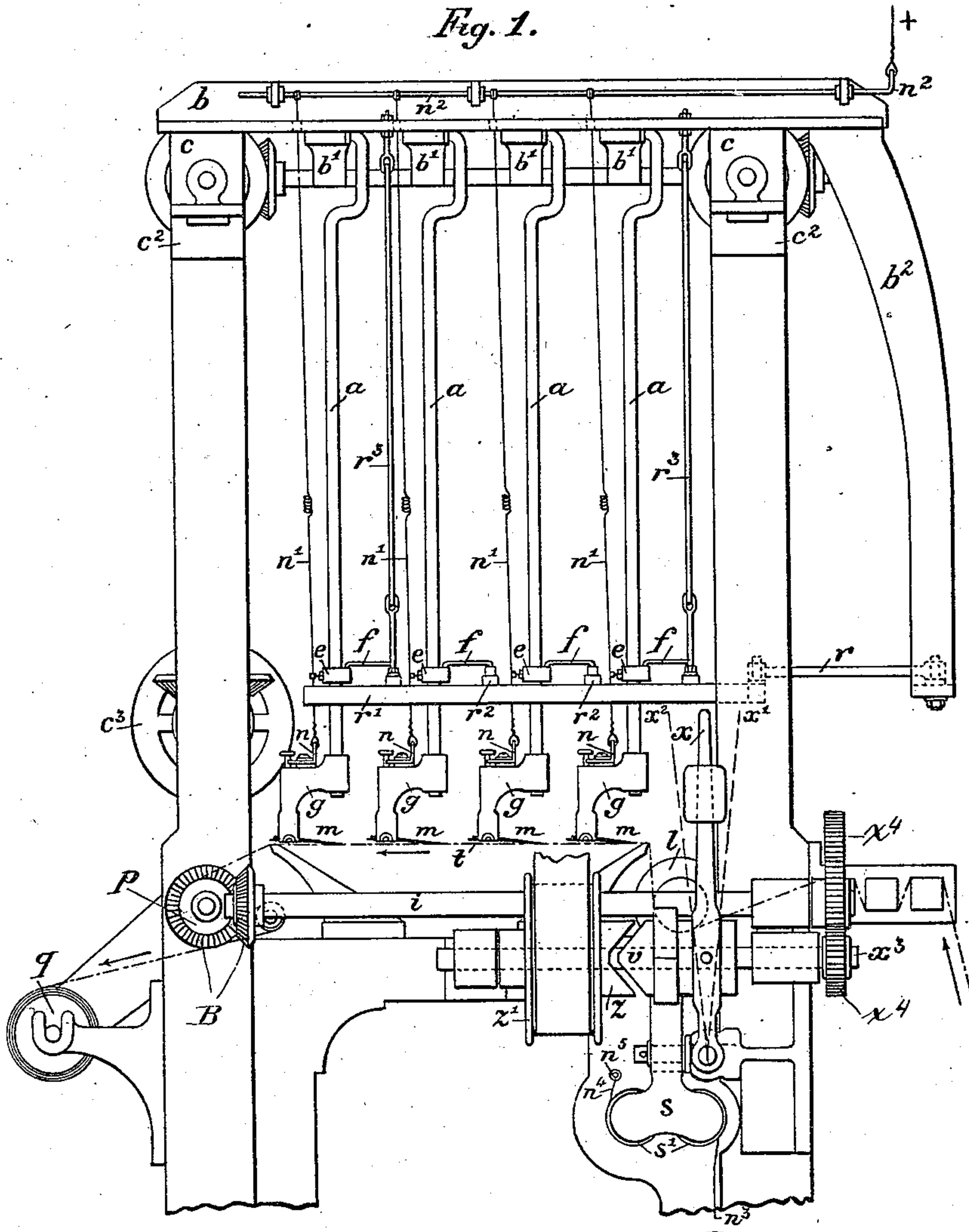
F. ALSINA.

MACHINE FOR CUTTING NAP OF FUSTIANS, &c.

No. 555,416.

Patented Feb. 25, 1896.

Fig. 1.



Witnesses.  
J. Blackwood  
John C. Wilson

Inventor:  
Fernando Alsina,  
by Whitman & Wilkinson,  
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(No Model.)

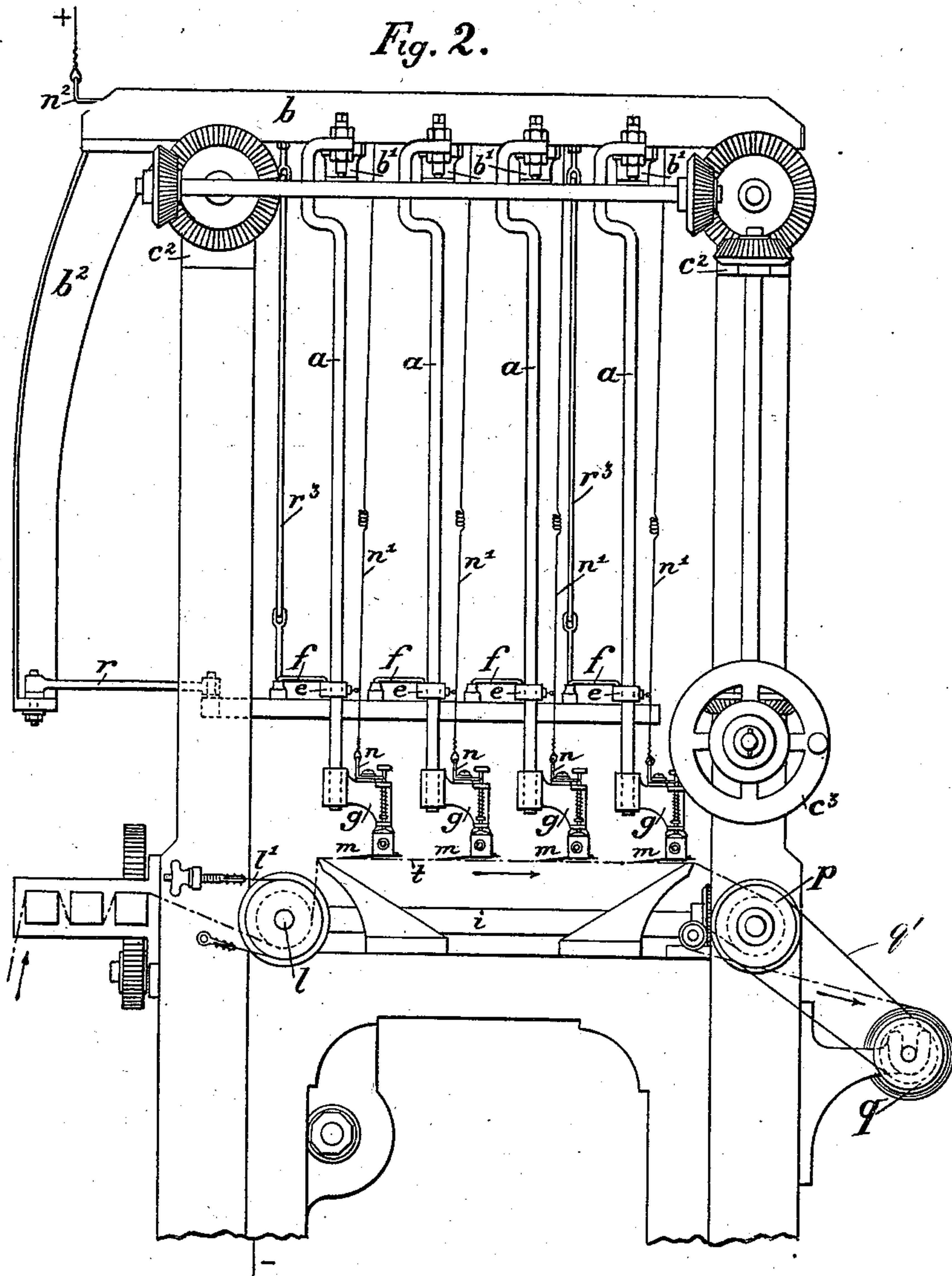
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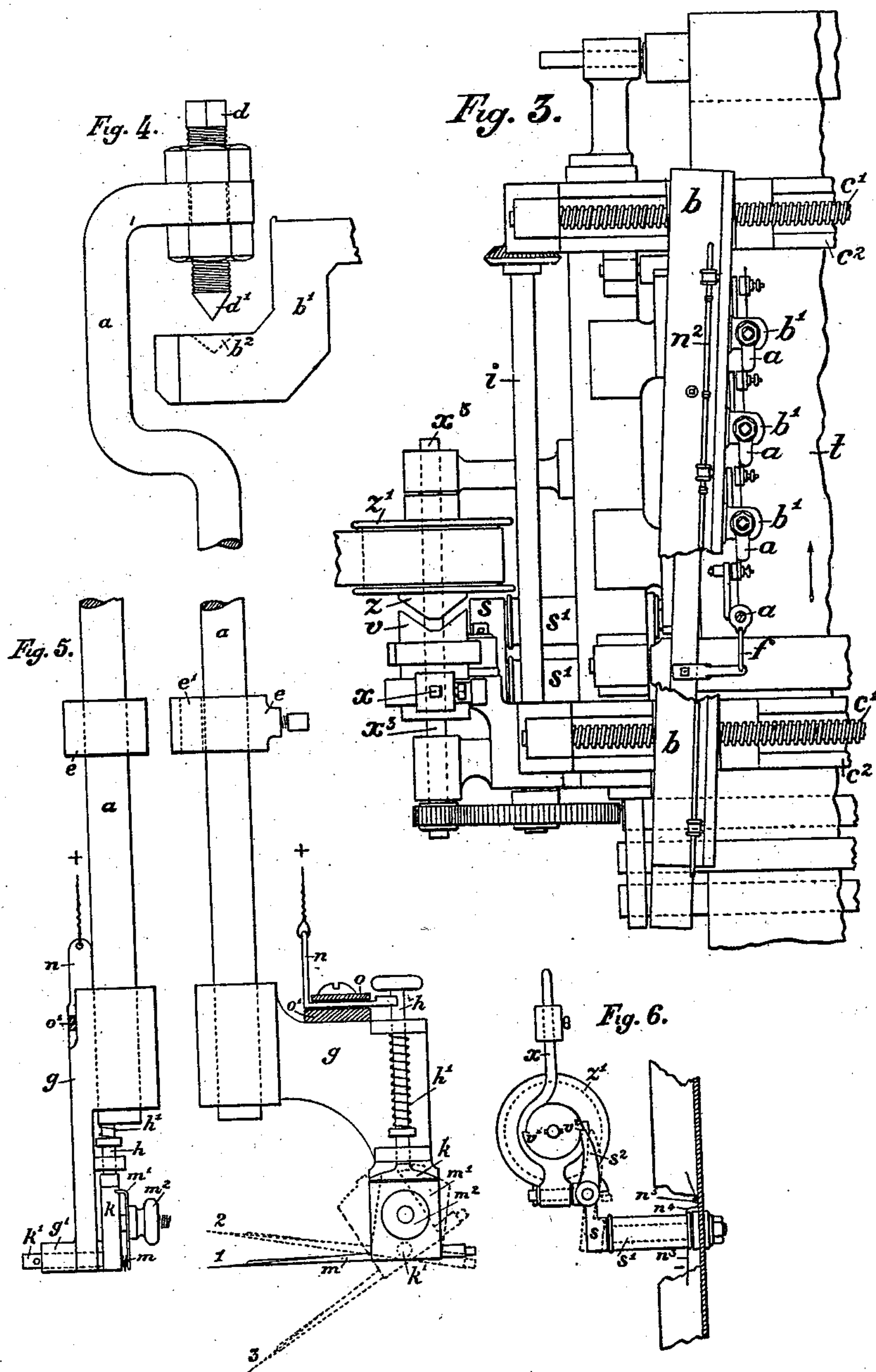
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Inventor:

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John C. Wilson



# UNITED STATES PATENT OFFICE.

FERNANDO ALSINA, OF BARCELONA, SPAIN.

## MACHINE FOR CUTTING NAP OF FUSTIANS, &c.

SPECIFICATION forming part of Letters Patent No. 555,416, dated February 25, 1896.

Application filed June 13, 1895. Serial No. 552,694. (No model.) Patented in Spain March 18, 1895, No. 17,161; in Italy May 4, 1895, No. 38,821; in Luxemburg May 4, 1895, No. 2,296; in Belgium May 6, 1895, No. 115,436; in Switzerland May 6, 1895, No. 10,189; in England May 7, 1895, No. 9,075; in France May 7, 1895, No. 247,231, and in Austria May 20, 1895, No. 2,017.

*To all whom it may concern:*

Be it known that I, FERNANDO ALSINA, a subject of the King of Spain, residing at Barcelona, Spain, have invented certain new and useful Improvements in Machines for Cutting the Nap of Fustians, Velveteens, Plushes, Velvets, or the Like, (for which Letters Patent have been granted to me in the following countries, viz: Spain, No. 17,161, dated March 18, 1895; Italy, No. 38,821, dated May 4, 1895; Luxemburg, No. 2,296, dated May 4, 1895; Belgium, No. 115,436, dated May 6, 1895; Switzerland, No. 10,189, dated May 6, 1895; England, No. 9,075, dated May 7, 1895; France, No. 247,231, dated May 7, 1895, and Austria, No. 2,017, dated May 20, 1895;) and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to machinery or apparatus employed in cutting or cropping the pile or nap of shaggy fabrics or fustians, whether made of cotton, wool, silk or other animal or vegetable fiber, the improvements being comprised under the following heads: first, the frame or "bridge," from which the knife-holders are suspended, which may be arranged at an angle to the line of the nap, such angle of inclination being variable according to requirements and the bridge or frame being capable of adjustment while remaining parallel to its initial plane; secondly, the knife-holders, which are so suspended from or pivoted to the frame or bridge as to be capable of moving in all directions except that of the advancing material; thirdly, a plate to which the guide for the blade or knife edge is secured, which is so provided as to enable the knife edge to be displaced in the vertical plane and to assume either the operative position with its point just touching or "sweeping" the material or the position of rest with its point raised above the material, or the position which it ought not to assume, except by accident, and in which its edge would penetrate the material, and, fourthly, an improvement in the blocking or arresting mechanism, whereby the cloth is instantane-

ously arrested in the event of the knife edge or blade being moved from the operative position, or when it happens to cut or pierce the fabric under treatment.

The invention will be best understood by reference to the accompanying drawings, which represent a nap cutting or cropping machine embodying my improvements.

Figures 1 and 2 are elevations of the front and rear, respectively. Fig. 3 is a plan of a part of the machine, corresponding with Fig. 1. Figs. 4 and 5 are detail views of the knife-holder and means for attaching the knife. Fig. 6 is a detail view of the coupling sleeve or clutch forming part of the locking or arresting device.

The knife-holder consists of a rod *a*, so shaped or bent at its upper end as to be capable of freely or movably fitting in a step-bearing *b'*. The rod *a* is furnished with a screw *d*, the extremity *d'* of which is made conical and has its bearing in the conical recess *b<sup>2</sup>* in the bearing *b'*. The rod *a* is also provided with a collar *e*, adjustable on said rod by means of a set-screw. This collar *e* is formed with a perforation or recess *e'*, adapted to receive one end of a hook *f*.

The machine comprises as many knife-holders *a* as there are bearings *b'*. These bearings are secured to a bridge or frame *b* supported on screws *c' c'*, whereof the ends work in nuts *c*, these nuts being adapted to slide along the guides *c<sup>2</sup>* as the corresponding screws are turned by hand through the medium of the hand-wheel *c<sup>3</sup>* and intermediate bevel-gearing. The nuts *c*, together with the bridge *b*, may thus be moved to or adjusted in the situation calculated to insure coincidence between each blade or knife edge and the line of nap threads or loops to be operated upon.

The bridge *b* carries an arm *b<sup>2</sup>* joined to the bar or rail *r'* by the lever *r*. This rail or bar is suspended from or linked to the said bridge *b* through the medium of rods *r<sup>3</sup>*, whereby it is free to oscillate to the required extent, the rail being furnished with bosses *r<sup>2</sup>* wherein one extremity of each of the hooks *f* engages.

The knife-holders are adapted to turn about their vertical axes or pivots and to oscillate



in any direction, so as to accommodate any variations of width and any irregularity which may occur in the formation of the lines of nap or weft threads; but they are precluded from following the direction of the progress of the fabric, any such movement being checked by the hooks  $f$  engaging with the bosses  $r^2$  on the rails  $r'$ .

The guide  $m$  of the knife edge is, by means of a spring  $m'$  and a set-screw  $m^2$ , attached to a plate  $k$  which turns about the pivot  $k'$  located within the sleeve  $g'$  of the support  $g$  which is arranged upon the rod  $a$  of the knife-holder. The plate  $k$  is provided with a rod  $h$  carrying a coiled spring  $h'$ , whereby the plate is constantly pressed down, the effect of the arrangement being to prevent the plate from moving and to securely retain it in the operative position, Fig. 4. So soon, however, as the knife edge receives an impulse more powerful than the resistance offered by the rod  $h$  the plate edge moves either to the position 2 or to the position 3, as the case may be.

The device for instantaneously arresting the working of the machine, on the knife becoming displaced, consists of electrical apparatus comprising a commutator or switch and an arresting-pawl. The switch or commutator consists of a metal plate  $n$  fitted to the support  $g$  and insulated therefrom by means of the insulating material  $o o'$ . The plate  $n$  is so arranged in relation to the rod  $h$  that as the blade moves toward the position 3, and thereby causes the rod  $h$  to descend, the knob or button thereon comes into contact with the metal plate  $n$ , thereby closing the circuit and allowing the electrical current to act upon the arresting-pawl. The locking or arresting mechanism proper consists of a solenoid  $s'$ , the armature  $s$  of which is arranged to act as a pawl upon the sliding portion  $v$  of a clutch. For this purpose the said sliding portion  $v$  has two projections  $v'$  and  $v^2$ , Fig. 6, provided on it, which projections are adapted to impinge against the point  $s^2$  of the armature, so as to arrest the rotary motion of the clutch.

Each knife-holder is provided with a plate  $n$  and a wire  $n'$ , connecting it to a bar  $n^2$ , which bar is in its turn connected with the positive pole of a battery. The coil  $s'$  is connected with the negative pole by the conductor  $n^3$  and is in electrical communication with the loom through the medium of the wire  $n^4$  and screw  $n^5$ . By means of this arrangement when the rod  $h$  descends and brings its shed or knob down upon the plate  $n$  the instantaneous closing of the circuit is the result. The coil  $s'$ , traversed by the current, attracts the end  $S$  of the pawl or armature, Figs. 1 and 6, the opposite end  $S^2$  of which engages with one of the projections  $v'$  or  $v^2$  of the friction-clutch, and thereby arrests the rotary motion of the said clutch. The part  $z$  of the friction-clutch, which is made integral with the driving-pulley  $z'$  and is in constant rotation, acts by means of its inclines upon the sliding por-

tion  $v$  and repels it, the latter portion carrying the lever  $x$  toward the position  $x'$ . (See Fig. 1.) On the motion of the portion  $v$  of the clutch being arrested the shaft  $x^3$ , by which motion is transmitted to the loom, also ceases to turn.

In preparing for work a machine of the improved construction, the knife-holders  $a$  are first suspended in their respective bearings  $b'$ , the conical ends  $d'$  of the screws  $d$  being placed in the recesses  $b^2$ . The guides  $m$  of the knife-blades are then turned to the position 2, so as to obviate any damage to the fabric  $t$  when inserting the same in the machine. In Figs. 1 and 2 the fabric or material  $t$  is shown in dotted lines, the arrows indicating the direction of travel through the machine. In stretching the fabric, the tension is controlled and adjusted by means of a brake device, such as  $l'$ , Fig. 2, which embraces the end of the roller  $l$ . By means of the hand-wheel  $c^3$  the screws  $c'$  are rotated in order to bring the frame or bridge  $b$  into the required position to place the knives just above the nap to be cropped. The knife-holders may now be adjusted in position and the guides  $m$  lowered, so as to resume their normal or operating position 1. The point of the guide enters the line of weft-threads forming the nap and retains this position until the desired contact between the weft and the knife is brought about. The knife-holders are then coupled to the rail  $r'$  by means of the hooks  $f$ , Figs. 1 and 2, when the machine will be ready for work.

In starting the machine, the lever  $x$ , Fig. 1, is pushed to the left until it assumes the position indicated in dotted lines at  $x^2$ . This has the effect of engaging the sliding portion  $v$  of the clutch with its counterpart  $z$ , which is attached to the driving-pulley  $z'$ . On the latter revolving, motion is transmitted to the shaft  $x^3$ , and thence to the shaft  $i$  by means of the spur-wheel  $x^4$ . The roller  $p$  receives motion from the shaft  $i$  through the intervention of the bevel-gearing  $B$ , the roller  $g$  being operated by means of a strap or belt  $q'$ .

As the material advances toward the gathering-roller  $g$ , each blade of the knife-holder cuts one line of weft or nap, unless by reason of some accident the blade deviates from its normal position and penetrates the body of the material. When this occurs—i. e., when the blade and its guide assume the position indicated at 3, Fig. 4—the plate  $k$  is moved out of its normal position, the rod  $h$ , operated by the spring  $h'$ , descends, and the electrical circuit is completed, the solenoid  $s'$  attracting the armature  $s$ . The point  $s^2$  of the armature engages with the one or the other of the projections  $v'$  or  $v^2$ , with the result that the sliding portion  $v$  of the clutch is arrested and the machine instantly stopped.

When the blade which caused the stoppage of the machine has been replaced in its working position, the lever  $x$  is moved to the position  $x^2$  and the machine again started.



In the drawings I have represented, by way of example, a machine comprising four knife-holders *a*, but it will be understood that the number of these knife-holders may be varied according to the requirements of each individual case.

The present improvements may be applied to existing machines employed in cutting or cropping the pile or nap of shaggy fabrics or fustians, whether of cotton, wool, silk or other animal or vegetable fiber.

Having thus described my invention, what I claim, and desire to secure by Letters Patent of the United States, is—

1. In a machine for cropping pile fabrics, the combination with a plurality of knife-holders freely suspended and adapted to be inclined at any angle to the line of weft or nap to be cut, of a bridge supporting said knife-holders and screws supporting and transmitting motion to the said bridge, substantially as described.

2. In a machine for cropping pile fabrics, the combination with a plurality of knife-holders, of the plates *k* adapted to turn about a horizontal axis, the spring-actuated vertical rods in frictional contact with the top of said plates, an adjustable bridge supporting said knife-holders, screws supporting and transmitting motion to the said bridge and an electrical stopping device, substantially as described.

3. In a machine of the character described,

the combination with a plurality of knife-holders, the plates *k* adapted to turn about a horizontal axis, the spring-actuated vertical rods in frictional contact with the top of said plates, an adjustable bridge supporting said knife-holders, screws supporting and transmitting motion to the said bridge, a bar linked to said bridge and connected to an arm carried by the bridge, and an electrical stopping device, substantially as described.

4. In a machine of the character described, the combination of an instantaneously-acting arresting device, comprising a metallic plate adapted to turn about a horizontal axis, a spring-actuated vertical rod in frictional contact with the top of said plate, a second metallic plate insulated from its support and adapted to complete the electrical circuit through the aforesaid vertical rod, a pawl terminating at its lower end in an armature, a solenoid adapted to attract the said armature, a clutch provided with inclined jaws, and a lever actuated by hand for again engaging said clutch, substantially as and for the purposes described.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

FERNANDO ALSINA.

Witnesses:

H. W. BOWEN,  
GEROMINI TOLIBAR.