

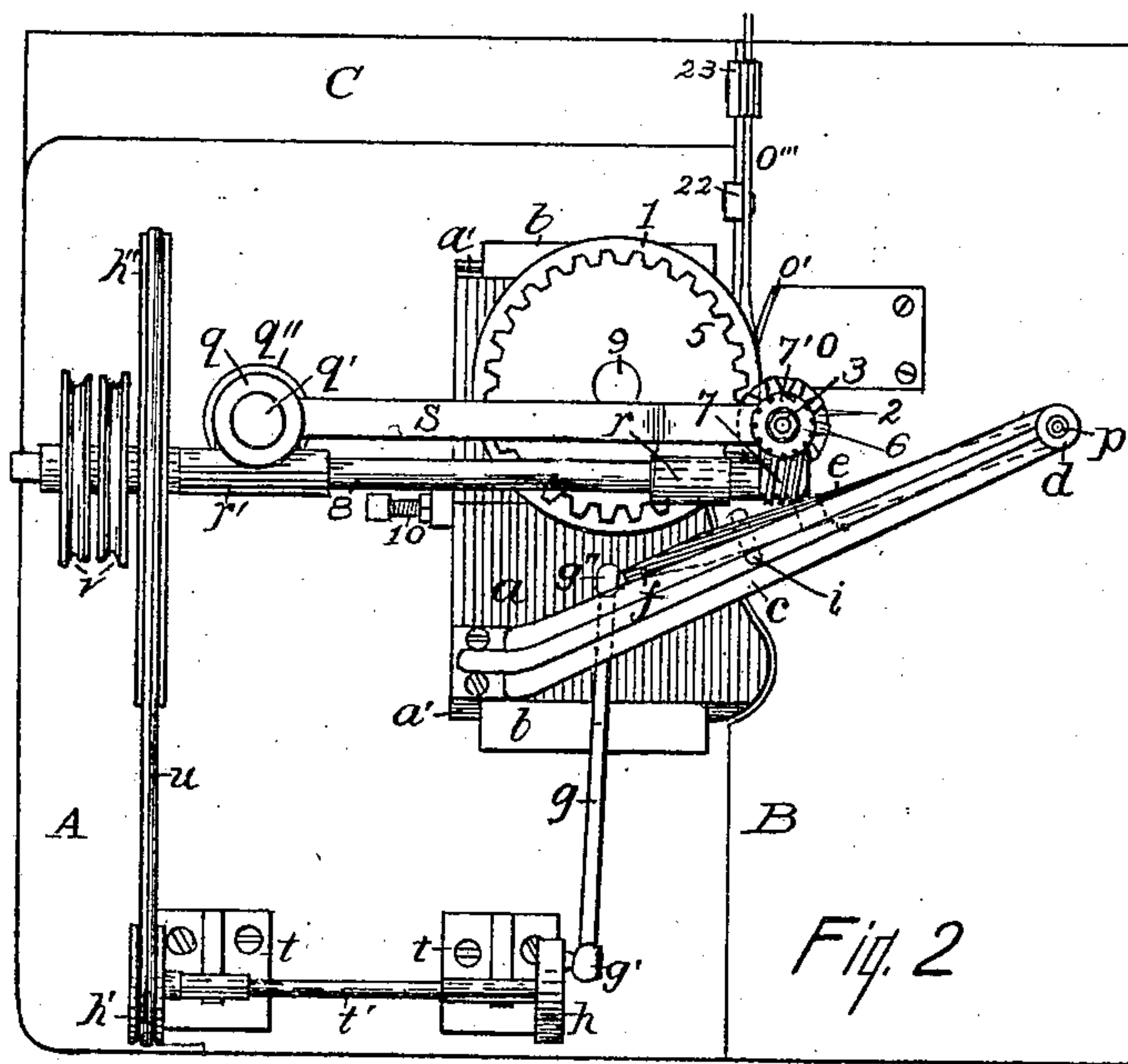
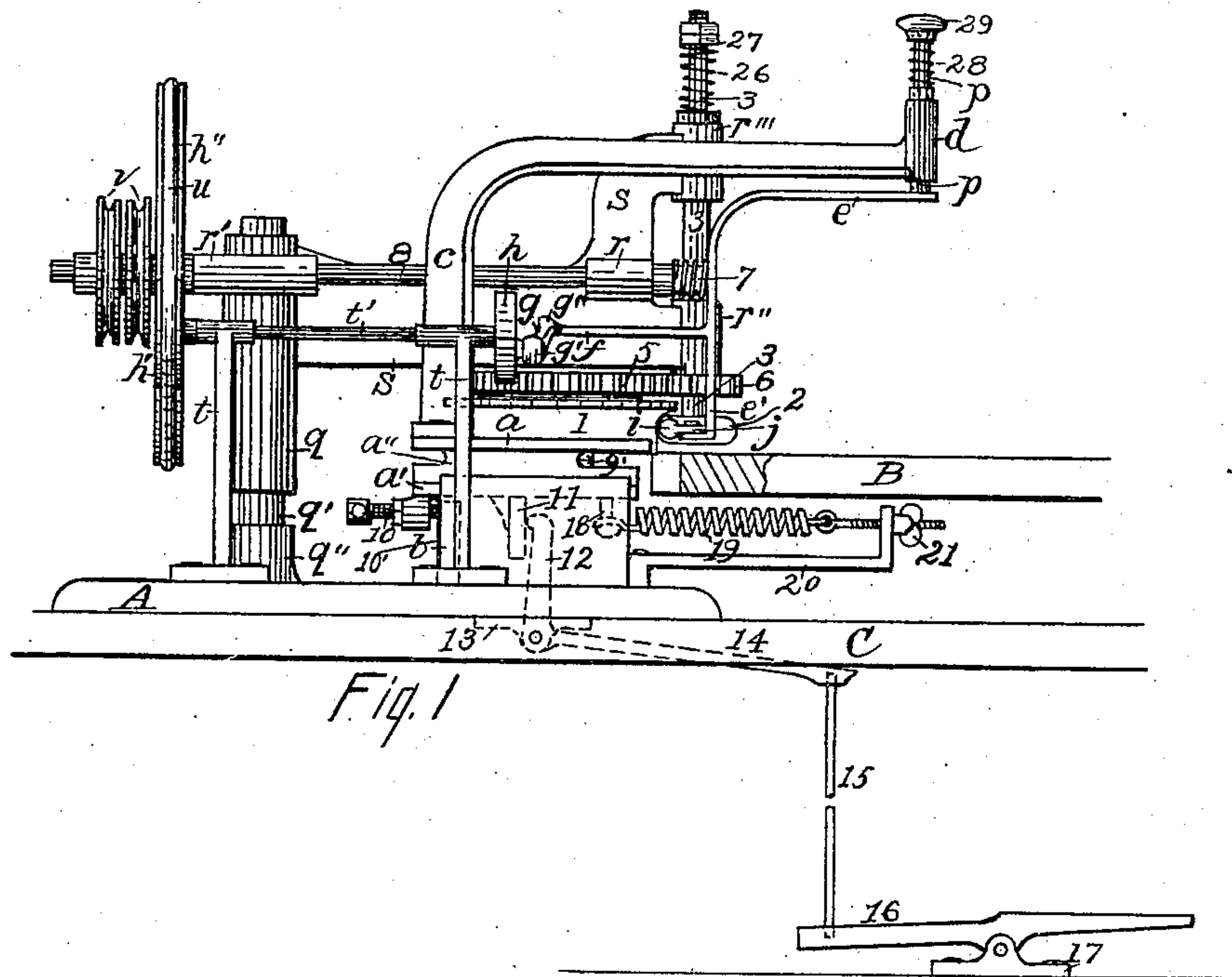
No. 886,142.

PATENTED APR. 28, 1908.

E. M. LYMAN & J. IVES.
HAT CURLING MACHINE.

APPLICATION FILED JAN. 30, 1907.

3 SHEETS—SHEET 1.



WITNESSES:

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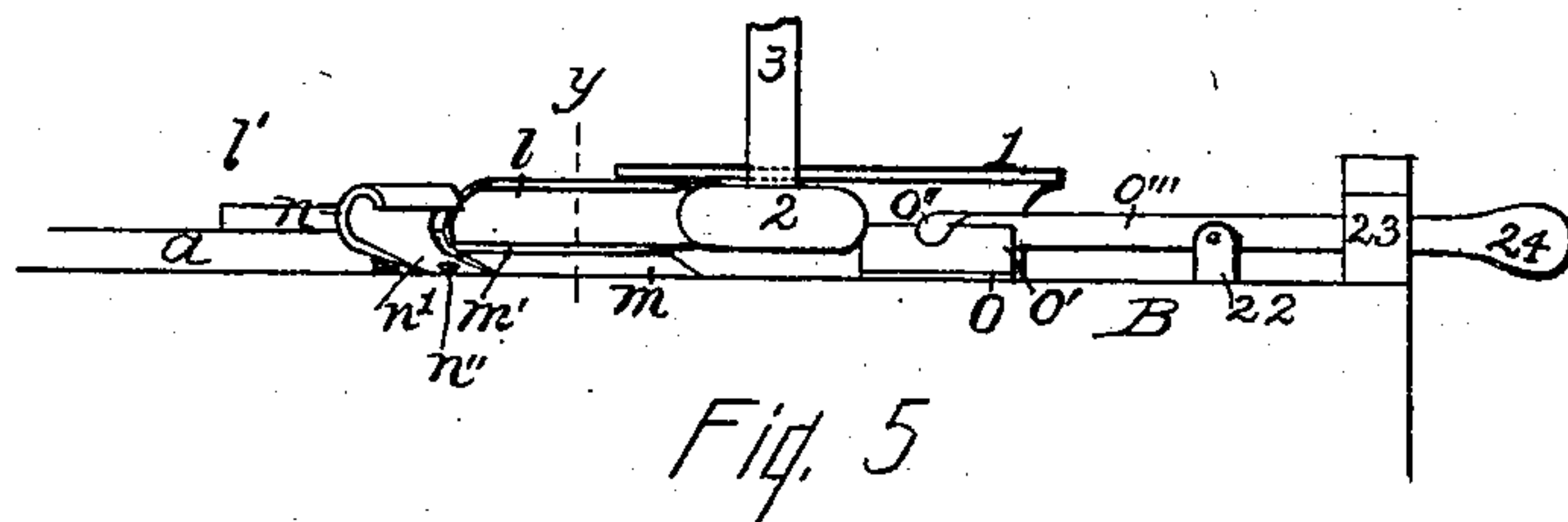
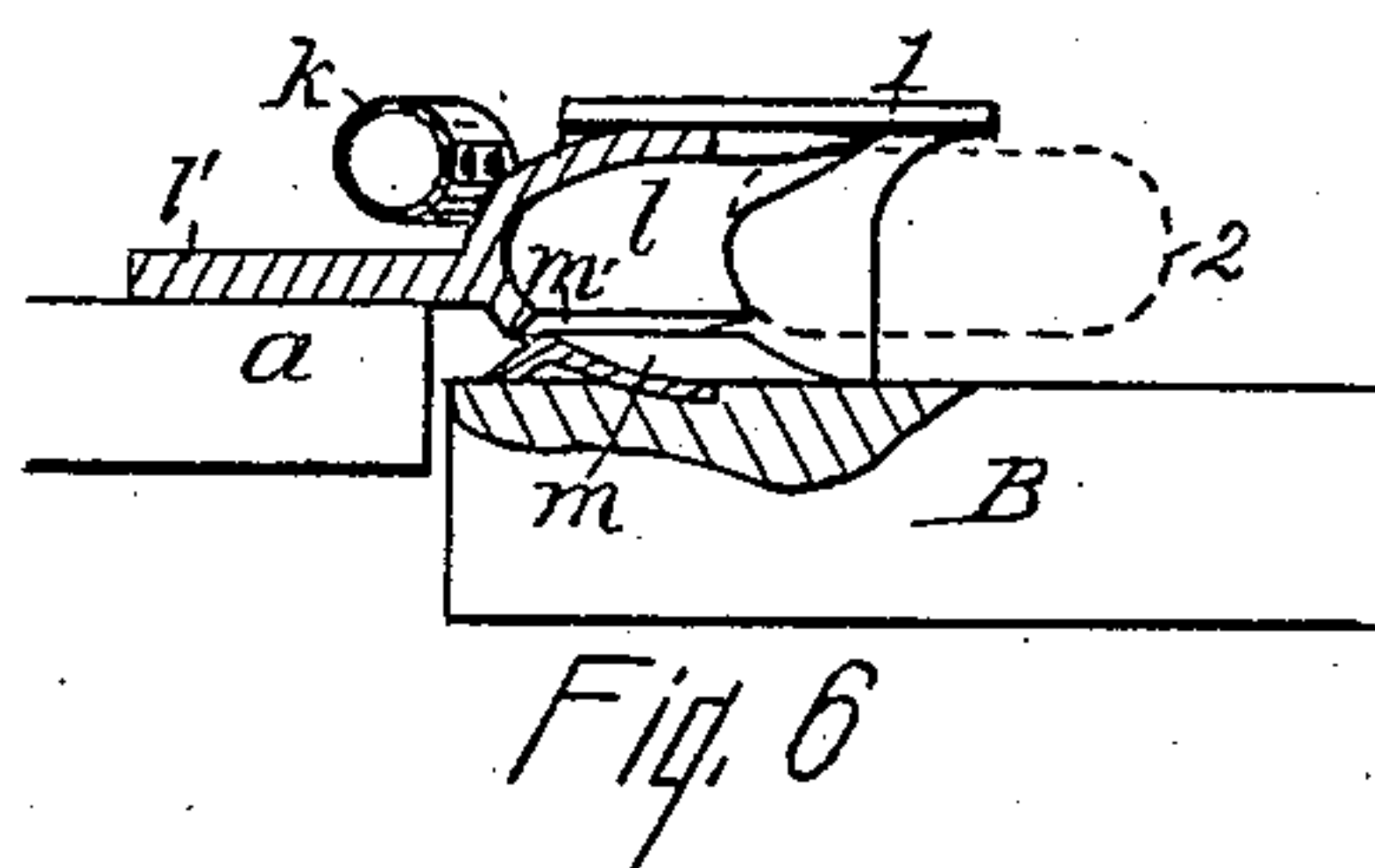
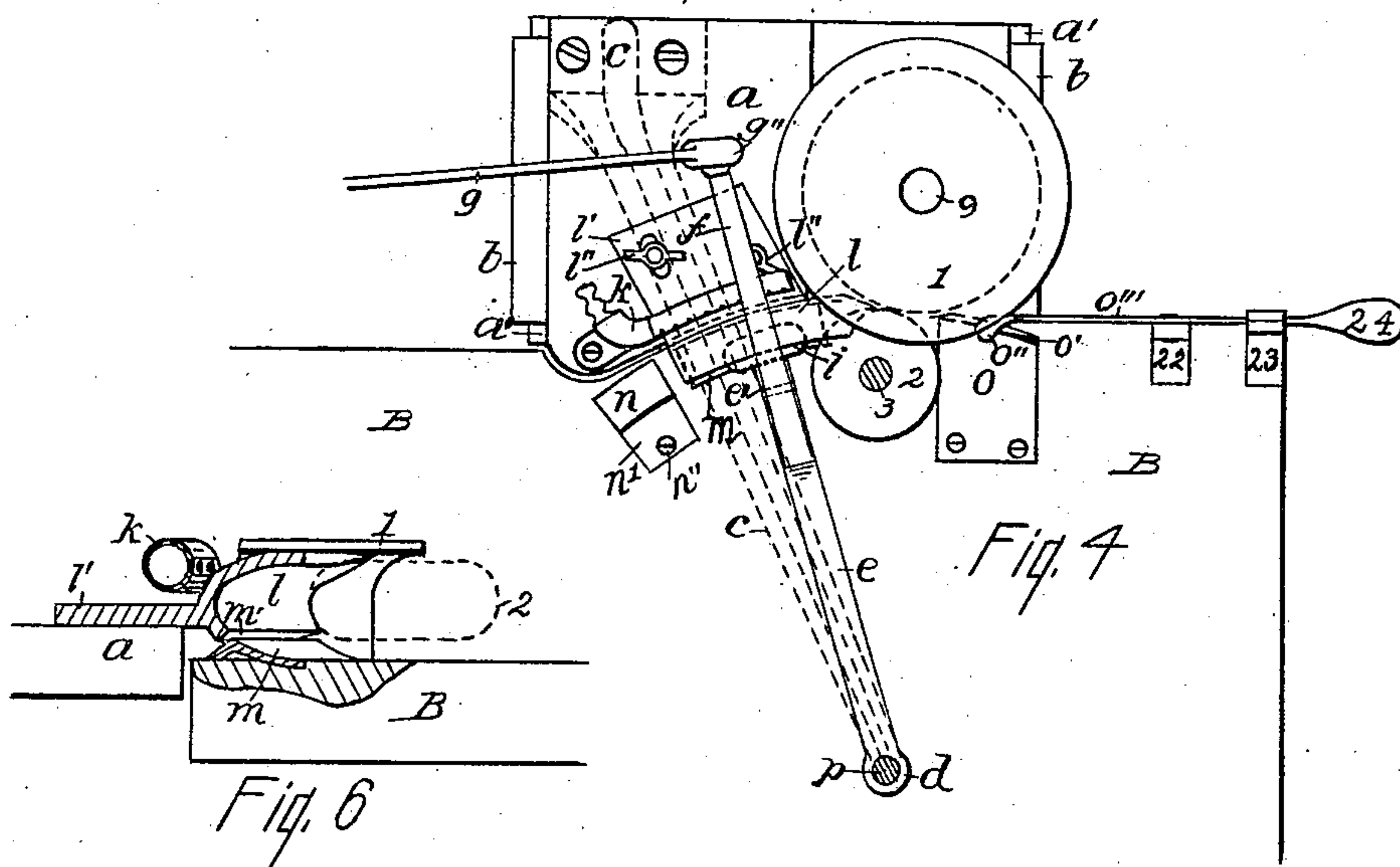
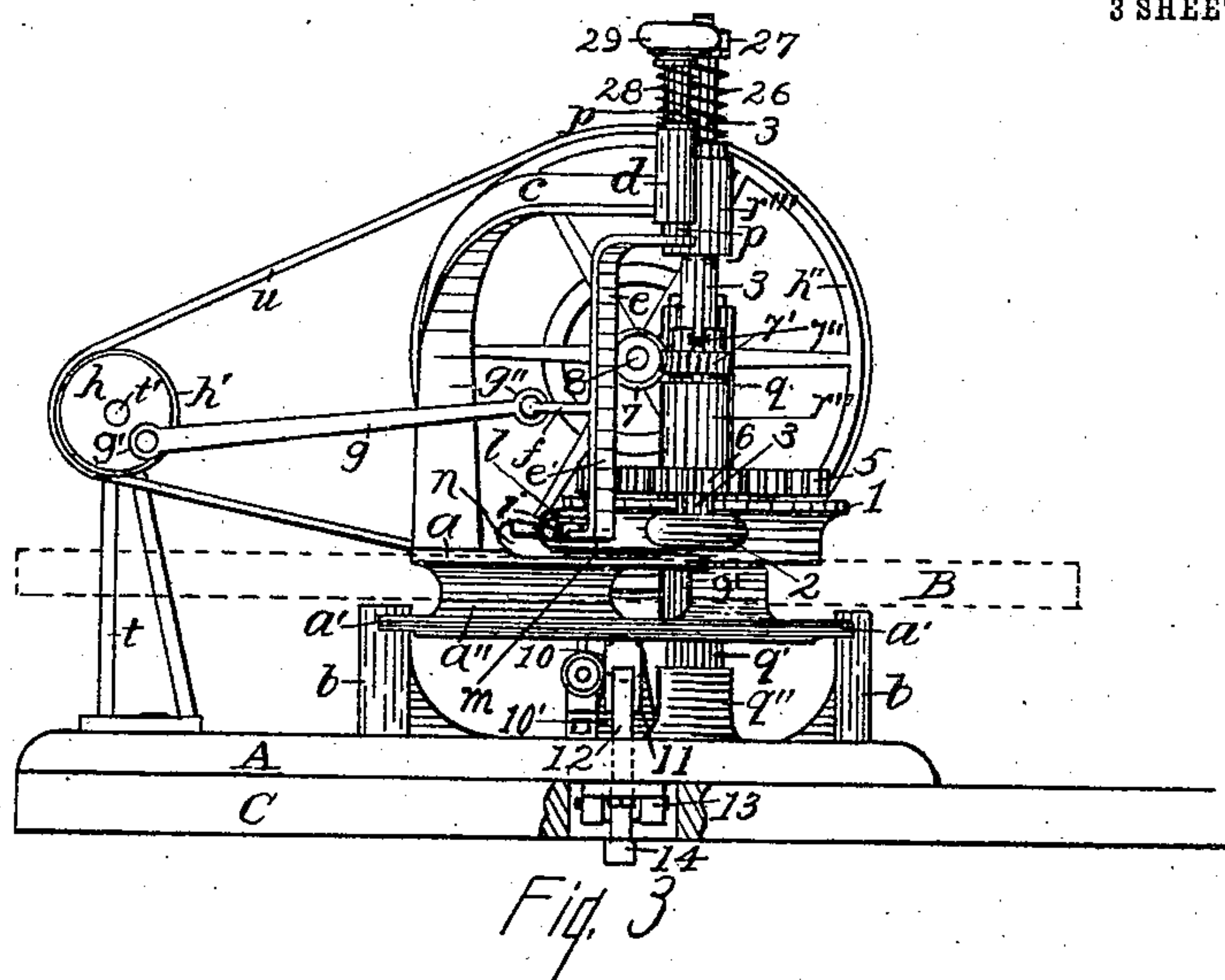
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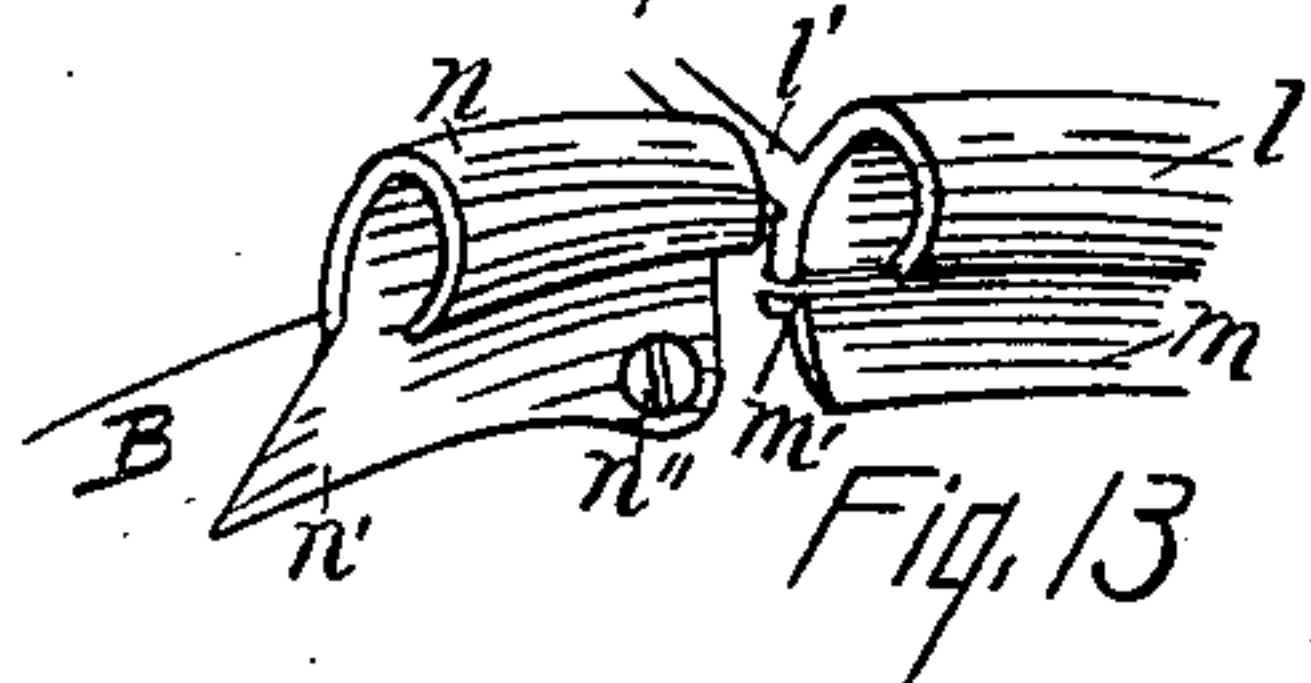
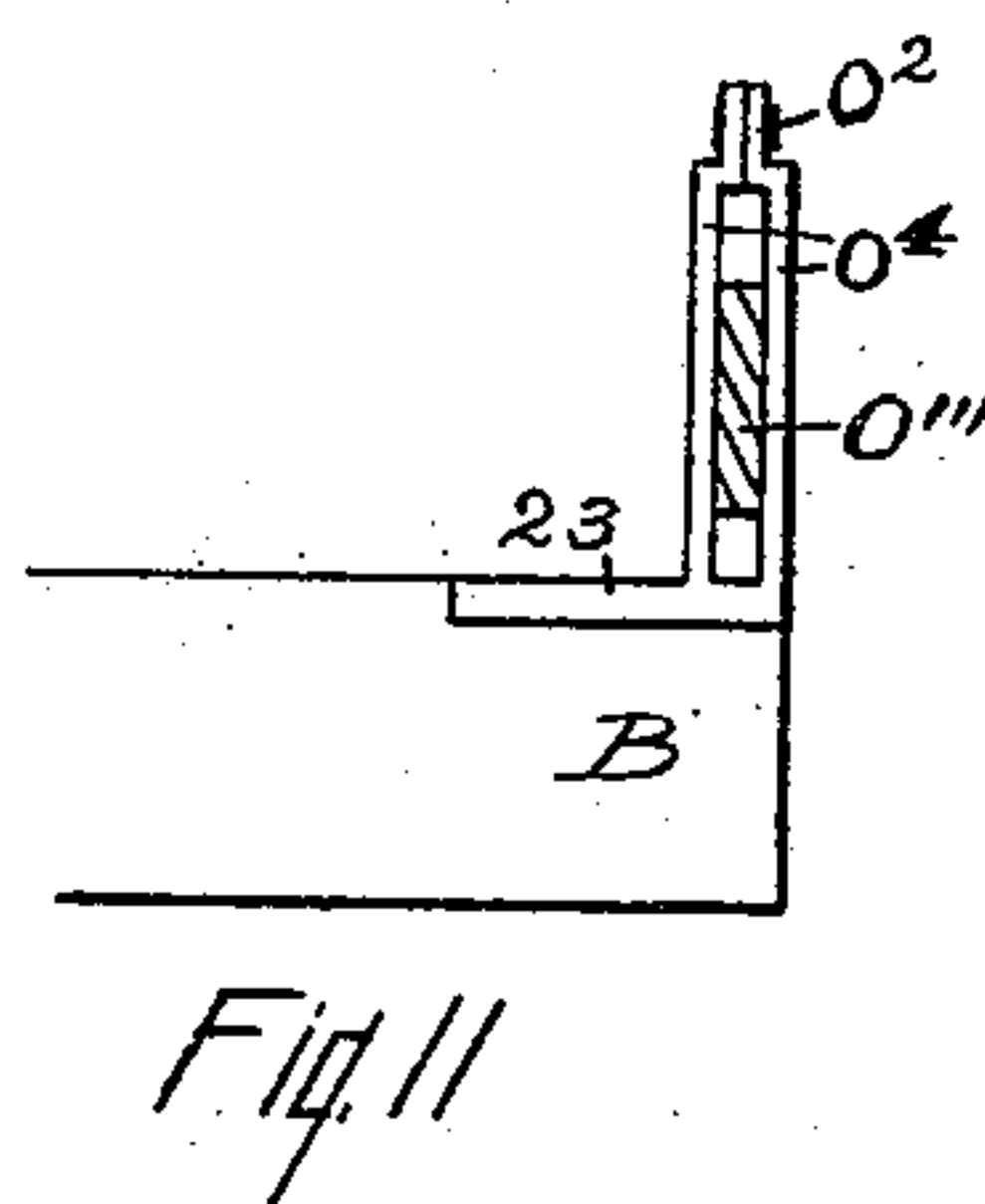
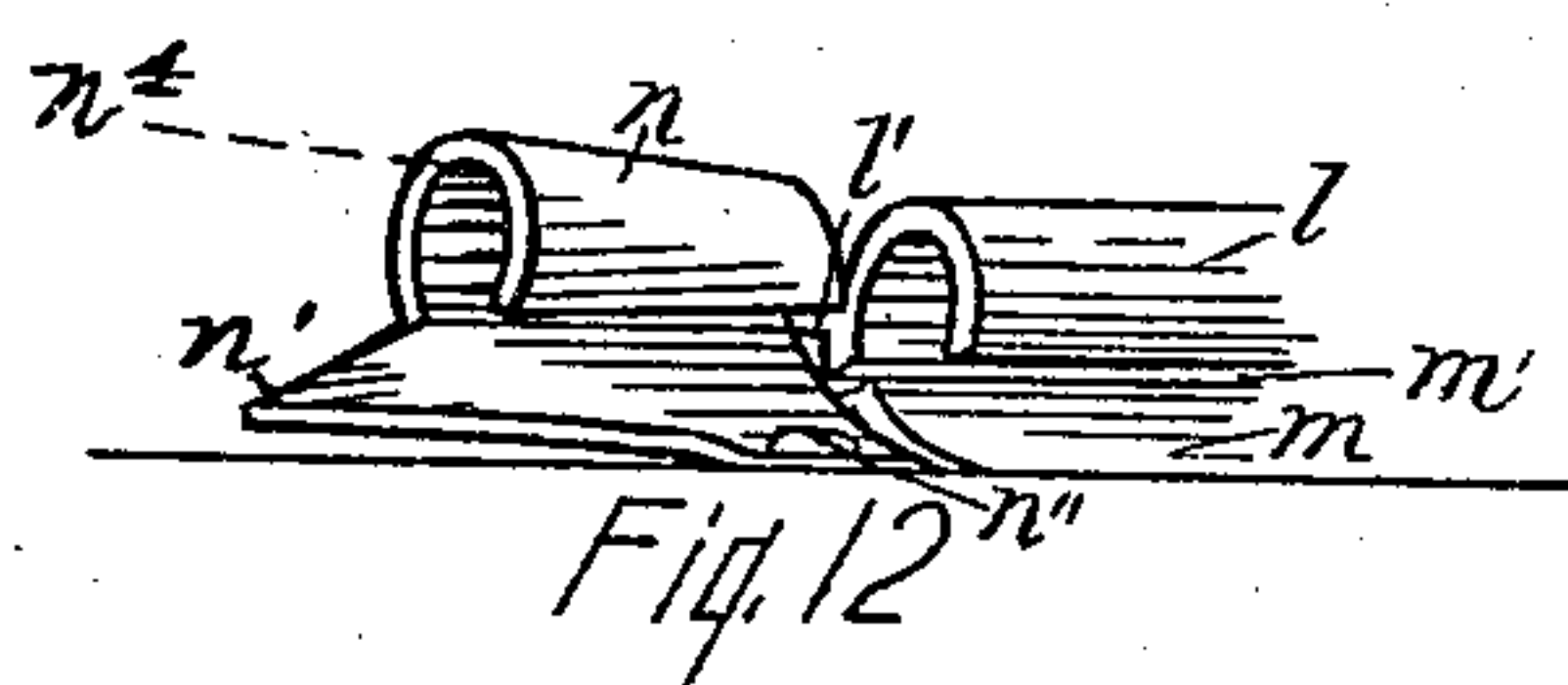
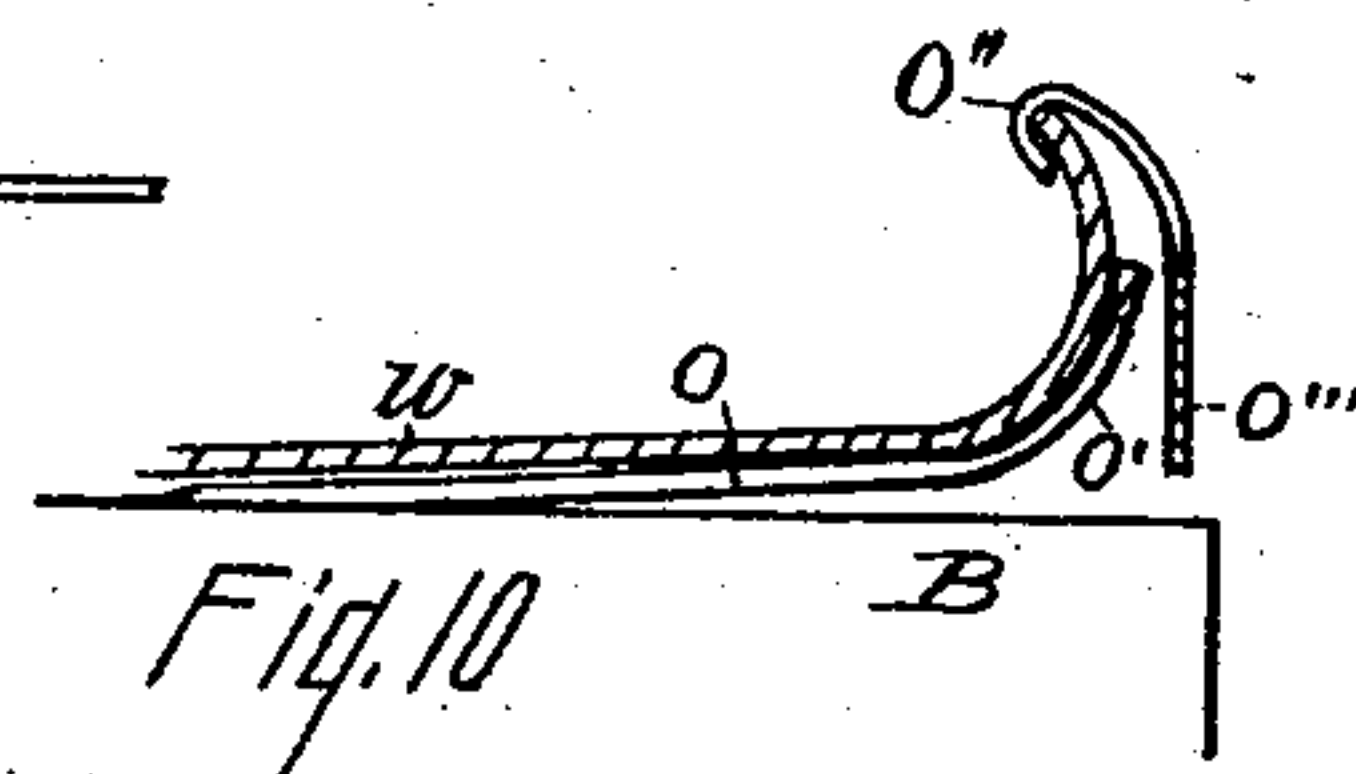
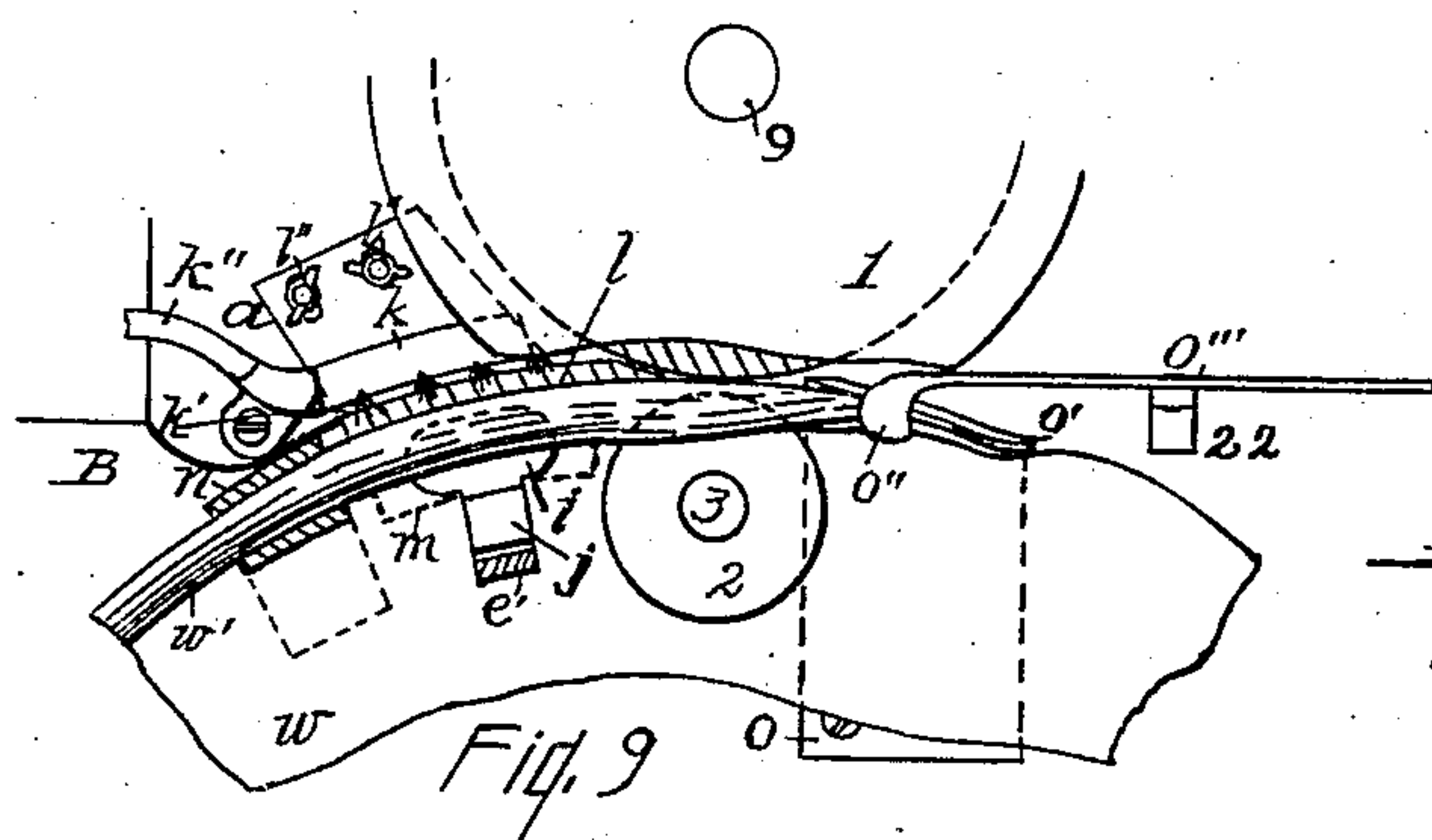
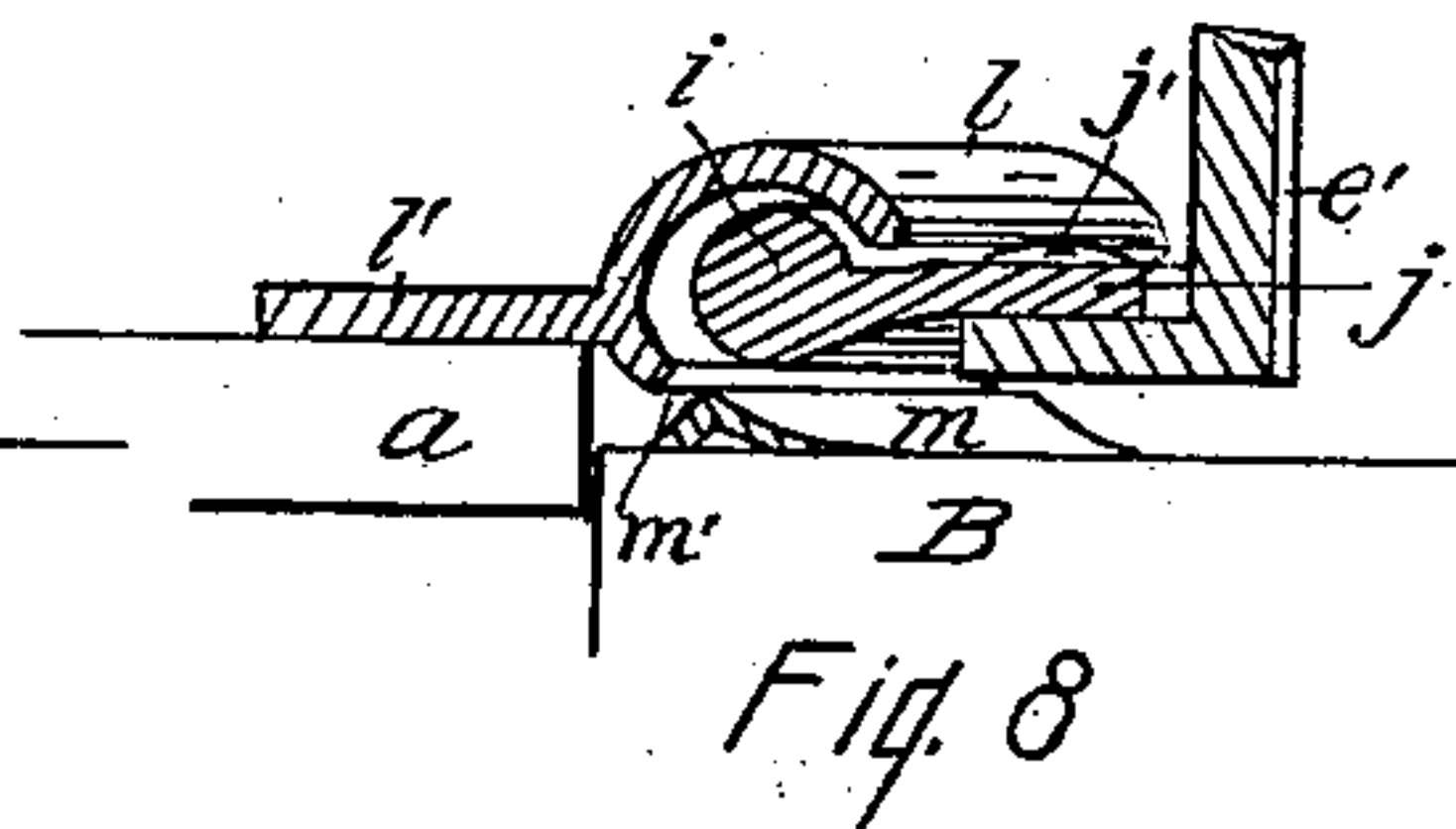
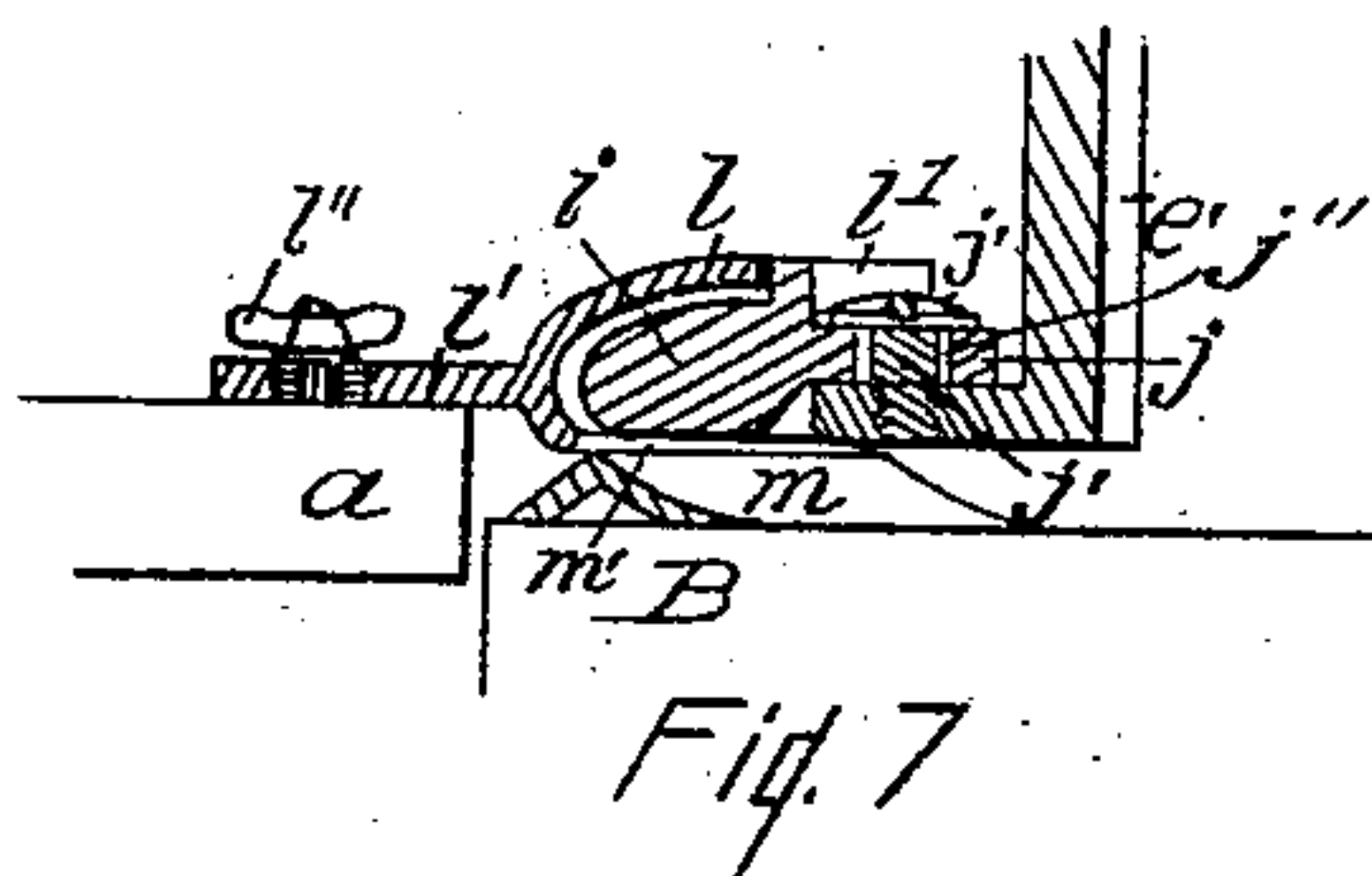
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HAT CURLING MACHINE.

APPLICATION FILED JAN. 30, 1907.

3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

EDUARD M. LYMAN AND JOSEPH IVES, OF PEEKSKILL, NEW YORK.

HAT-CURLING MACHINE.

No. 886,142.

Specification of Letters Patent.

Patented April 28, 1908.

Application filed January 30, 1907. Serial No. 354,788.

To all whom it may concern:

Be it known that we, EDUARD M. LYMAN and JOSEPH IVES, citizens of the United States, and residents of Peekskill, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Hat-Curling Machines, of which the following is a specification.

This invention relates to the curling of hat brims, and its object is to accomplish the curling more effectively than has heretofore been done, to avoid glazing of the curled part, and to automatically pass the hat through the operation. These objects are attained by the means set forth in these specifications and the accompanying drawings, in which like letters refer to similar parts throughout the several views.

Figure 1, Sheet 1, is a side elevation of the machine. Fig. 2 is a plan of the machine. Fig. 3, Sheet 2, is a front elevation of the machine. Some of the curling devices are omitted from Figs. 1, 2, 3, for the purpose of showing the method of operating the ironer. Fig. 4 is a plan showing the arrangement of the curling devices. Fig. 5 is a front elevation of the curling devices on an enlarged scale. Fig. 6 is an enlarged convex-sectional view of the ironing plate. Fig. 7, Sheet 3, is a cross-sectional view of the curler, and Fig. 8 is a cross-sectional view of the bead shaped curler. Fig. 9 illustrates the passage of the hat rim through the machine. Fig. 10 is a cross-sectional view of automatically adjustable guides. Fig. 11 is an elevation partly in cross-section of the guiding lever and its clamp. Figs. 12 and 13 are views of the former in conjunction with the ironing plate.

To indicate the operation of the machine attention will first be directed to Fig. 9, Sheet 3, which shows the arrangement and operation of the curling devices.

w represents the hat brim *o o'* an adjustable guide for the brim to the rollers 1, 2.

l, is an ironing plate shown with its top removed.

i is an ironer working within the ironing plate and against the outer edge of the hat brim, and *n* is a former, with top removed, that completes the formation of the brim-curl *w'*.

The object in hat curling machines is to produce the curl by shrinking the outer edge of the hat-brim, so that as it is curled in-

wardly towards the crown of the hat the curl will remain set. But in reality, most of the contraction of the edge of the brim is produced by a more or less minute crimping of the edge, so that when a curl is unrolled it will remain unrolled. In this machine the contraction of the edge of the brim is accomplished wholly by the contraction or shrinking of the felt, produced by ironing it while moist, and within the plate where the curl is formed. In this machine a curl is produced that will resume its curl when unrolled, and that is free from glaze.

Referring to Figs. 1, 2, 3 a bed-plate A contains all the moving parts of the machine. A standard *q'* secured in a hub *q''* supports a vertically adjustable frame *q s s*. A vertical shaft 3 in this frame having bearings in the hubs *r'' r'''* carries the rim-feeding wheel 2 on its lower end. This shaft is driven by the horizontal shaft 8 that has bearings in the hubs *r' r* that are a part of the frame *q s s*, a worm wheel 7 on the horizontal shaft engaging with a pinion 7', on the vertical shaft. The shaft 8 is the main shaft in the machine and is provided with tight and loose driving pulleys 2.

The wheel 1 is supported on a stud 9, Fig. 2, that is secured in a hub 9', Figs. 1 and 3, on a sliding base *a*. The base *a* has bearings *a' a'* in guides *b b* that are integral with the bed-plate A. A spur wheel 5 is secured to this wheel that engages with a pinion 6 on the vertical shaft 3. That is to say, it is adapted to engage with the pinion, but is also adapted to be disengaged from it by a movement backwards of the base *a*. This movement backwards is accomplished through a treadle 16. A lug 11, shown in Fig. 1, projects from the under side of the base *a*. A bell-crank lever 12 14, pivoted on the under side of the bed plate A at 13, is made operative by the treadle through the connecting rod 15. The treadle is fulcrumed to the floor as at 17. Depressing the treadle forces the lever arm 12 against the lug 11, causing the base *a* to move towards the post *q'*. A set-screw 10 in a lug from the base, Figs. 1, 2, and a lug 10' projecting upwardly from the bed-plate, Figs. 1 and 3, affords an adjustable stop for the forward movement of the base. A spring 19 attached to the under side of the base, at 18, keeps the base in its normal front position as in Fig. 1. The outer end of the spring 14 is supported by a bracket 20

attached to the bed plate A. A screw 21 makes an adjustment for the tension of the spring.

The vertical shaft 3 is slightly adjustable vertically, having a pin 7'', Fig. 3, through it that lies in a slot in the hub of the pinion 7'. On the upper end of the shaft is a spring 26, Figs. 1 and 3, retained in place and having an adjustable tension by means of check-nuts 27, by means of which the wheel 2 on the lower end of the shaft may adapt its position to the thickness of a hat-brim passing between it and the wheel 1. The pinion 7' is not affected by the slight vertical movement of the shaft, as the worm wheel travels to the right and tends to keep the pinion down against the bearing below it.

The wheel 1 has a shape corresponding to the half of a grooved wheel as shown. This wheel, in conjunction with the wheel 2, which has a convex face corresponding in curve with the concave curve in the wheel 1, starts the curl in the hat-brim, and propels the brim through the curling plates; but in this machine is not relied upon to fix the curl, as it is in some other machines. So far as described, except as to the sliding base *a*, we do not claim the machine as new, the wheels 1 and 2 having been used for a hat curler years ago, as were also means for separating the two wheels for the insertion and removal of the hat-brim between them, which is one of the purposes of the sliding backwards of the base *a*.

To the left of and adjacent to the wheels 1 and 2 is an ironing plate *l*, as, for the present purposes, shown in Figs. 4, 5, 9. An ironer *i* is suspended within this plate and is caused to vibrate back and forth therein by means as follows: Upon the sliding base *a* is an arched arm or bracket *c*, Figs. 1, 2, 3, 4, extending forward of the machine and over the table B. It is provided at its forward end with a hub-bearing *d*, which is substantially in line with the axes of the shaft 3 and post *q'*, as in Fig. 2, and vertically central with a hat in position for curling on the table B. In the hub *d* is a spindle *p* that supports a vibrating arm *e e' f*. The spindle is provided with a spring 28, above the hub *d*, and for convenience of handling a knob 29. The lower end *e'* of the arm carries the ironer *i*, as in Figs. 1, 2, 3, 4 and 9.

On the bed plate A at the left of the machine two standards *t t* support a shaft *t'* that is driven from a pulley *h''* on the shaft 8, by means of the belt *u* and the pulley *n'* on the shaft *t'*. On the forward end of this shaft is a face or crank-plate *n*. A ball and socket bearing *g'* on the plate, and a similar bearing *g''* on the end of the arm *f* are connected by a rod *g*. Revolving the shaft *t* imparts a reciprocating motion to the arm *f*.

Figs. 4, 5 and 9 show the forms and positions of the curling plates in their relation to

the ironer *i* and the wheels 1, 2. A table B is fixed in front of the machine just below the level of the sliding base *a*, as, especially, in Figs. 1, 2, 3, 4. The machine and table B are both secured on a supporting table C, partly shown in nearly all the figures.

At the right of the wheels 1, 2, Fig. 4, is a guide *o o'' o'''*. To the left of the wheels is an ironing plate curved lengthwise to adapt it to either the average or to a special hat brim radius. This plate is shown in Fig. 9 with the top cut away, and the figure also shows that the plate begins at the end next the wheel 1 tangentially to the periphery of said wheel, so that the hat-brim will pass smoothly from the one to the other. This plate is shown on an enlarged scale in Fig. 6 in cross-section, and it will be observed that it is secured to the base *a*, by means of a flange *l'* and the screws *l''*, and that the curved portion has no contact with the table B. On the table B is another curved plate *m* secured to the table, and except for a space *m'* between the two plates, forms a continuous curve with that of the plate *l* to the table. The plate *l* is heated by means of a gas-burner *k*, Figs. 4, 6, 9. In the latter figure the burner is shown to be attached to the base *a* by means of a flange and screw *k'*. *k''* represents a gas tube attached to the burner. It is desirable that the under plate *m* should be kept measurably cool is the reason for preserving the space *m'* between the two plates.

As shown in Fig. 6 the ironing plate is the form used when the curl on the hat brim is to be a U shaped curl. When the curl is to be "bead" shaped the plate describes more of a circle in its cross-section, as shown in Fig. 8.

Figs. 7 and 8 show the positions occupied within the ironing plates by the ironer *i*. The ironers are removable from the lever *e'*, and are secured in place by means of a screw *j*. They are also adjustable on the lever, the hole for the screw *j* being slotted as at *j''*, Fig. 7. The U shaped curling ironer is shown in Fig. 7 as provided with a flange *l'* which will engage with the edge of the ironing plate and prevent too close contact of the ironer with the back surface of the plate.

Referring again to Fig. 9, *n* represents a former, which is curved lengthwise to correspond with the curve of the ironing plate. It is secured to the table B. In Fig. 5 it is shown as lying in the same horizontal plane as the ironing plate, but in Figs. 12 and 13 it is represented as standing at somewhat of an angle with said plate. The former is slightly tapering lengthwise, having the smaller diameter at the end away from the ironing plate. It serves three purposes: First, as its temperature is considerably less than that of the ironing plate it cools the felt of the curl as it leaves the ironer, hastening the shrinking of

the felt. Second, it turns the curl somewhat closer than the ironing plate, and as the closer curling and the cooling occur simultaneously the curl given to the felt is maintained. Third, it assists greatly in the automatic passage of the hat-brim through the machine. As shown in Figs. 12, 13, it is supported on one corner by a pivot screw, tight enough to admit of being moved by the hand, but not movable by the passage of the hat. It is also shown as having the outer end of its flange extended as at n' . This is to afford support to the hat-brim in its movement away from the former. The tilting of the former from a horizontal as indicated in Fig. 12 and by the broken line n^4 in conjunction with the extended length through which the hat-brim is held in bounds, constituted by the guide o , wheels 1, 2, ironing plate and former, make the machine automatic in its handling of the hat. This result is only partially obtained in other machines, the best of them requiring some hand manipulation until the completion of the curling. With this machine, when the hat is started through the curling operation, the attendant is free to wet the brim of another hat, one attendant operating two machines.

The guide o o' is a plate of spring metal, the flange o' having a curve upward and lengthwise. As shown in Fig. 10 it is secured to the table B, and its flanged end rises slightly from the table, and as the plate is thin the free end is flexible. A lever o'' , Figs. 4, 5, 9, is pivoted to the table B as at 22, and its outer end is held within a clamp 23, and it terminates in a handle 24. The inner end of the lever terminates in a hook o'' bent forward above the flange o' . This is more clearly shown in Fig. 10, and the combined action of the hook and guides o o' upon the hat brim w is shown in the same figure. The height to which the hat-brim can be turned is controlled by the hook o'' . The stem of the hook is flexible sidewise. There is a difference in the stock composing hat-brims, even in lots supposed to be uniform. With some hats a perfect curl will be made in passing once through the machine, while others may require two or even three turns through. The flexibility of the plate o o' and the hook o'' allow them to adjust themselves to the curl when passing by them. But the hook o'' is rigid as to its adjustment vertically, but is controllable by the attendant. Fig. 11 illustrates the operation of the clamp 23. Its sides o' are made to spring together so as to bind upon the lever o'' with a spring pressure.

In operating the machine, the operator, with the aid of a sponge, wets the edge of the hat-brim, then by pressure of his foot on the treadle, Fig. 1, causes the wheel 1 to move back from the wheel 2, admitting of the insertion of the hat brim between the two

wheels. As soon as pressure is removed from the treadle the spring 19 restores the base a to its normal position, the wheels 1 2 seizing the hat between them, carrying it through the curling devices in the manner shown in Fig. 9. As the wet brim comes in contact with the heated ironing plate l it is rapidly rubbed by the ironer i' , which itself becomes heated through contact with the plate l and the steam and convection of heat through the felt. The former n next acts upon the curl in the manner heretofore described, and the result is a shrinking of the felt and the making of a better curl than has heretofore been produced. The movement backwards of the base a carries with it the ironing plate l and the bracket e with the ironer i , when the hat rim is easily removed from the machine.

What we claim and desire to secure by Letters Patent is—

1. In a hat curling machine, the combination with wheels for moving the hat brim, flexible guides on one side of said wheels for guiding the hat brim to the said wheels, on the other side of said wheels and adjacent thereto a curved ironing plate and means for heating said plate, an ironer for vibrating longitudinally in said ironing plate, means for suspending and operating said ironer, a plate beneath the ironing plate curved to conform to the curves of the ironing plate but separated therefrom by an air space, and a former adjacent to the ironing plate.

2. In a hat brim curling machine the combination with means for moving the hat brim, of flexible guides for guiding the hat brim to the moving means, a curved ironing plate adjacent to the moving means and means for heating said plate, an ironer operating longitudinally within the ironing plate, means for suspending and operating the ironer, a plate beneath the ironing plate curved to conform to the curves of the ironing plate but separated therefrom by an air space, and a former adjacent to the ironing plate.

3. In a hat brim curling machine a wheel having a fixed bearing and a movable wheel for carrying the hat brim adapted to engage and disengage one from the other, a sliding base supporting the movable wheel, a bracket on said sliding base supporting a spindle above and about centrally of a hat in position for curling on the fixed table, an arm from said spindle extending out and down to the ironing plate, an ironer on the end of said arm lying within the ironing plate, means for reciprocating said arm comprising an extension from said arm and a connecting rod uniting the arm with a revolving crank-disk, a curved ironing plate within which the ironer operates and means for heating said plate both secured to the

movable base, a stationary table in front of the movable base, a plate used in conjunction with the ironing plate fixed to the stationary table, and a former secured to the stationary table adjacent to the ironing plate.

4. In a hat brim curling machine the combination of a fixed and a movable means for moving the hat brim, the movable means being on a movable base, a bracket on the movable base supporting a spindle above and about centrally of a hat in position for curling on a fixed table, an arm from said spindle extending out and down to an ironing plate, an ironer on the end of said arm lying within the ironing plate, means for reciprocating said arm, a curved ironing plate adjacent to the moving elements within which the ironer oscillates, and means for heating the ironing plate both secured to the movable base, a fixed table in front of the movable base, a plate on the fixed table beneath the ironing plate, a former adjacent to the ironing plate, and adjustable guides to direct the hat brim to the hat moving means.

5. In a hat brim curling machine, the combination with a curved ironing plate, of an ironer operating inside of said ironing plate, and means for imparting a reciprocating motion to said ironer in the direction of the length of said plate and upon a curve whose axis corresponds with that of the ironing plate.

6. The combination in a machine for curling hat brims with hat moving means and a heated curved ironing plate with an ironer operating within the plate in the direction of the length of the ironing plate, of a plate beneath the ironing plate conforming to the curves of the ironing plate with an air space between the two plates.

7. The combination in a machine for curling hat brims with hat moving means and a heated ironing plate with an ironer operating therein in the direction of the length of the plate, and a curved plate beneath the ironing plate with an air space separating the two plates, of a former adjacent to the ironing plate rising from the table and having a pivotal adjustment.

8. In a machine for curling hat brims, the combination with hat moving means and a heated ironing plate and ironer adjacent thereto, a guide to the said moving means comprising a plate with a vertical curved flange having also a curve lengthwise, one end of the plate secured to the fixed table, the flanged end of the plate rising from the table, and a lever fulcrumed to the table, clamped at one end, and at its other end formed into a hook above the said flanged guide, the lever being rigid vertically and flexible laterally.

9. In a machine for curling hat brims, the

combination of a fixed bed plate, supporting means for driving a vertical shaft carrying a hat brim feeding wheel and a sliding base that carries a larger feeding wheel, a gear pinion on the vertical shaft to engage with a spur wheel on the said larger wheel, an adjustable spring for holding the movable base in a normal position and a treadle means for moving the base away from its normal position, an adjustable stop on the base, a fixed table in front of the moving table, adjustable guides on the fixed table for guiding the hat brim to the said feeding wheels, a curved ironer plate to receive the hat brim from the feeding wheels, a gas burner for heating the ironing plate, the ironing plate secured to the movable table, a plate on the fixed table under the ironing plate and conforming in curves therewith with an air space between said plates, a former pivoted on the fixed table adjacent to the ironing plate, a bracket spindle support on the sliding base supporting a vertical spindle above the fixed table and about centrally of a hat in position for curling on said table, an arm from the said spindle extending out and downwards to the ironing plate, an ironer within the ironing plate on the lower end of said arm, an extension from the said arm connected by a connecting rod with a revolving crank die, and a spring on the upper end of the spindle carrying the ironer arm.

10. In a hat brim curling machine having an ironer reciprocating within an ironing plate, a flange on the ironer to engage with the upper edge of the ironing plate.

11. In a hat brim curling machine in combination with hat moving means and iron curling devices embracing an ironing plate with an ironer to reciprocate therein, an arm extending above and over the table containing the curling devices supporting a spindle and connections with said ironer, and means for imparting a reciprocating motion to said ironer connections.

12. In a hat brim curling machine in combination with hat moving means and hat rim curling devices embracing an ironing plate with an ironer to reciprocate longitudinally therein, an arm extending above and over the table to which the curling devices are attached, the arm supporting a spindle and connections therewith with said ironer, and means for imparting a reciprocating motion to the said ironer and connections, and a spring on the upper end of said spindle.

Signed at Peekskill, in the county of Westchester and State of New York, this 18th day of January, A. D. 1907.

EDUARD M. LYMAN.
JOSEPH IVES.

Witnesses:

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