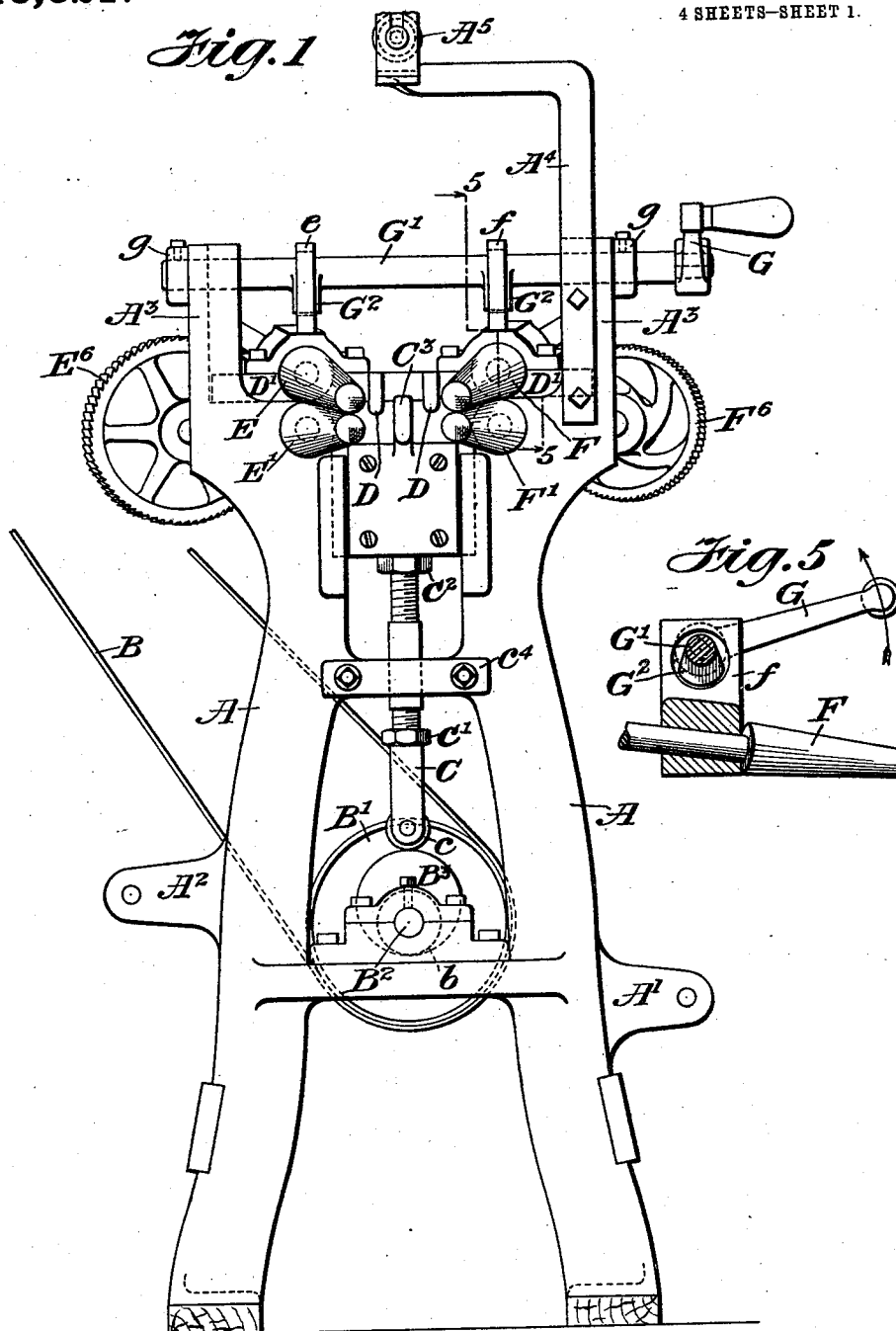


1,013,321.

4 SHEETS—SHEET 1.



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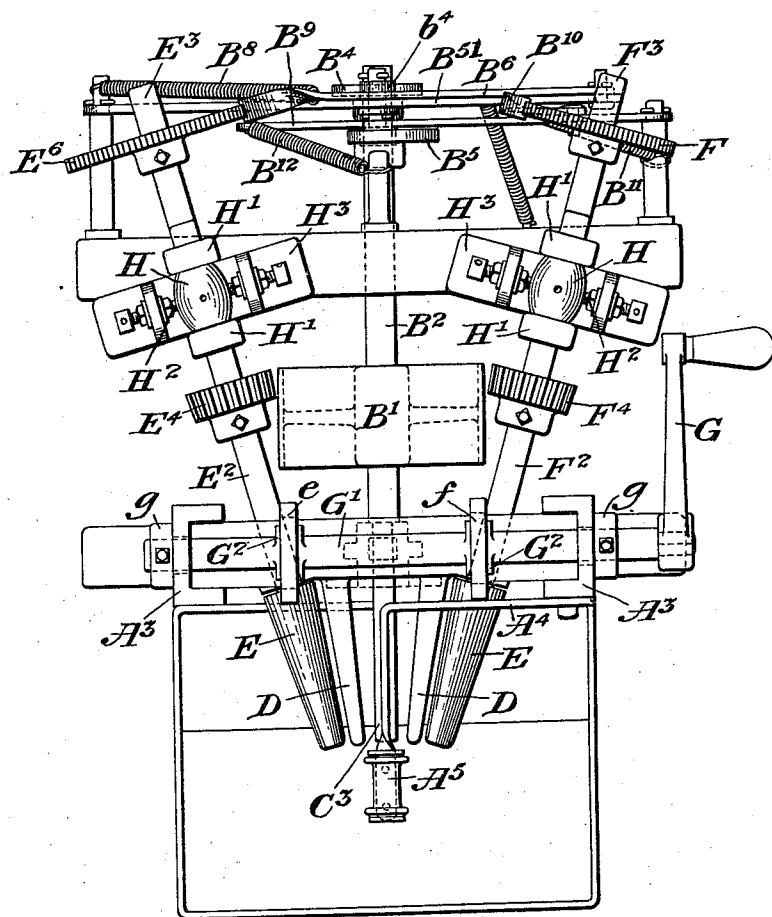
G. SCHOFIELD.
HAT BRIM STRETCHING MACHINE.
APPLICATION FILED JUNE 17, 1909.

1,013,321.

Patented Jan. 2, 1912.

4 SHEETS—SHEET 2.

Fig. 2



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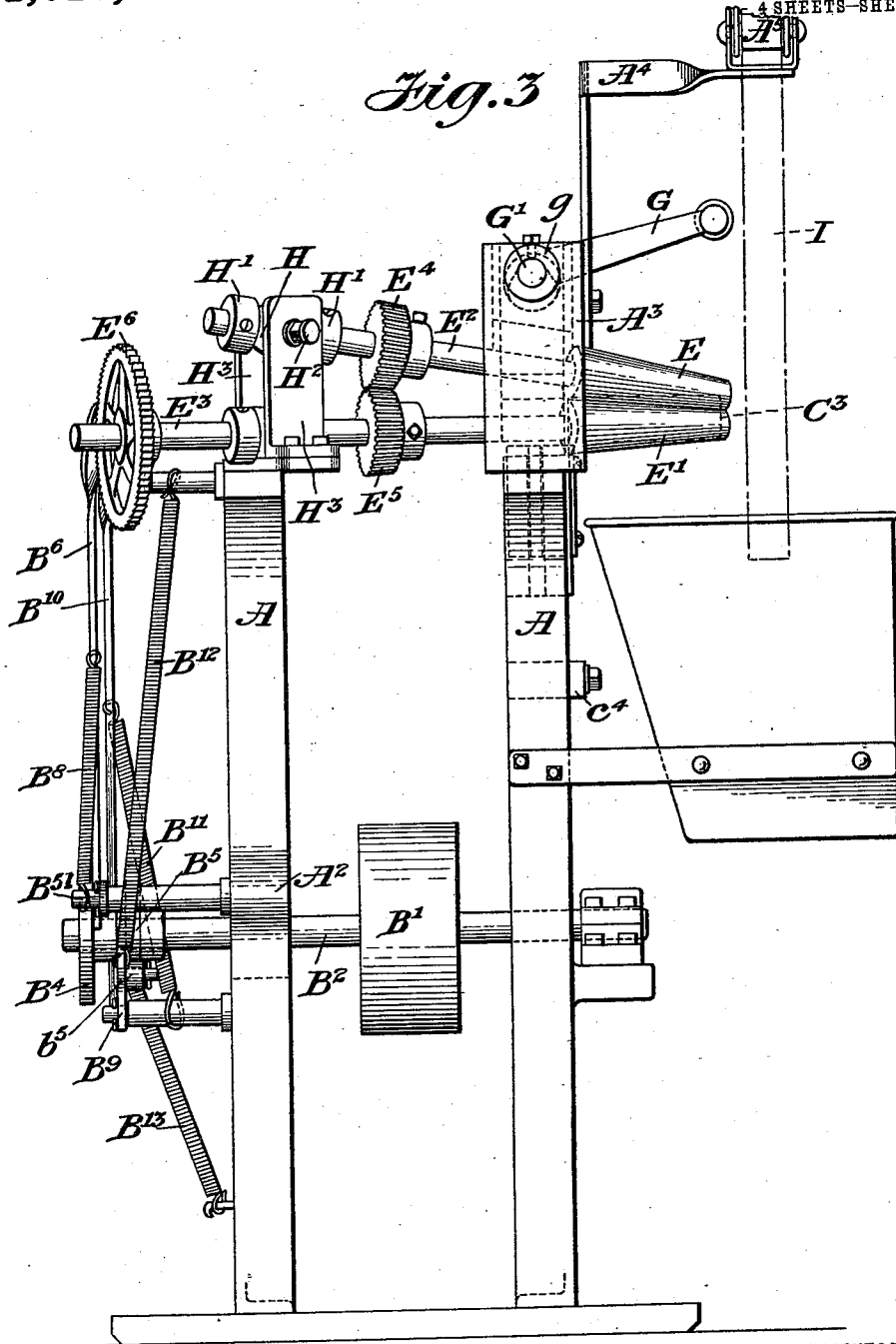
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4 SHEETS—SHEET 3.

Fig. 3



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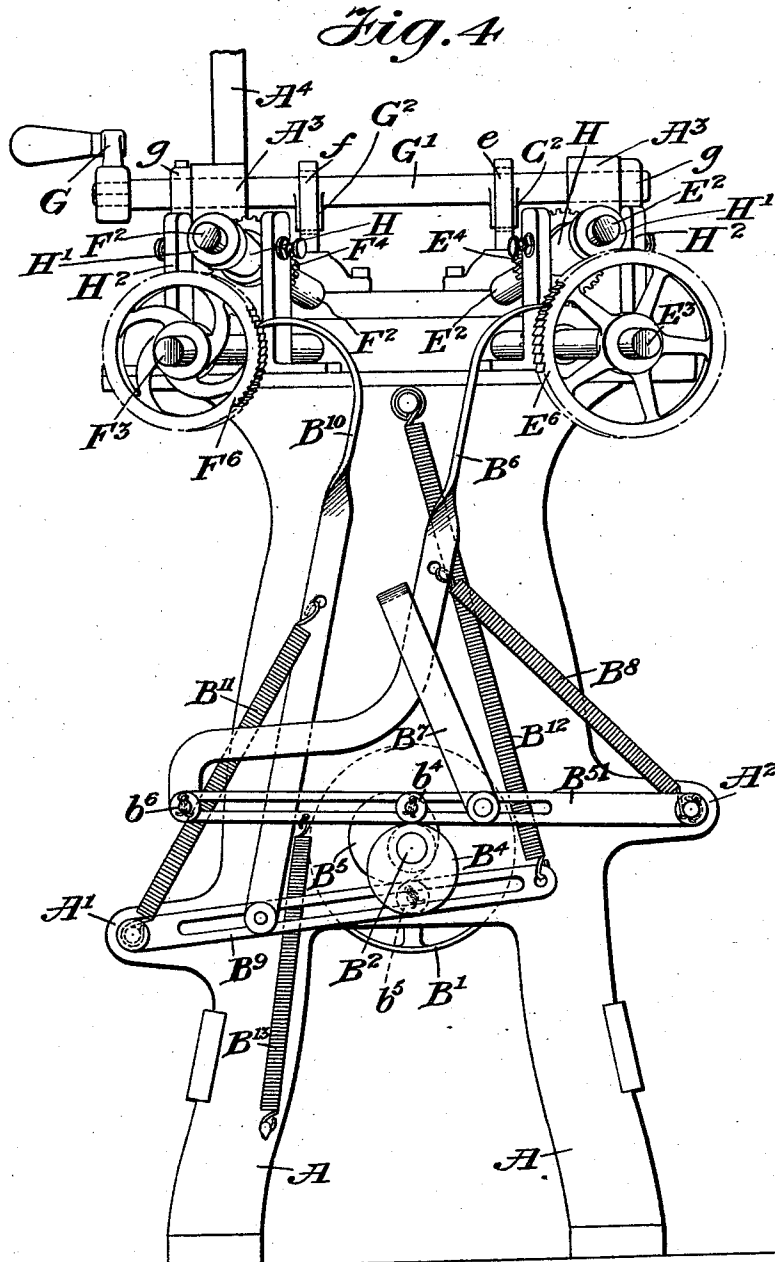
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

GEORGE SCHOFIELD, OF BROOKLYN, NEW YORK.

HAT-BRIM-STRETCHING MACHINE.

1,013,321.

Specification of Letters Patent.

Patented Jan. 2, 1912.

Application filed June 17, 1909. Serial No. 502,653.

To all whom it may concern:

Be it known that I, GEORGE SCHOFIELD, a subject of the King of Great Britain, resident of Brooklyn borough, Kings county, in the State of New York, have made certain new and useful Improvements in Hat-Brim-Stretching Machines, of which the following is a specification.

My present invention relates to the manufacture of felt hats, and has particular relation to that part of the process in which the brims of such hats are formed from the cone. In this art, the felt is first formed into a cone-shaped bat, a part of the edge of which is then manipulated and stretched until the brim formed therefrom stands out at an angle to the rest of the cone, which is shaped to form the crown of the hat. The process of stretching is not only laborious, but demands considerable skill; the cone must be kept soaked with hot water during the entire treatment. If it be permitted to get dry, or if the water gets too cool, the felt gets tender and tears, as it will also do if stretched too fast, or too much at one time; for this there is no remedy, as torn felt cannot be repaired so as to be merchantable. It is not possible for the mechanic to wear gloves, because no material has yet been found which will stand the wear and hot water, and yet enable the workman to use his hands with sufficient facility. The heat and friction are hard on the hands, producing callosities and soreness; but so far as I am aware after a practical experience of many years at the bench, much of which time has been spent at this step in the manufacture, both in this country and abroad, no prior machine has successfully performed this particular operation in the hat-maker's trade.

Briefly described, my invention consists of means for applying tension to the felt, combined with means for stretching it while so held under tension; and preferably at least, of feeding the felt intermittently, and stretching it during the intermissions of the feed. This I now believe to be the best way of operating the invention, but I do not exclude other methods or arrangements.

The machine which I have devised to embody my invention consists of sets of tapered rolls, between which is arranged a stretching or tension device. One of the sets of rolls is constructed to rotate somewhat faster than the other, the result of which is

to put the felt under tension; while thus held taut the tension device is operated, stretching the felt between the sets of rolls. The tension device then releases, and the rolls by their revolution take up the slack caused by the stretching of the material and feed the brim forward, presenting a new portion of it to the action of the machine; the action of the tension device being so timed that the felt is substantially stationary when it is operated, the rolls acting intermittently.

In the machine illustrated in the drawings and described in this specification, only two sets of rolls are employed, with a single tension or stretching device between them; nothing in the invention limits me in this regard, as I may employ more sets, if desired. Excellent results, however, are obtained from the machine shown. All such modifications or extensions of the principles of my invention I aim to cover by my claims. So also other forms of gears or other parts may be substituted without departing from the invention.

I believe myself to be the first to devise a successful machine for stretching the brims of felts hats; and I wish to make claims commensurate with what I believe to be the scope of my invention.

The accompanying drawings show one form in which I have embodied my invention. Figure 1 is a front elevation; Fig. 2 is a plan; Fig. 3 is a side elevation, looking to the right in Fig. 1; Fig. 4 is a rear elevation; and Fig. 5 is a detail, partly in section upon the line 5—5 of Fig. 1.

Referring first to Figs. 1, 2 and 3, A is the frame of the machine, having lugs A¹ A², and upright arms A³ A³; a bracket A⁴ is attached to the upper part of the frame and carries a roller A⁵, over which (see Fig. 3) runs a band I, for supporting the work; the block upon which the cone is mounted being heavy, the band relieves the workman from the strain of supporting it. Mounted in suitable bearings carried by the frame is a pulley B¹, driven from any desired source of power by the belt B, and rotating the shaft B²; upon the shaft is mounted an eccentric B³, by means of the collar b. Operated by the eccentric is a plunger C, provided at the lower end with a cam-roller c; and the rod is held in place by the straps C⁴ C⁴, and its length may be adjusted by means of the units C¹ C². This adjustment does not

alter the length of the stroke of the rod, but changes the position of the member C³ of the stretching or tension device, presently to be more fully described, so that the stroke, always of the length fixed by the proportions of the eccentric, may begin at a point higher or lower, as may be desired. It is obviously within my invention to substitute a slotted link, crank, or other equivalent gear for the eccentric shown, thus permitting an adjustment also of the length of the stroke, if desired; in practice I have found this to be a needless refinement. Such devices being familiar to all good mechanics, I do not think it necessary to illustrate or further describe them. Coöperating with the movable member C³ are other members D D, relatively fixed. As will be presently pointed out, these members move for the insertion of the work, but afterward remain stationary until the brim is completed. The felt passes over the movable member C³, and under the relatively fixed members D D, which serve as an abutment for holding the brim in place while the member C³ is forced upward by the revolution of the eccentric B³, stretching the felt; no spring is needed to insure the return of the rod C, gravity, combined with the resultant downward pressure from the tension on the felt, sufficing for this purpose.

Upon each side of the stretching device just described are the sets of taper rolls E, E¹; F, F¹. By an arrangement of gears to be described with particularity in connection with Fig. 4, the rolls E, E¹ rotate faster than F, F¹; the motion of the upper rolls is clockwise, and the work passes through the machine illustrated from right to left. The upper and lower rolls of each set are arranged to run at equal speeds (see Fig. 3) by the gears E⁴, E⁵, F⁴, etc., and the upper rolls are arranged to be lifted for the insertion of the work; the cones of felt being endless, this is necessary. It is accomplished by the handle G, secured to the rock-shaft G¹, which is carried in bearings in the arms A³ A³, and held from longitudinal displacement by the collars g g. The upper rolls are carried in front bearings D¹ D¹, the lower parts or which are preferably formed integral with the stationary members D D of the stretching or tension device. Extending upward from the upper halves of the bearings are links or arms e, f, in sockets in which reciprocate cams G², (see Fig. 5), carried by the rock-shaft G¹. The operation of these parts is as follows: When the handle G is in the illustrated position, the upper and lower rolls are closely approximated, the gears E⁴, E⁵, etc., are in mesh, and the members D D are depressed to their illustrated position; when the handle is turned in the direction of the arrow in Fig. 5, the cams G² G² raise the links e f, lifting the

upper rolls E, F, and the members D, D; the work is then inserted, the handle G depressed, and operation resumed. Obviously the belt need not be shipped, since the speed of the pulley is moderate; I have found from forty to sixty R. P. M. to be suitable.

I do not know whether the precise taper to the rolls is fixed, or if not within what limits it may vary; in general it should be so selected that the inner and outer circumferences of the brim will travel at suitable relative speeds. I do know, however, that the rolls in my present machine, which have a taper which includes an angle of 8° 8', are fully operative, and in fact answer their purpose admirably. Beyond this it has seemed to me unnecessary to theorize; and in any event I do not intend to restrict myself in this regard.

The rear bearings H, H of the shafts E², F², carrying the upper rolls, are borne in upwardly projecting brackets H³, H³ (see Figs. 2 and 3), and swing upon pins H², H²; these are formed at their outer ends into capstan-screws, for ready adjustment; collars H¹ H¹ upon the shafts prevent their longitudinal movement.

The means for rotating the rolls will be best understood from Fig. 4, though shown in part also in Figs. 2 and 3. Upon the shafts E³, F³ driving the lower taper rolls are fixed ratchet-wheels E⁶, F⁶. The teeth of wheels E⁶ are farther apart than those of F⁶, so that each reciprocation of its pawl turns it farther than the wheel F⁶ is turned by the pawl operating it. Fixed to the shaft B² (which is driven by the pulley B¹) is an eccentric B⁴, upon which bears a cam-roller b⁴, borne upon a stud adjustably secured in any suitable way in the slotted link B⁵; the pawl B⁶, which actuates the wheel E⁶, is carried by a similarly adjustable stud b⁶ in the end of the link; a guide B⁷ serves to steady the pawl. A second eccentric B⁵ actuates a similar cam-roller b⁵ in the slotted link B⁹, the pawl B¹⁰ of the ratchet-wheel F⁶ being actuated thereby. Springs B⁸, B¹¹ respectively keep the pawls B⁶, B¹⁰ in engagement with the ratchet-wheels, while other springs B¹², B¹³ keep the cam-rollers b⁴ b⁵ in operative contact with their respective eccentrics.

The proportions of the levers, pawls and eccentrics may be so chosen as to utilize ratchet-wheels of similar or dissimilar size teeth, or other forms of gearing may be substituted, and many other changes made, as will be obvious to those skilled in mechanics.

The action of the rolls E, E¹ takes up the slack in the felt, also stretching it slightly; while, in conjunction with the slower movement of the rolls F, F¹, the felt is fed in regular steps through the machine, each portion between the strokes of the pawls being

stretched by the members C³, D, D, until in the judgment of the operator the stretching is sufficient. As the various parts are connected to the pulley B¹ by reciprocating elements, it is immaterial in which direction the pulley revolves.

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

1. In a machine for stretching felt the combination, with means for applying tension to the felt, such means intermittently actuated to feed the felt, of means for stretching the felt, such means acting during the intermissions of the feed.

2. In a machine for stretching felt the combination, with means for applying tension to the felt, of a plunger for stretching the felt, and means for actuating the plunger while the felt is held taut.

3. In a machine for stretching felt the combination, with means for applying tension to the felt, such means intermittently actuated to feed the felt, of a plunger for stretching the felt, and means for actuating the plunger; such means operating the plunger to stretch the felt during the intermissions of the feed.

4. In a machine for stretching felt the combination of sets of rolls and a stretching device interposed between them, with means for actuating the rolls and the stretching device.

5. In a machine for stretching felt the combination of two sets of rolls, one set rotating faster than the other, a stretching device between the sets, and means for actuating the rolls and the stretching device.

6. In a machine for stretching felt the combination of sets of rolls, means for intermittently actuating the rolls, a stretching device, and means for actuating the stretching device.

7. In a machine for stretching felt the combination, with sets of taper rolls and means for operating them, of a stretching device between the sets of rolls, and means for actuating it at desired times.

8. In a machine for stretching felt the combination, with sets of taper rolls and a stretching device, of means for intermittently actuating the rolls, and means for actuating the stretching device; the said several means being so timed that the stretching device will act when the rolls are substantially stationary.

9. In a machine for stretching felt the combination, with rolls in sets, some of which rotate faster than others, and means for intermittently actuating them, of a stretching device located between the sets, and means for actuating the stretching device at desired times.

10. In a machine for stretching felt the combination, with two sets of taper rolls

and means for intermittently actuating them, of a stretching device located between the sets, and means for actuating it during the intermissions of rotation of the rolls.

11. In a machine for stretching felt the combination, with sets of taper rolls, of means for rotating the rolls, such means acting intermittently to rotate one set faster than the other; a stretching device between the sets, and means for actuating it during the intermission, as described.

12. In a machine for stretching felt the combination, with sets of taper rolls and a stretching device located between them, of a main shaft, ratchets and pawls arranged to intermittently rotate the rolls, a rod for operating the stretching device, and connections from the shaft to the pawls and the rod.

13. In a machine for stretching felt the combination, with the rolls, of a stretching device having members fixed relative to some of the rolls, a movable member reciprocating between them, and means for operating the reciprocating member.

14. In a machine for stretching felt the combination, with sets of rolls, ratchets and pawls for rotating them, and means for actuating the pawls, of a stretching device between the sets of rolls comprising fixed members and a reciprocating member, and means for operating the reciprocating member.

15. In a machine for stretching felt the combination, with rolls in sets and a stretching device located between them having fixed and moving members, of means for simultaneously opening the sets of rolls and the stretching device to permit the insertion of the work.

16. In a machine for stretching felt the combination, with rolls in sets, one roll of each set being located above the other; a stretching device having members fixed relative to the upper rolls, and a movable member reciprocating between the fixed members; of means for operating the rolls and the stretching device, and means for simultaneously lifting the upper rolls and the fixed parts of the stretching device.

17. In a machine for stretching felt the combination, with sets of rolls and a stretching device having a reciprocating member, a main shaft, pawls and ratchets intermittently actuating some of the rolls faster than others and a rod actuating the reciprocating member, of eccentrics upon the main shaft operating the pawls and rod, the eccentrics being so related that the rod is actuated during the intermission of the rolls.

18. In a machine for stretching felt, the combination, with a continuously rotating main shaft, of sets of taper rolls, means operated by the rotation of the main shaft to rotate the rolls intermittently, one set running at greater peripheral speed than the

other; a stretching device located between the two sets of rolls, and means driven by the continuously rotating shaft for operating the stretching device, the said several means being so timed that the stretching device will operate upon the felt during the intermissions of movement of the rolls; whereby the rolls will take up the slack of the felt and stretch it taut, and then remain substantially stationary while the stretching device operates thereupon, and so on.

19. In a machine for stretching the brims of felt hats, the combination of two sets of tapered rolls, a continuously revolving main shaft, means for operating the rolls from the main shaft, one of the sets being driven at greater peripheral speed than the other, a stretching device located between the two sets of rolls, and means driven by the continuously rotating shaft for operating the stretching device; the said several means being so timed that the stretching device will operate upon the felt during the intermissions of movement of the rolls; whereby the rolls will take up the slack in the felt and stretch it taut, and then remain substantially stationary while the stretching device operates thereupon, and so on.

20. In a machine for stretching the brims of felt hats, the combination of a continuously rotating main shaft, two sets of tapered rolls, means operated by the main shaft for intermittently driving the rolls, one of the two sets of rolls being driven at

greater peripheral speed than the other, a stretching device comprising members fixed relative to some of the rolls and a moving member driven with a reciprocating motion from the main shaft; the said several elements being so timed that the stretching device will act upon the felt while the rolls are substantially stationary, and after its action the rolls will take up the slack and feed the felt so that the stretching device will act upon a new portion thereof.

21. In a machine for stretching the brims of felt hats, the combination of a continuously revolving main shaft, two sets of tapered rolls, connecting means for transmitting the motion of the shaft to the rolls, one of the sets being driven at greater peripheral speed than the other, a stretching device located between the rolls, and means connecting the stretching device to the shaft; the said several means being so timed that the stretching device will act upon the felt while the rolls are substantially stationary, and embracing in each of them a reciprocating member; whereby the shaft may be driven in either direction without affecting the operation of the machine.

In witness whereof I have hereunto set my hand in the presence of two witnesses.

GEORGE SCHOFIELD.

Witnesses:

T. J. JOHNSTON,
IRVING M. OBRIGT.