(No Model.) 6 Sheets—Sheet 1.

T. RASMUS.

FUR CLIPPING AND UNHAIRING MACHINE.

No. 275,077. **Patented Apr. 3, 1883.**

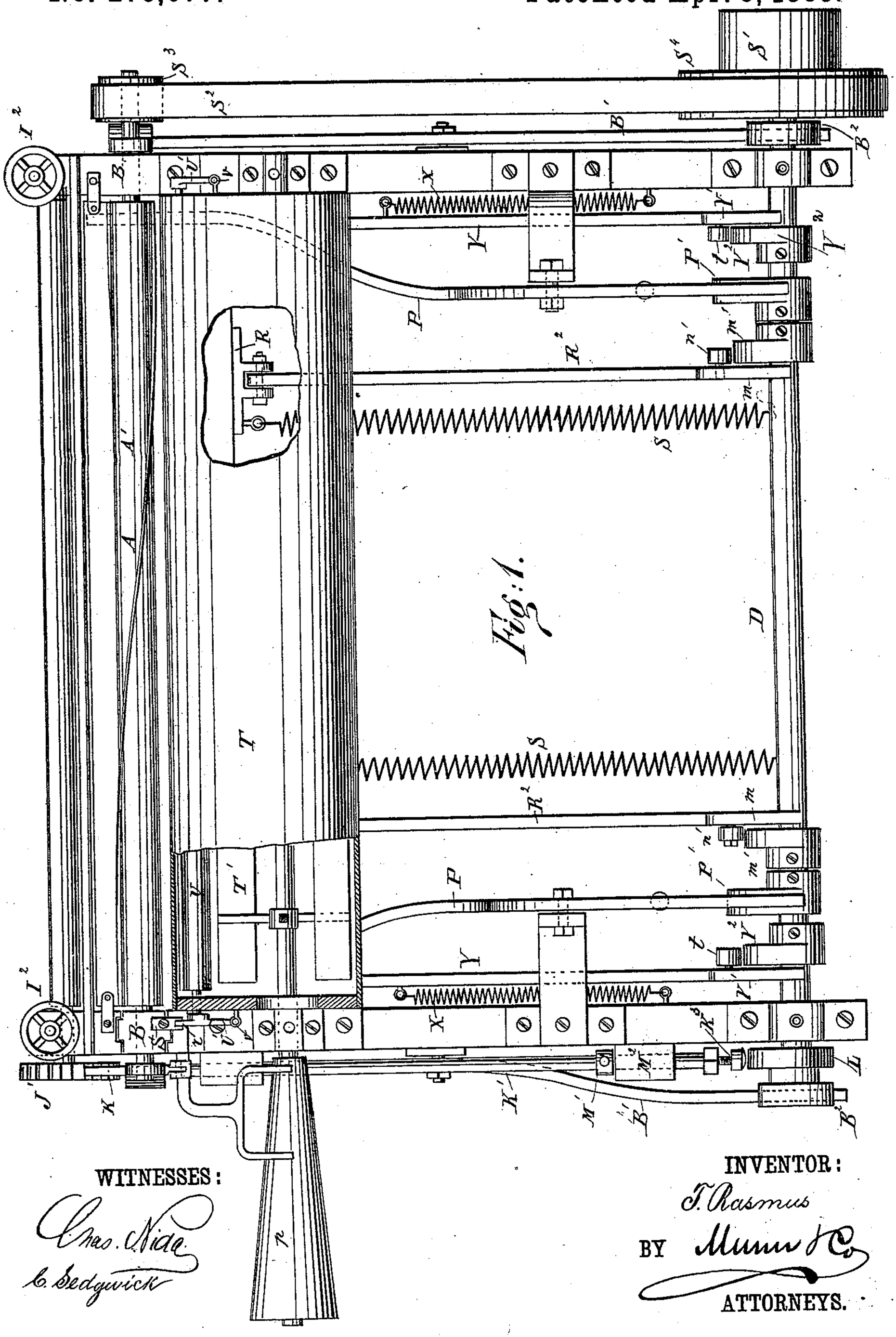

Fig. 1.

WITNESSES:

Chas. Nide

C. Sedgwick

INVENTOR:

T. Rasmus

BY Munn & Co

ATTORNEYS.

(No Model.) 6 Sheets—Sheet 2.

T. RASMUS.

FUR CLIPPING AND UNHAIRING MACHINE.

No. 275,077. Patented Apr. 3, 1883.

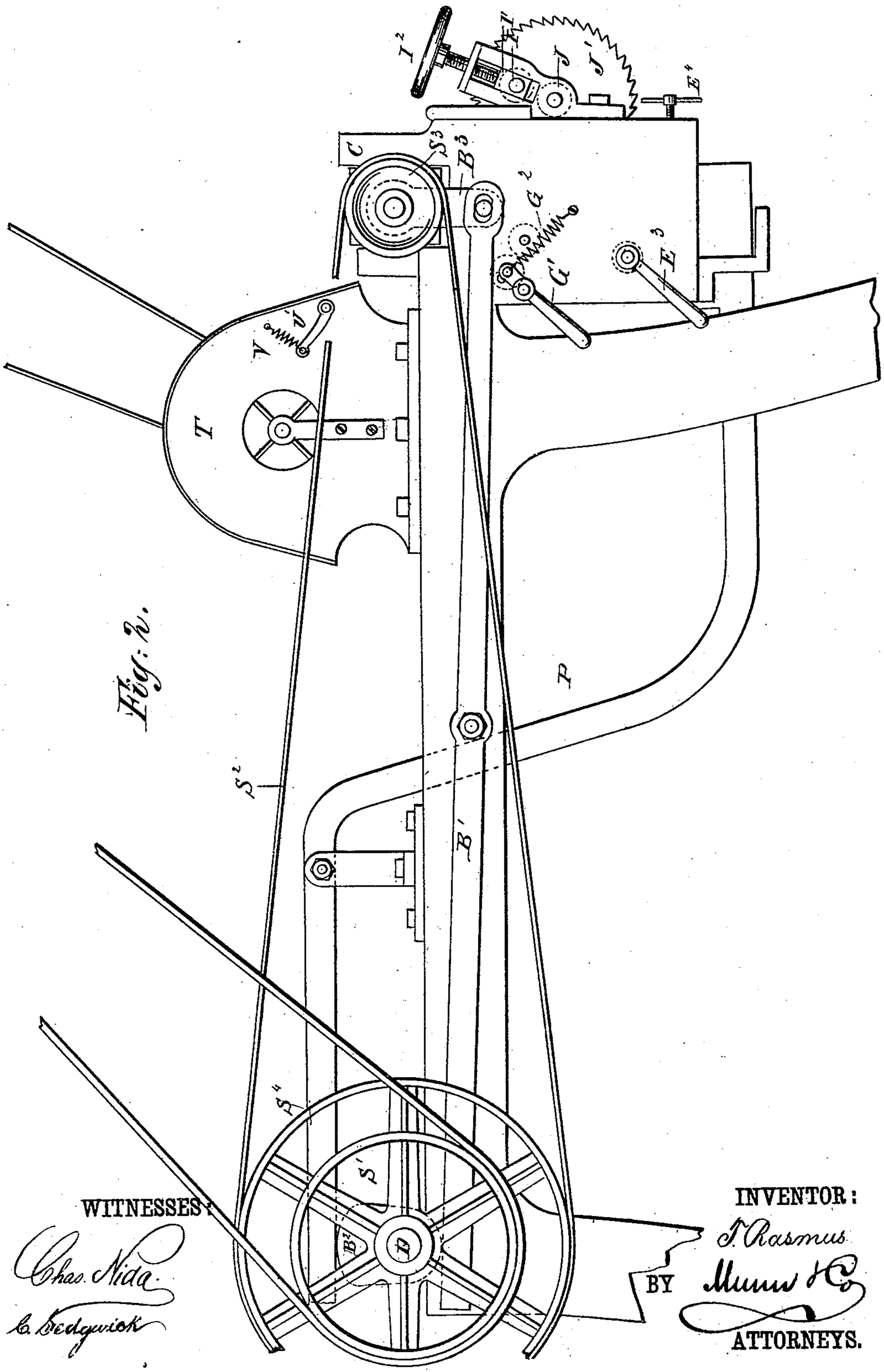

Fig. 2.

WITNESSES:

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INVENTOR:

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(No Model.)

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T. RASMUS.

FUR CLIPPING AND UNHAIRING MACHINE.

No. 275,077. Patented Apr. 3, 1883.

Fig. 3

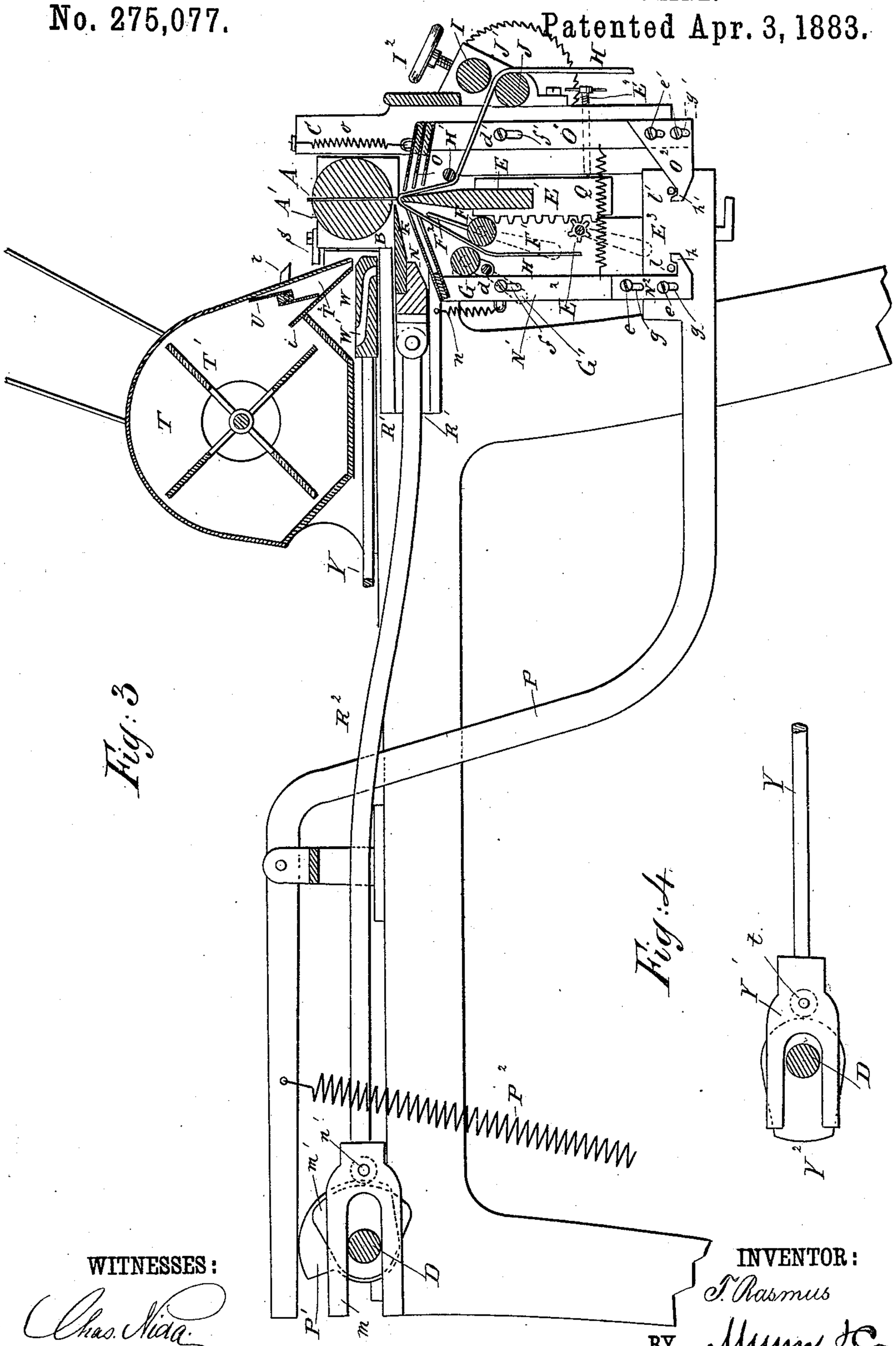

Fig. 4.

WITNESSES:

Chas. Nida.

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T. RASMUS.

FUR CLIPPING AND UNHAIRING MACHINE.

No. 275,077. Patented Apr. 3, 1883.

Fig. 5.

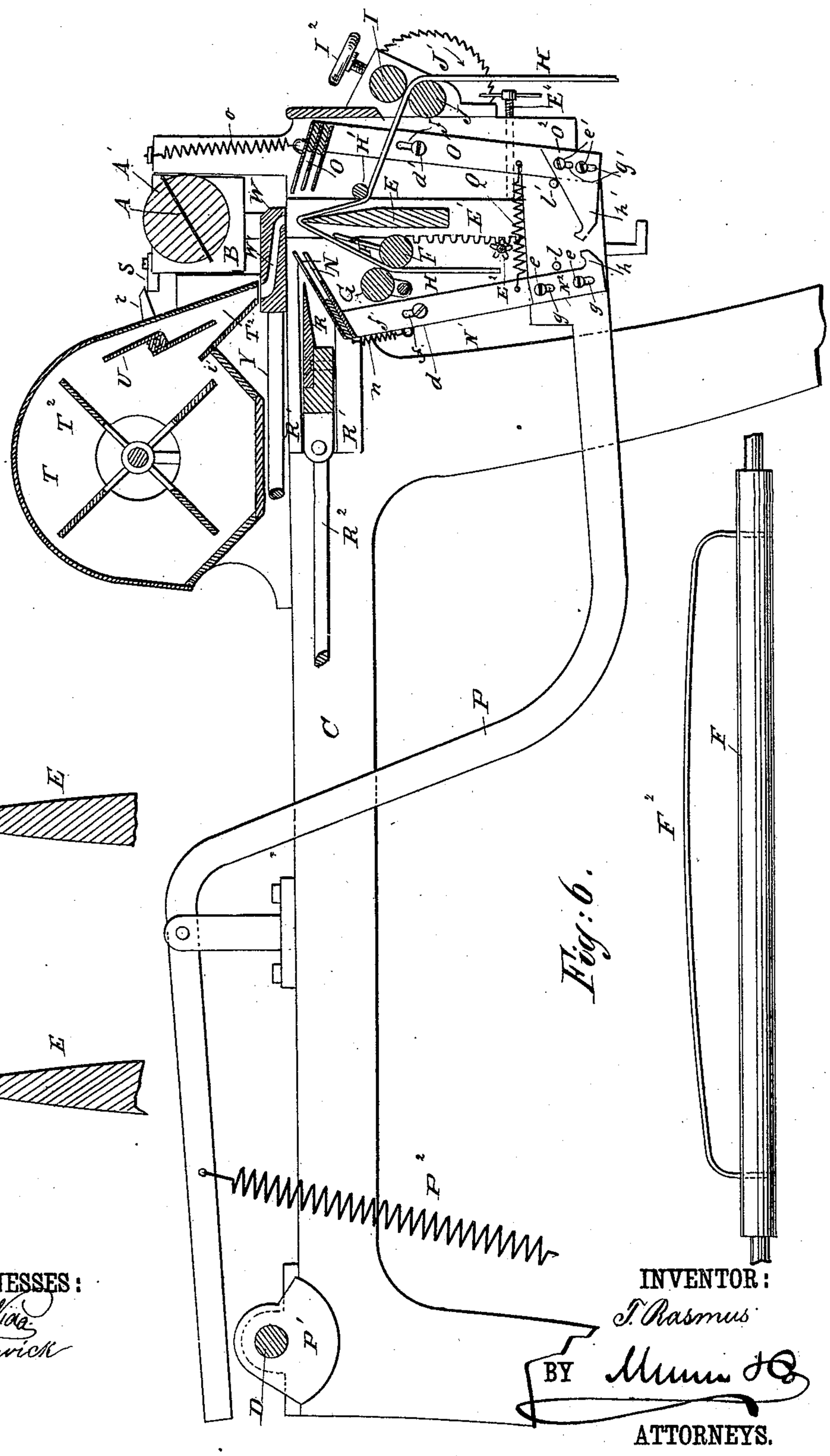

Fig. 8

Fig. 7.

Fig. 6.

WITNESSES:

Chas. Nida

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INVENTOR:

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(No Model.)

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T. RASMUS.

FUR CLIPPING AND UNHAIRING MACHINE.

No. 275,077. Patented Apr. 3, 1883.

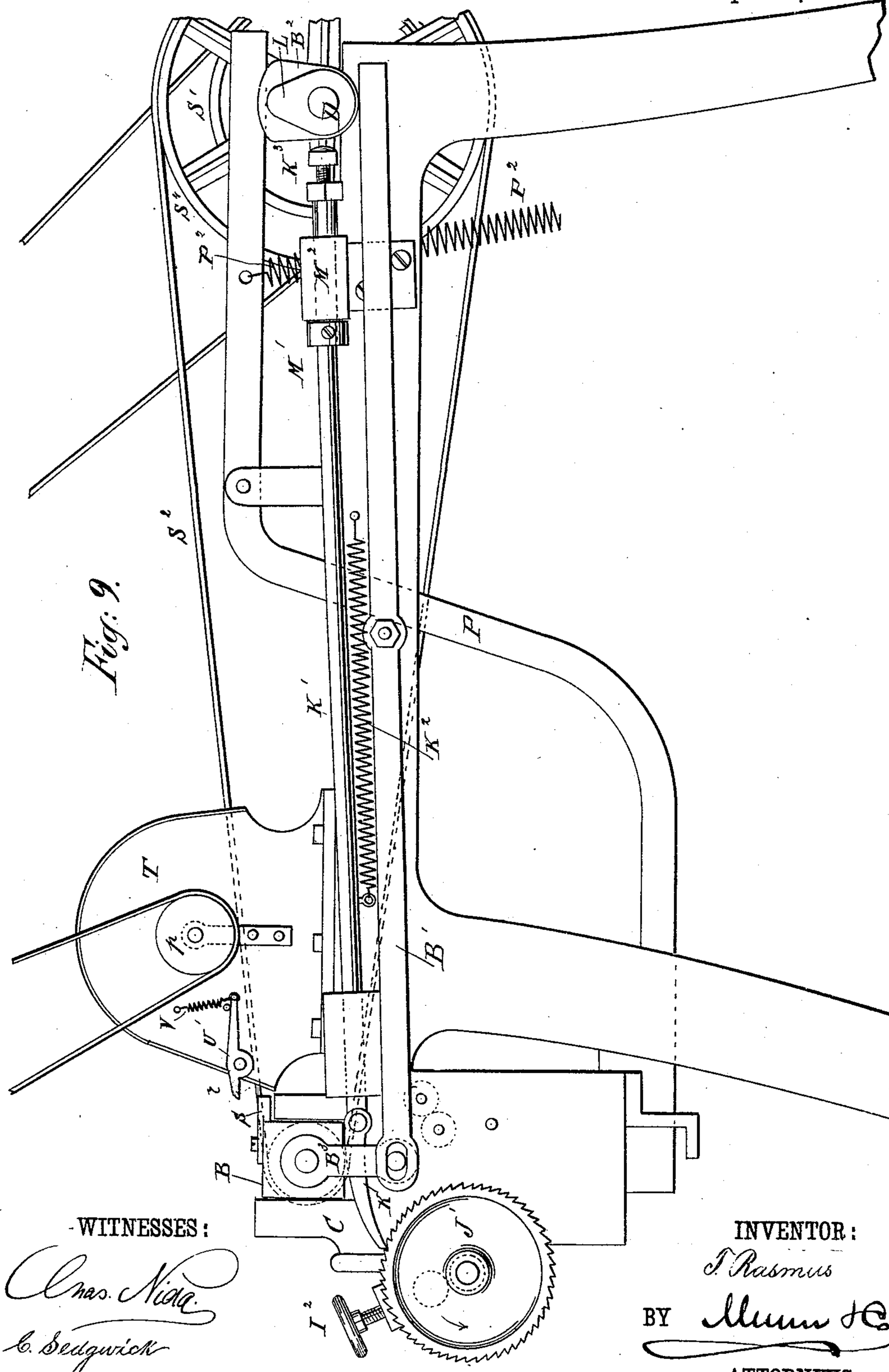

Fig. 9.

WITNESSES:

Chas. Nida.

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INVENTOR:

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(No Model.) 6 Sheets—Sheet 6.

T. RASMUS.

FUR CLIPPING AND UNHAIRING MACHINE.

No. 275,077. Patented Apr. 3, 1883.

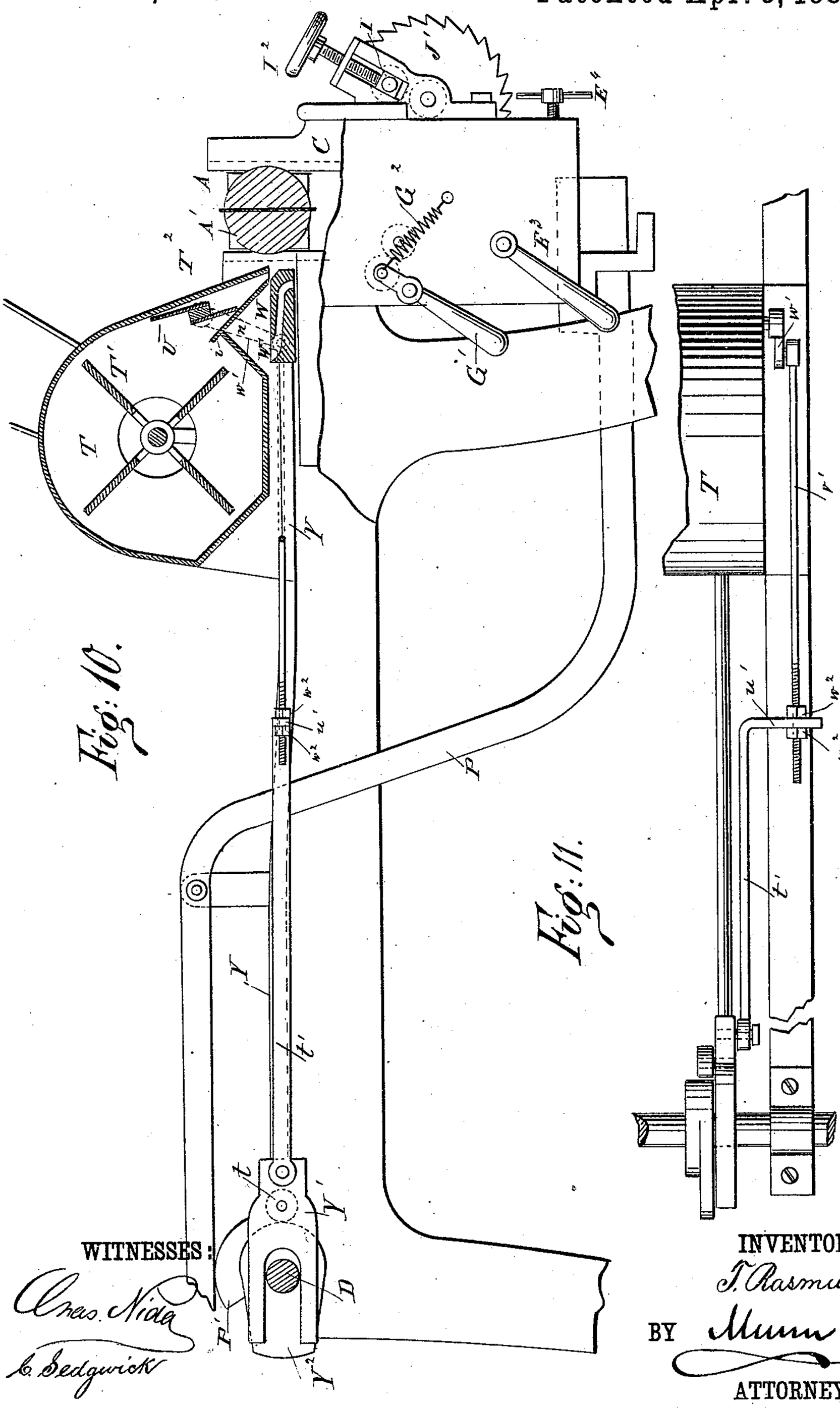

Fig. 10.

Fig. 11.

WITNESSES:

Chas. Nida

C. Sedgwick

INVENTOR:

T. Rasmus

BY Munn & Co

ATTORNEYS.

UNITED STATES PATENT OFFICE.

THEOPHIL RASMUS, OF NEW YORK, N. Y.

FUR CLIPPING AND UNHAIRING MACHINE.

SPECIFICATION forming part of Letters Patent No. 275,077, dated April 3, 1883.

Application filed November 23, 1882. (No model.)

To all whom it may concern:

Be it known that I, THEOPHIL RASMUS, of the city, county, and State of New York, have invented a new and Improved Fur Clipping and Unhairing Machine, of which the following is a full, clear, and exact description.

The object of my invention is to provide a new and improved machine for removing the stiff bristles or water-hairs from seal-skins and other skins, and also for unhairing such skins or cutting off part of the length of the hair of the skins.

The invention consists in a machine for clipping and unhairing fur, provided with devices for stretching the fur over a plate, devices for delivering a current of air on that part of the fur which is stretched on the edge of the said plate, and with devices for holding the fine hair and wool down, and other devices for clipping off the coarse hairs or bristles which are not laid over by the current of air. The current of air is produced by a suitable blower on the machine and passes to the edge of the plate through a movable nozzle-plate which is moved forward when the cutting devices are removed, and which nozzle-plate is moved back when the cutting devices approach the edge for the purpose of clipping the hairs.

The invention further consists in devices for moving the nozzle-plate for opening or closing a gate in the spout of the air-forcing apparatus, in devices for moving the cutting-knives toward the upper edge of the plate over which the skin is stretched, and in devices for pressing combs against the skin after the hairs have been laid down by the current of air, all of which devices are operated from one and the same driving-shaft, and are all operated in regular order.

The invention also consists in parts and details and various combinations of the same, as will be fully described and set forth hereinafter.

Reference is to be had to the accompanying drawings, forming part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of my improved fur clipping and unhairing machine, parts being broken out and others shown in section. Fig. 2 is a longitudinal elevation of the same. Fig. 3 is a longitudinal sectional elevation of the same, showing the position of the parts at the moment of clipping the hairs. Fig. 4 is a longitudinal elevation of the cam end of the bar for moving the nozzle of the blower. Fig. 5 is a longitudinal sectional elevation of the machine, showing the parts separated before cutting off the hairs. Fig. 6 is a longitudinal elevation of the feed and stretching roller. Fig. 7 is a cross-sectional elevation of the blade over which the fur is passed. Fig. 8 is a cross-sectional elevation of a modification of the same. Fig. 9 is a longitudinal elevation of the machine, showing the mechanism for operating the feeding device and raising the rotary cutter. Fig. 10 is a longitudinal elevation of my fur clipping and unhairing machine, showing a modified construction of the device for opening the gate of the blower, parts of machine being shown in section. Fig. 11 is a plan view of the rod for operating the gate of the blower.

A spiral knife, A, having two diametrically-opposite cutting-edges, is secured in a cylinder, A′, journaled in vertically-movable bearings B, which are contained and guided in a recess in the frame C of the machine. The bearings B are each provided with a downwardly-projecting arm, B^3, which has a pivot working in a longitudinal end slot in a lever, B′, which is pivoted to the side of the frame C and is adapted to rock vertically. The opposite end of the lever B′ rests against a cam, B^2, mounted on the driving-shaft D of the machine, whereby when the said shaft D rotates the corresponding end of the lever B′ will be depressed, and thereby the end attached to the bearing B will be raised, and when the shaft D completes its revolution the weight of the bearing will cause the same to descend, and will cause the end at the cam B^2 to rise. The bearings B, at each end of the spiral knife A, rest upon a lever, B′, which is acted upon by a cam, B^2, in the manner described. A vertical plate, E, which is tapered toward its upper edge, is held in a vertical position directly below the central line of the spiral knife A and parallel with the said central line. The said plate E is attached to racks E′, which engage with pinions E^2, mounted on a shaft, which is provided at one end with a handle, E^3. By turning the said handle the racks E′ and the plate E can be raised or lowered more or less, as may be desired or necessary. By means

of screws E^4, projecting from the front of the machine and extending back to the racks E′, the said racks can be locked in the desired position. The plate E is provided in its upper narrow edge with a longitudinal groove, *a*, as shown in Fig. 7, whereby two edge ridges will be formed, one at each longitudinal side of the plate; but a wire or catgut string, *b*, can be placed within the groove *a*, as shown in Fig. 7. A roller, F, parallel with the plate E, is held in the frame C, and is provided at one end with a handle, F′, by means of which it can be turned. A metal bow or frame, F^2, projects from the top of the roller F, the said bow projecting more or less toward the upper edge of the plate E, as shown in Fig. 3, which inclination of the frame or bow F^2 toward the upper edge of the plate E can be adjusted by means of the handle F′ on the said roller.

Adjoining to the roller F a roller, G, is journaled in swinging bearings in the frame C, one of which bearings is provided with a handle, G′, whereby by pulling the handle downward the roller G can be separated from the roller F. A spring, G^2, acting on the upper part of the handle G′, presses the roller G against the roller F.

The fur H which is to be clipped or unhaired is passed between the rollers F and G, over the upper edge of the plate E, and under a roller, H′, and then between two feed-rollers, I and J, on the front of the frame C, of which the roller I is mounted in sliding bearings I′, which can be moved toward or from the roller J by means of hand-wheels I^2. A ratchet-wheel, J′, is rigidly mounted on one end of the feed-roller J, and with the teeth of the said ratchet-wheel J′ a pawl, K, engages, which is mounted on the end of a rod, K′, which is adapted to slide backward and forward in the direction of the length of the machine, and which is drawn from the rear of the machine by a spring, K^2, attached to the rod K′ and to the frame C. At its rear end the rod K′ is provided with a buffer, K^3, against which a cam, L, on the shaft D is adapted to strike. The said buffer K^3 is attached to a screw, by means of which the distance it projects from the rear end of the rod K′ can be adjusted. An adjustable sleeve, M′, is secured on the rod K′ and strikes against a bearing, M^2, in which the rod K′ slides, and thus prevents the rod K′ from being drawn too far back by the spring K^2. Every time the shaft D rotates it pushes the rod K′ forward in the direction of its length, and thereby causes the pawl K to rotate the wheel J′, whereby the feed-rollers will also be rotated, and the skin or fur H will be fed forward from the rear toward the front part of the machine.

Two combs, N, on the rear side of the plate E, are attached at the ends to the upper ends of bars N′ in such a manner that the teeth of the said combs project upward toward the upper edge of the plate E and toward the front of the machine. The bars N′ are pivoted to rock forward and backward in the vertical plane by means of pivots *d*, passing through longitudinal slots *f* in the said bars.

To the lower end of each bar N′ a hook-plate, N^2, is held by means of screws *e*, passing through longitudinal slots *g* in the said hook-plate, whereby the hook-plate can be adjusted higher or lower. The hook-plate is provided at its lower end with a hook, *h*, which projects toward the front of the machine.

A series of combs, O, (in the case shown three,) are attached at the ends to the upper ends of bars O′, which are also pivoted to swing backward and forward in the vertical plane by means of screws *d*′, passing through vertical slots *f*′, and to the lower end of each bar O′ a hook-plate, O^2, is attached, which is provided at its lower end with a hook, *h*′, projecting toward the hook *h*, and the said hook-plate O^2 can be adjusted higher or lower on the lower end of the bar O′ by means of screws *e*′, passing through longitudinal slots *g*′ in the hook-plates.

At each side of the machine a curved lever, P, is pivoted, the rear end of which is above a cam, P′, mounted on the shaft D, which rear end of the lever P is drawn downward upon the said cam by a spring, P^2. At or near the middle the lever P is curved downward, and the front end will be below the plate E. Two studs, *l* and *l*′, project from one side of the front end of each curved lever P, the said studs resting against the adjoining edges of the bars N′ O′ or their corresponding hook-plates, N^2 O^2, as shown. One pair of bars N′ and O′ is at each side of the machine, and, as stated above, a corresponding lever, P, is also provided at each side of the machine. The bars O′ and N′ are drawn toward each other at their lower ends by a spring, Q, attached to both bars. Each bar O′ is drawn upward by a spring, *o*, attached to the said bar and to the frame C, and each bar N′ is drawn upward by a spring, *n*, attached to the said bar and to the frame of the machine.

A horizontally-sliding knife, R, is held transversely in the machine-frame and is guided in tracks R′, and at each end it is pivoted to a rod, R^2, which rods are each provided at the opposite end with a fork, *m*, the shanks of which surround the shaft D.

Adjoining each fork *m* the shaft D is provided with a cam, *m*′, which is adapted to strike against a roller, *n*′, on a pintle projecting from the side of each fork *m*, whereby when the shaft D rotates the cams *m*′ will press the knife R toward the front of the machine. Springs S, attached to the frame of the machine and to the knife R, draw the same toward the rear of the machine.

A hollow drum, T, containing a fan-blower, T′, the shaft of which passes longitudinally through the drum T, is mounted on the frame C, and the said drum is provided at its front end with a spout, T^2, which extends throughout the entire width of the machine and is above and slightly back of the upper edge of the plate E. The fan-blower T′ is provided at

the end of its shaft with a cone-pulley, *p*, whereby by shifting the belt on the pulley the speed of the fan-blower may be increased or decreased.

A gate, U, is mounted on a shaft passing longitudinally through the upper part of the spout T^2, which gate extends the entire length of the said spout. By turning the said gate so that the outer edges of the same rest against the sides of the spout the said spout will be closed and the compressed air cannot issue from the same. Arms U′ are attached to each end of the shaft, on which the gate U is rigidly mounted, and the ends of the said arms are drawn upward by springs V, whereby the gate U is held closed. One arm U′ is provided with a projection, *r*, toward the front of the machine, which projection is of such length that it can be struck by an arm of the vertically-movable bearing B at the same side of the machine.

A plate, W, resting flat on the top of the machine-frame, is provided throughout its entire length with a diagonal channel, W′, which extends from the rear part of its upper surface to the front part of its lower surface, and the said plate W is attached at each end to a rod, Y, each of which is provided at the opposite end with a fork, Y′, surrounding the shaft D, which is provided, adjoining to each fork Y′, with a cam, Y^2, which is adapted to press against a roller, *t*, mounted on a pintle projecting from the side of the fork, whereby when the shaft D rotates the plate W will be pushed toward the front end of the machine.

Springs X, attached to the frame of the machine and to the rods Y, draw the plate W toward the rear part of the machine. When the plate W has been pushed toward the front end of the machine to its full extent, the opening of the spout T^2 will be exactly above the rear opening of the diagonal channel W′ in the plate W.

The driving-shaft D is driven by a belt passed over a pulley, S′, and the rotating knife A is operated by a belt, S^2, passing over a pulley, S^3, on the end of the knife-cylinder A′, and over a pulley, S^4, mounted on the shaft D.

The fan-blower is operated by a separate pulley. The fan-blower may be made of the usual construction; or, if desired, it may be provided with a longitudinal ridge, *i*, which projects a short distance within the casing along the upper end of the bottom side of the spout, as shown in Figs. 3, 5, and 10. The projection *i* causes a stronger current of air to be forced out of the spout.

I have shown a projection, *r*, on one of the arms U′ for operating the gate U of the blower; but in place of the same I may use a rod which is operated directly from the fork Y′. An arm, *w′*, projects downward from the shaft of the gate U, and its lower end is pivoted to a rod, *v′*, the opposite end of which is screw-threaded and passed through the rectangularly-bent end end *u′* of a rod, *t′*, which is pivoted to the fork Y′, as shown in Fig. 10. Locking-nuts w^2, on the threaded end of the rod *v′* at opposite sides of the bent end *u′* of the rod *t′*, serve to hold the rod *v′* in the desired position in relation to the rod *t′*, and permit of adjusting the length of the two rods in such a manner that the gate U will be opened more or less by the said rod. In place of making the rod adjustable, as described above, a single length of rod may extend from the lower end of the arm *w′* to the fork Y′. Whenever the movable nozzle-plate W is moved forward the rods *t′ v′* will open the gate U and permit air to pass out of the spout T^2 of the blower T.

The operation is as follows: The fur that is to be clipped or unhaired is passed between the rollers F and G, behind the plate E, over the upper edge of the said plate, under the roller H′, and then between the feed-rollers I and J, which are pressed toward each other by means of the hand-wheels I^2. Every time the shaft D makes one revolution the cam L pushes the rod K′ toward the front of the machine, and thereby the pawl will rotate the ratchet-wheel J′, as indicated by the arrow, and the fur H will be moved in the direction toward the front of the machine. The cams B^2 press down the rear ends of the levers B′, and thereby the front ends of the said levers, and the bearings B, carried by the said front ends, will be raised, as will be the rotary spiral knife A, which is journaled in the said bearings. As the bearings move upward the projection *s* on one of the bearings strikes the projection *r* on one arm U′, and thereby opens the gate U of the blower and permits the air to issue from the opening of the spout T^2, as shown in Fig. 5. At the same time the cams Y^2 have pushed the rods Y toward the front of the machine, so that the rear upper opening of the transverse channel W′ in the plate W will be directly below the opening of the spout T^2, and the air issuing from the spout will be conducted through the channel W′, the front lower opening of which is then directly above the upper edge of the plate E. During this time the knife R has been held withdrawn by the springs S, and the rear end of the lever P has been lowered by the spring P^2, whereby the combs N and O, on the upper ends of the bars N′ and O′, will be held from the plate E. As the movable nozzle-plate W moves forward the wind from the lower opening of the same will first strike the upper edge of the plate E diagonally and will blow down the hair on the front of the plate E, and when the movable nozzle-plate W is in the position shown in Fig. 5 the air is thrown vertically upon the upper edge of the plate E and forces the soft hair down equally at each side, and only the water-hairs or bristles, which are so stiff that they cannot be blown over by the current of air, remain standing. By this time the shaft D is turned so that the bearings B, carrying the knife A, are lowered, and thereby the springs V are permitted to close the gate U and shut off the current of air. At the same time the movable nozzle-plate W is withdrawn toward the rear of the

machine and the cam P′ raises the rear end of the lever P, and thereby the front end of the said lever will be lowered. The studs *l l′* press against the edges of the bars N′ O′, or the hook-plates N² O², and thereby separate the lower ends of the said plates N² O², whereby the combs N O, at the upper ends of the said bars, will be moved toward each other and toward the sides of the plate E. At the same time the studs *l l′* draw the plates N² O² downward, which movement is permitted by the slots *f f′*, and thereby the ends of the teeth of the combs will be pressed against the hairs that have been blown down at each side of the plate E by the current of air, and will hold the said hairs down against the skin and prevent them from rising when the current of air ceases, for the movement of the combs toward the skin takes place at the same time that the lower opening of the movable nozzle-plate W is being removed from above the upper edge of the plate E. At the same time that the combs are pressed against the skin the transverse knife R is moved toward the front end of the machine to such an extent that its front or cutting edge will be directly above the longitudinal center line of the upper edge of the plate E, and the bearings B have been lowered to such an extent that the lowest point of the spiral edge of the knife A will coincide with the horizontal position of the cutting-edge of the knife R, and thereby the water-hairs or bristles projecting from the skin on the upper edge of the plate E will be clipped or cut off by the knife R and the rotary knife A. Then the bearings B begin to rise, the feed-rollers draw the skin forward, the knife R is withdrawn, and the rear end of the lever P rises, thereby releasing the lower ends of the bars N′ O′ and permitting the spring Q to draw them together, whereby the combs N and O will be moved from the skin, the movable nozzle-plate W will be moved forward, the gate U will be opened, and the current of air issuing from the bottom opening of the plate W will blow off the hair that has been clipped from the fur, and also will lay down the hair for the next operation, and so on until the fur is clipped.

In some furs different kinds of hairs must be removed and the fur must be passed through the machine one or more times accordingly, a different grade of hairs being removed at each operation. For instance, some hairs require a very strong current of air to cause them to lie against the fur, and others are so slender that the fur must be subjected to a weak current of air only, so that all the hairs both stiff and pliable shall not be folded against the fur, in which case none could be cut off. For this reason I have provided the cone-pulley on the shaft of the fan-blower to permit of increasing or decreasing the speed of the blower at will. The roller F has been provided with a bow-frame, F², to permit of giving the fur a different inclination before it reaches the upper edge of the plate E.

It may be necessary that some kinds of fur, which have peculiar bristles, should be passed over the upper edge of the plate E at a certain inclination. In most cases it will be desirable to use the plate E with a groove in its upper edge, whereby a larger part of the skin will be exposed to the action of a vertical current of air and more bristles will project; or, if only a very small part of the fur is to be exposed to the action of the current of air the catgut or wire *b* is placed in the groove *a*. In the first place a double cut will be made, and a considerable length of fur can be fed for each revolution of the driving-shaft; but in the second case the feed must be very slight, as only a very small portion of the fur is exposed to the action of the machine.

In place of combs N and O, metal strips may be used.

The machine can also be adjusted to be used for cutting off a certain length of all of the hairs of a piece of fur, thus making all the hairs of a uniform length. In such cases the plate E must be so adjusted that the distance from the upper surface of the skin on the same to the cutting-edge of the knife R is equal to the desired length of the hairs of the fur.

I am aware that it is not new to combine with a knife-edged bar, means for stretching and means for feeding the skin over the said knife-edged bar, an air-forcing apparatus or oscillating guard-combs or clipping-knives; also, that it is not new to stretch the skin tightly over a knife-edged support, then force the soft hair back by a strong air-current, next retain and protect the soft hair by suitable guard devices, and finally clip or pluck the stiff projecting hair or bristles; but

What I do claim as new and of my invention is—

1. A machine for clipping and unhairing fur, made, substantially as herein shown and described, with devices for stretching the fur over a plate, devices for delivering a current of air on the stretched fur, and with a rotary and a reciprocating knife for cutting the bristles of the fur, as set forth.

2. In a machine for clipping and unhairing fur, the combination, with a plate over the edge of which the skin can be passed, of an air-forcing apparatus, a reciprocating knife, and a vertically-adjustable rotary knife, substantially as herein shown and described, and for the purpose set forth.

3. In a machine for clipping and unhairing fur, the combination, with a plate over the edge of which a skin can be passed, of an air-forcing apparatus, a reciprocating knife, a vertically-adjustable rotary knife, and of combs or strips on each side of the plate over which the skin is passed, substantially as herein shown and described, and for the purpose set forth.

4. In a machine for clipping and unhairing fur, the combination, with a plate over the edge of which a skin can be passed, of an air-forcing apparatus provided with a movable nozzle, and of knives for cutting off the hairs

of the fur, substantially as herein shown and described, and for the purpose set forth.

5. In a machine for clipping and unhairing fur, the combination, with a plate over the edge of which a skin can be passed, of an air-forcing apparatus provided with a movable nozzle, of a reciprocating and a rotary knife, and of devices for withdrawing the nozzle and pushing forward the reciprocating knife at the same time that the rotary knife is lowered, substantially as herein shown and described, and for the purpose set forth.

6. In a machine for clipping and unhairing fur, the combination, with a plate over the edge of which a skin can be passed, of an air-forcing apparatus, a reciprocating knife, a vertically-adjustable rotary knife, movable combs on each side of the plate over which the skin is passed, and of devices for withdrawing the nozzle of the air-forcing apparatus, moving forward the reciprocating knife, and pressing the combs against the fur at the same time that the vertically-adjustable rotary knife is lowered, substantially as herein shown and described, and for the purpose set forth.

7. In a machine for clipping and unhairing fur, the combination, with a plate, over the edge of which a skin can be passed, of an air-forcing apparatus provided with a movable nozzle and with a gate, a rotary and a reciprocating knife, of combs at each side of the plate over which the skin is passed, and devices for closing the gate in the air-forcing apparatus, withdrawing the nozzle, pushing forward the reciprocating knife, and pressing the combs against the fur at the same time that the rotary knife is lowered, substantially as herein shown and described, and for the purpose set forth.

8. In a machine for clipping and unhairing fur, the combination, with the plate E, over the edge of which the skin can be passed, of the blower T, provided with a gate, U, having a projection, *r*, on the end of its shaft, and of the rotary knife A, having vertically-movable bearings B, substantially as herein shown and described, and for the purpose set forth.

9. In a machine for clipping and unhairing fur, the combination, with the plate E, over the edge of which a skin can be passed, of the blower T, provided with a gate, U, having arms U′ at the ends, the springs V, acting on the said arms, the projection *r* on one of the arms, and of the rotary knife A, journaled in vertically-movable bearings B, substantially as herein shown and described, and for the purpose set forth.

10. In a machine for clipping and unhairing fur, the combination, with the plate E, over the edge of which a skin can be passed, of the rotary knife A, the knife R, the blower T, and the movable nozzle-plate W, provided with a diagonal channel, W′, throughout its entire length, substantially as herein shown and described, and for the purpose set forth.

11. In a machine for clipping and unhairing fur, the combination, with the plate E, over the edge of which a skin can be passed, of the rotary knife A, the knife R, the blower T, the movable nozzle-plate W, provided with a diagonal channel, W′, throughout its entire length, the rods Y, the forks Y′, the cams Y^2 on the driving-shaft D, the rollers *t* on pintles of the forks Y′, and the springs X, substantially as herein shown and described, and for the purpose set forth.

12. In a machine for clipping and unhairing fur, the combination, with the plate E, over the edge of which a skin can be passed, of the rotary knife A, an air-forcing apparatus, the reciprocating knife R, the rods R^2, the forks *m*, the cams *m′* on the shaft D, the rollers *n′*, pintles on the forks *m*, and the springs S, substantially as herein shown and described, and for the purpose set forth.

13. In a machine for clipping and unhairing fur, the combination, with the plate E, over the edge of which a skin can be passed, of an air-forcing apparatus, of knives for clipping the bristles of the fur, and of combs N and O, attached to the upper ends of bars adapted to swing toward and from the plate E in the vertical plane, substantially as herein shown and described, for the purpose set forth.

14. In a machine for clipping and unhairing fur, the combination, with the plate E, over the edge of which a skin can be passed, of an air-forcing apparatus, of knives for clipping the bristles off the fur, of the combs N and O, attached to the upper ends of bars adapted to swing toward and from the plate E in the vertical plane, and of a lever acting on the lower ends of the bars carrying the combs and acted upon by a cam on the driving-shaft, substantially as herein shown and described, and for the purpose set forth.

15. In a machine for clipping and unhairing fur, the combination, with the plate E, over the edge of which a skin can be passed, of an air-forcing apparatus, knives for clipping the bristles off the fur, the combs N and O, attached to the upper ends of bars adapted to swing toward and from the plate E in the vertical plane, the hook-plates N^2 O^2, attached to the lower ends of the bars N′ O′, the levers P, and the studs *l l′* on the lower front end of the said levers P, substantially as herein shown and described, and for the purpose set forth.

16. In a machine for clipping and unhairing fur, the combination, with the plate E, over the edge of which a skin can be passed, of an air-forcing apparatus, knives for clipping the bristles off the fur, the combs N and O, attached to the upper ends of bars adapted to swing toward and from the plate E in the vertical plane, the hook-plates N^2 O^2, attached to the lower ends of the bars N′ O′, the levers P, the studs *l l′* on the lower front ends of the levers P, and the springs Q, substantially as herein shown and described, and for the purpose set forth.

17. In a machine for clipping and unhairing fur, the combination, with the plate E, over

the edge of which a skin can be passed, of an air-forcing apparatus, knives for clipping the bristles off the fur, the combs N and O, attached to the upper ends of bars adapted to swing toward and from the plate E in the vertical plane, the hook-plates N^2 O^2, attached to the lower ends of the bars N′ O′, the levers P, the studs *l l′* on the lower front ends of the said levers P, the springs Q, and the springs *n* and *o*, substantially as herein shown and described, and for the purpose set forth.

18. In a machine for clipping and unhairing fur, the combination, with the plate E, over the edge of which a skin can be passed, of an air-forcing apparatus, of knives for clipping the bristles off the fur, of the combs N and O, attached to the upper ends of bars N′ O′, adapted to swing toward and from the plate E in the vertical plane, which bars N′ O′ are provided with longitudinal slots *f* and *f′*, through which screws or pins *d d′* pass, the hook-plates N^2 O^2, provided with slots *g g′*, through which screws *e* pass, the levers P, and the studs *l l′*, projecting from the lower end of the same, substantially as herein shown and described, and for the purpose set forth.

19. In a machine for clipping and unhairing fur, the combination, with the plate E, over the edge of which a skin can be passed, of an air-forcing apparatus, of knives for clipping the bristles off the fur, of combs adapted to swing against the fur, and the rollers F and G, the latter provided with a bow-frame, F^2, substantially as herein shown and described, and for the purpose set forth.

20. In a machine for clipping and unhairing fur, the combination, with the plate E, over the edge of which a skin can be passed, of an air-forcing apparatus, of knives for clipping the bristles off the fur, of combs adapted to swing against the fur, the racks E′, to which the plate E is attached, the pinions E^2, for adjusting the racks E′, and devices for locking the racks E′ in position, substantially as herein shown and described, and for the purpose set forth.

21. In a machine for clipping and unhairing fur, the combination, with the plate E, over the edge of which a skin can be passed, of an air-forcing apparatus, of knives for clipping the bristles off the fur, of combs adapted to swing against the fur, of the feed-rollers I and J, the ratchet-wheel J′, the pawl K, the rod K′, the spring K^2, and the cam L, substantially as herein shown and described, and for the purpose set forth.

22. In a machine for clipping and unhairing fur, the combination, with the plate E, over the edge of which a skin can be passed, of an air-forcing apparatus, of knives for clipping the bristles off the fur, combs adapted to swing against the fur, the feed-rollers I and J, the ratchet-wheel J′, the pawl K, the rod K′, the spring K^2, the cam L, the adjustable sleeve M′, and the adjustable buffer K^3, substantially as herein shown and described, and for the purpose set forth.

23. In a machine for clipping and unhairing fur, the combination, with the plate over the edge of which a skin can be passed, of an air-forcing apparatus, devices for clipping the hairs, a gate in the air-forcing apparatus, and devices for operating the said gate from the main driving-shaft, substantially as herein shown and described, and for the purpose set forth.

24. In a machine for clipping and unhairing fur, the combination, with the plate over the edge of which a skin can be passed, of an air-forcing apparatus, devices for clipping the hairs, a movable nozzle-plate, a gate in the air-forcing apparatus, and devices for operating the said gate and moving the nozzle-plate forward and backward, substantially as herein shown and described, and for the purpose set forth.

25. In a machine for clipping and unhairing fur, the combination, with the plate over the edge of which a skin can be passed, of an air-forcing apparatus, devices for clipping the hairs, the gate U, the arm *w′*, and the rods *v′ t′*, connected with devices operated by the main driving-shaft, substantially as herein shown and described, and for the purpose set forth.

26. In a machine for clipping and unhairing fur, the combination, with the plate over the edge of which a skin can be passed, of an air-forcing apparatus, devices for clipping the hairs, the gate U, the arm *w′*, the rod *v′*, with a bend, *u′*, the nuts w^2 on the threaded end of the rod *v′*, and of devices connected with the rod *t′* and operated by the same driving-shaft, substantially as herein shown and described, and for the purpose set forth.

27. In a machine for clipping and unhairing fur, the plate E, provided on its upper edge with a longitudinal groove, *a*, substantially as herein shown and described, and for the purpose set forth.

28. In a machine for clipping and unhairing fur, the plate E, provided in its upper edge with a groove, *a*, combined with the wire *b*, placed within the said groove, substantially as herein shown and described, and for the purpose set forth.

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Witnesses:
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