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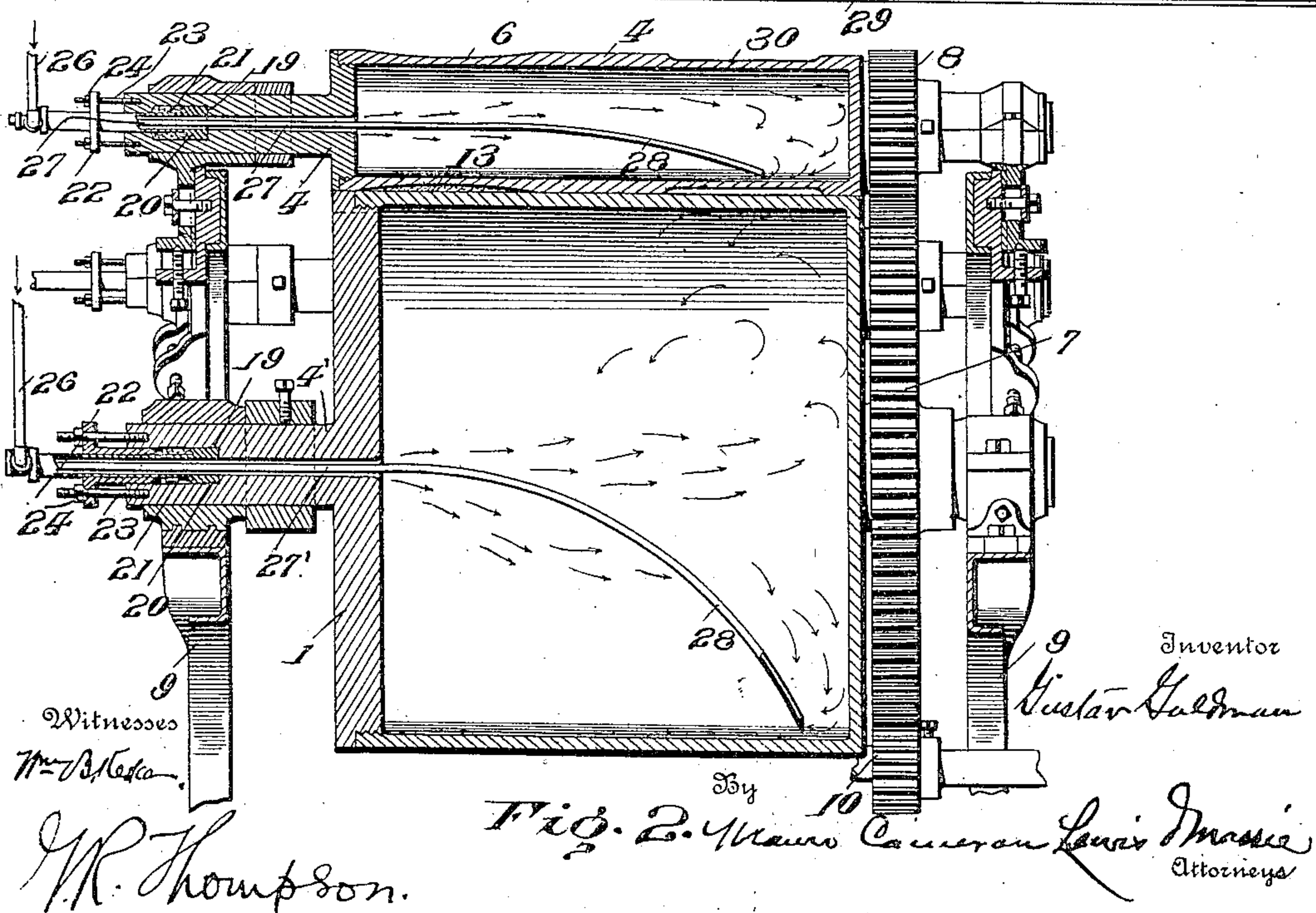
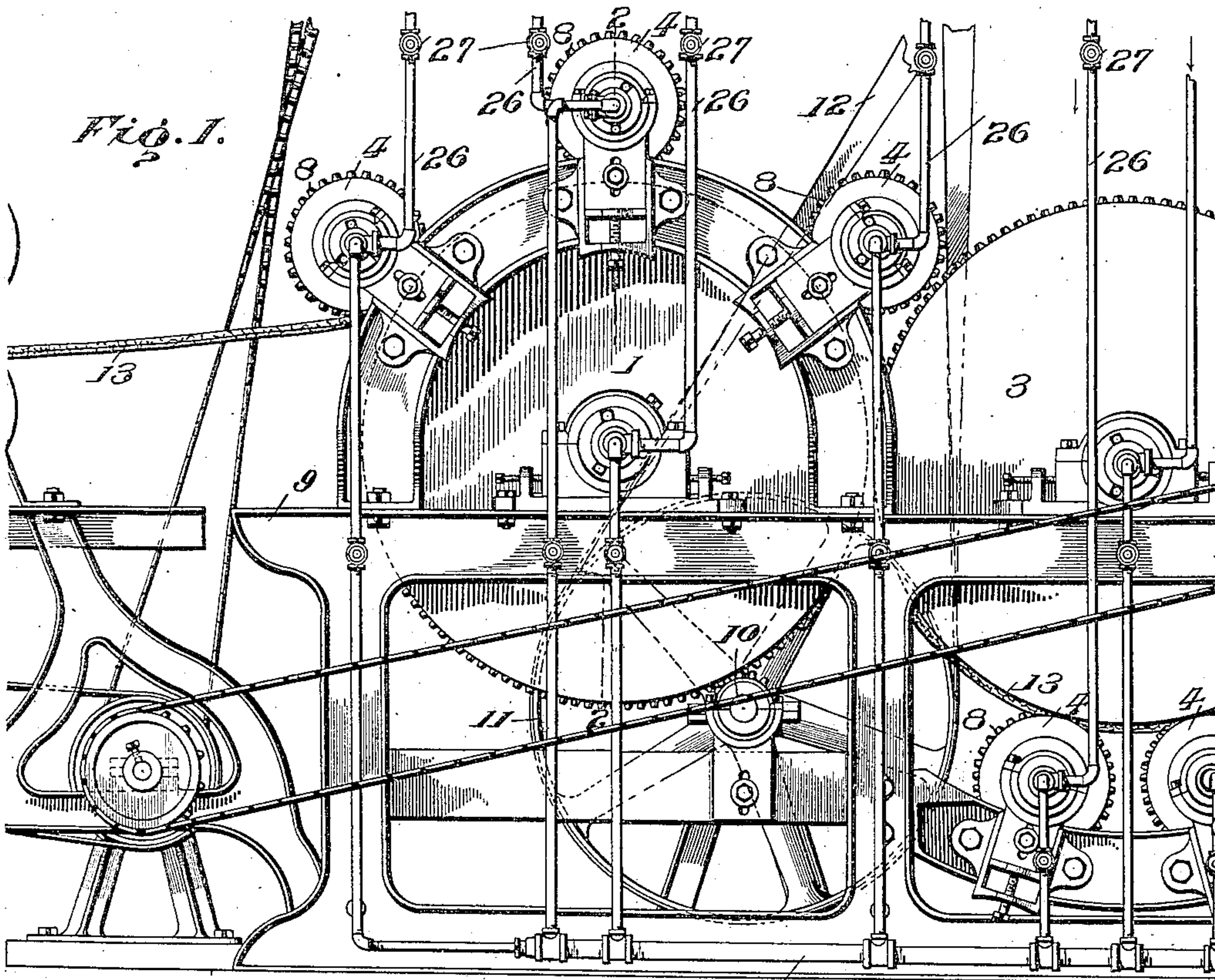
G. GOLDMAN.

PATENTED DEC. 18, 1906.

MACHINE FOR FINISHING THE SURFACES OF MATTED OR FELTED MATERIAL.

APPLICATION FILED NOV. 2, 1904.

2 SHEETS—SHEET 1.



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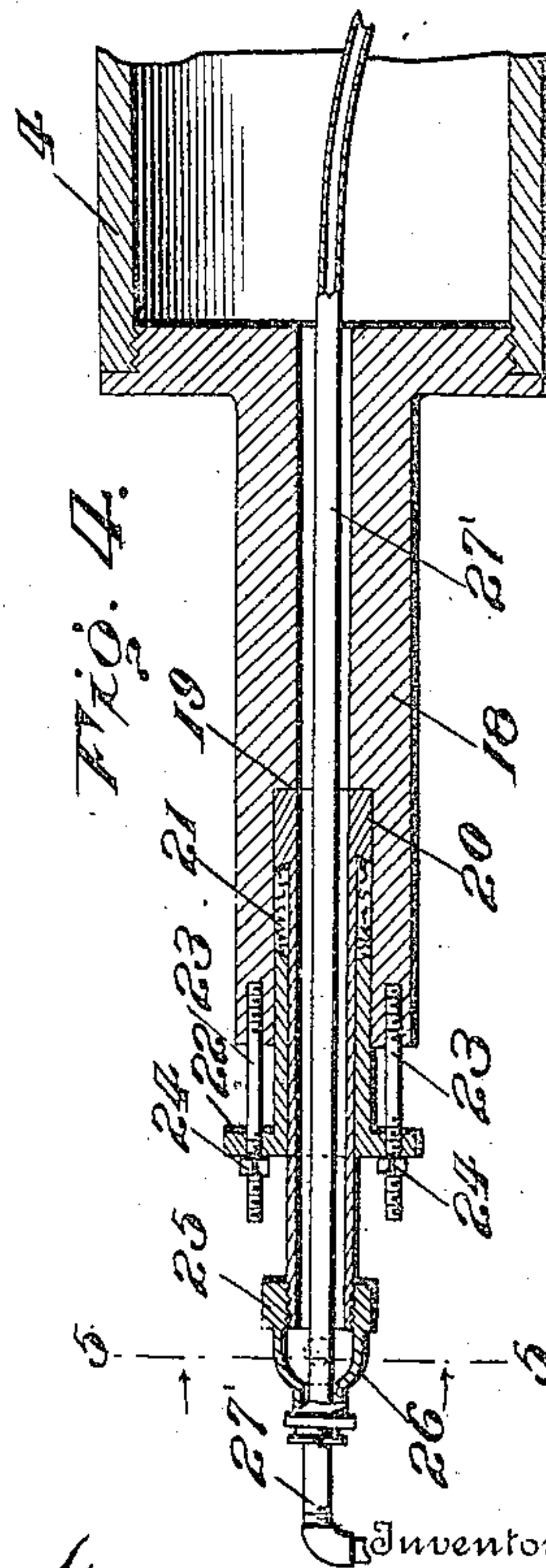
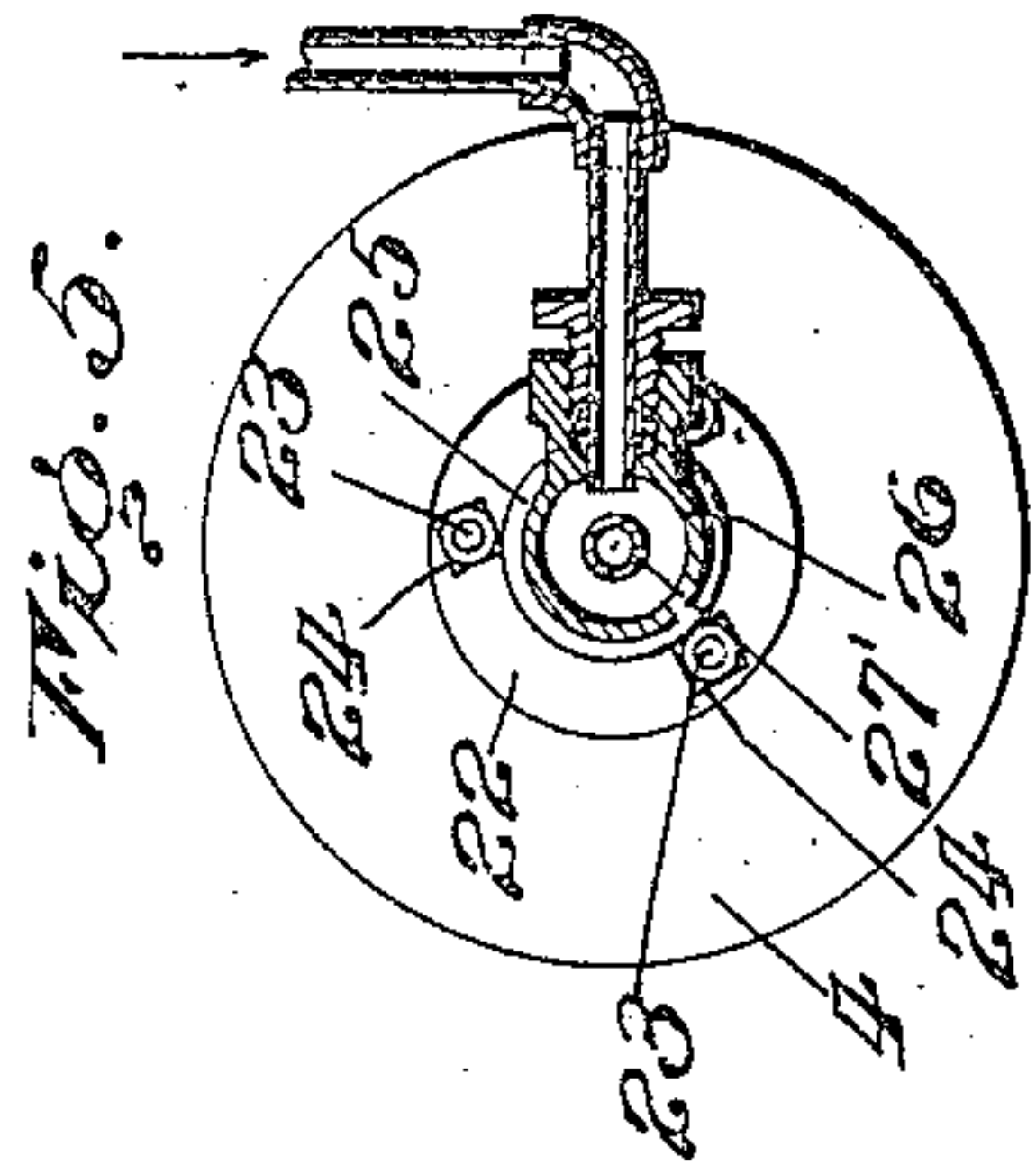
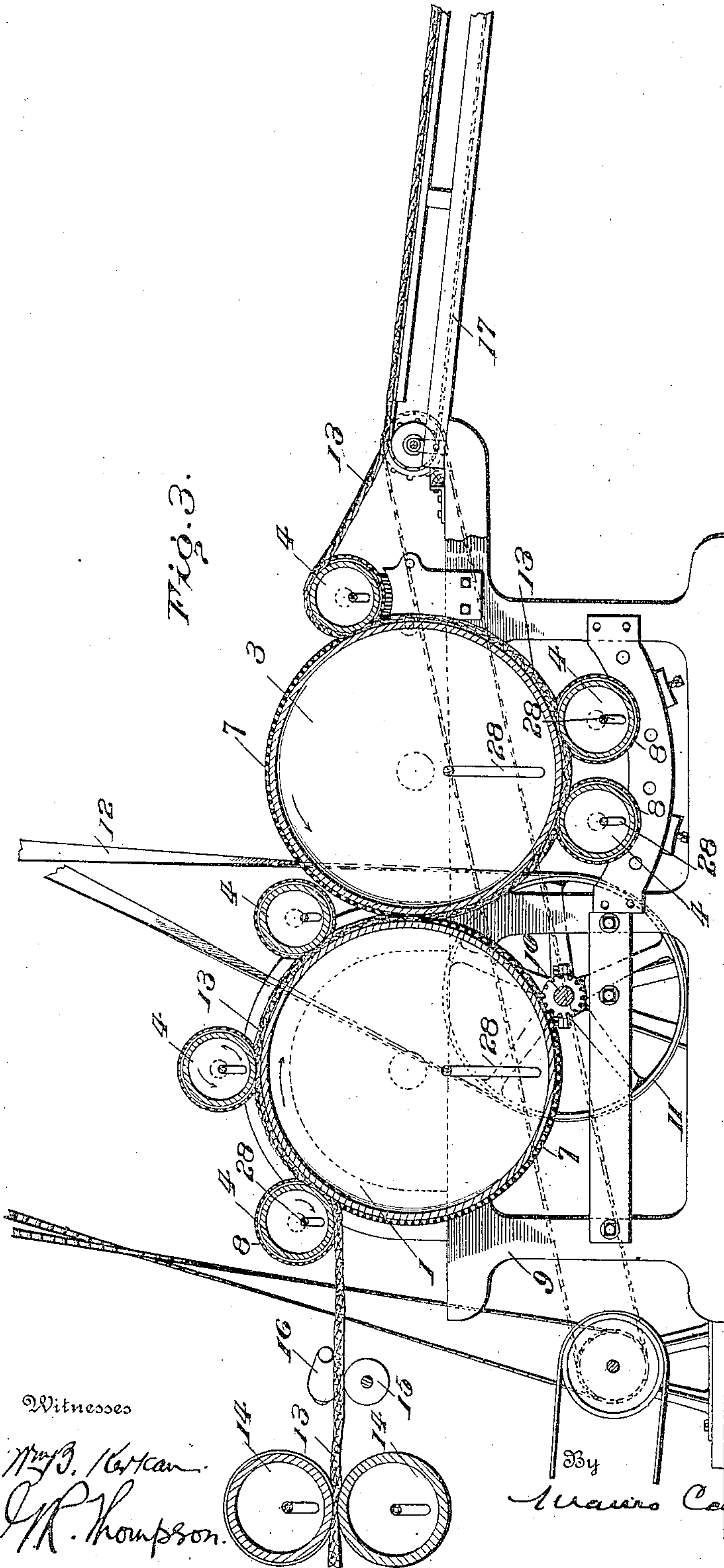
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Witnesses

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MACHINE FOR FINISHING THE SURFACES OF MATTED OR FELTED MATERIAL.

No. 838,616.

Specification of Letters Patent.

Patented Dec. 18, 1906.

Application filed November 2, 1904. Serial No. 231,117.

To all whom it may concern:

Be it known that I, GUSTAV GOLDMAN, a resident of Baltimore, Maryland, have invented a new and useful Improvement in
5 Machines for Finishing the Surfaces of Matted or Felted Material, which invention is fully set forth in the following specification.

This invention relates to means for smoothly finishing the surfaces of sheets of fibrous material, such as padding, wherein the fibers are
10 not bound or woven into a cloth, matted or felted sheets of material being another illustration of the character of the material designed to be treated. Fibrous padding
15 sometimes has its surface subjected to sizing for the purpose of binding together or holding down the loose fibers which would otherwise project from its surface, and according to one method of matting or felting fibers together
20 the fibrous mass as a whole is subjected to a binding material, such as a resinate, which serves as a binder.

The object of the present invention is to provide means for effectively finishing or
25 smoothing the surfaces of material of the character described. Where the material treated is a sized padding, if such padding is subjected to the action of the mechanism before the sizing is thoroughly dry the ends of
30 the small projecting fibers can be thoroughly pressed down into the sizing for the purpose of effecting the smoothing of the surface. On the other hand, if the material treated be a matted or felted sheet or strip in which the
35 fibers are bound together by a binder, such as a resinate, the latter can be softened by the application of heat, and while in this softened condition if the fibers are pressed down into the surface of the mass the binding material
40 will seize upon them and retain them snugly within the surface, and thus effect the desired smoothness of finish.

With the objects above mentioned in view the invention consists in means for simulta-
45 neously subjecting the matted mass of fibers (whether treated with a sizing simply or whether the entire mass is bound together by a suitable binder) to the action of heat and pressure, preferably simultaneously applied.

50 In the manufacture of certain articles, such as garment-pads, it is practical to form a continuous sheet or strip of matted or felted fibers, which strip is not of uniform thickness in cross-section, but tapers either from an in-
55 termediate line toward its two edges or from

one edge to the other edge, and in order that the surfaces of such a sheet may be effectively smoothed it is essential that the smoothing apparatus should be so constructed as to properly apply the heat and pressure to the
60 tapering surfaces.

The inventive idea involved in the structure hereinafter illustrated may receive various mechanical expressions, one of which is
65 shown in the accompanying drawings for the purpose of illustrating the invention, the limits of the invention being defined by the claims.

In said drawings, Figure 1 is a partial side elevation of the invention. Fig. 2 is a broken
70 vertical section on the line 2 2, Fig. 1. Fig. 3 is a central longitudinal section of the invention, showing also certain other parts preferably used in conjunction therewith. Fig. 4 is an enlarged detail of a portion of Fig.
75 2, showing the manner of admitting steam or other heating fluid into the pressure-rollers and withdrawing the condensed steam therefrom. Fig. 5 is a sectional detail on the line
80 5 5 of Fig. 4 looking in the direction of the arrows.

Referring to the drawings, 1 and 3 are large hollow cylinders, preferably mounted on parallel horizontal axes in such position as
85 to allow their peripheries or cylindrical surfaces to very nearly contact with each other. These cylinders have their ends closed in any suitable manner, as will be understood from an inspection of Fig. 2, and are provided with
90 means for admitting steam through one of its trunnions, as trunnion 4', Fig. 2, and with means for the withdrawal of any steam that may condense within said cylinders. Each
95 of the large cylinders 1 and 3 has a plurality, here shown as three, of smaller cylinders 4, with their axes or trunnions mounted in suitable bearings, so that the peripheries of the smaller cylinders firmly contact with the
100 peripheries or cylindrical surfaces of the larger cylinders, as will be understood from an inspection of Fig. 2. Preferably each of the small cylinders 4 has its surface cut away, as at 6, so as to conform to the cross-sectional
105 outline of the strip of fibers that is to be treated. Each of the large cylinders has substantially secured thereto a gear-wheel 7 approximately of the same diameter as the
110 cylinder, said large gear-wheel meshing with the gear-wheel 8 on each of the smaller cylinders, the diameter of the said gear-wheel 8

being substantially the same as that of the small cylinders 4. Each of the large cylinders and all of the small cylinders have their bearings in suitable parts of the frame 9, as
 5 will be understood from an inspection of Figs. 1 and 2. The gear-wheels 7 on the large cylinders 1 and 2 intermesh, and power is applied to one of the large cylinders, as 1, though a suitable gear 10, Fig. 3, keyed to a
 10 shaft, upon which is also secured a pulley 11, driven by a belt 12, extending to any suitable source of power. It will thus be seen that when the pulley 11 is set in motion it revolves the cylinder 1 through a gear 10 and
 15 that said cylinder imparts motion at the same rate to the cylinder 3 and also through the intermeshing of gears 7 and 8, Fig. 2, imparts motion to each of the smaller cylinders 4 in a direction the reverse to that of the large cylinders 1 and 3.

The sheet of material 13 to be treated may be fed to the apparatus in any suitable way or by any suitable means. Preferably, however, it is advanced between a pair of steam-
 25 heated rollers 14, Fig. 3, whereby it has heat imparted to it; and, if desired, after it has thus been heated it may be subjected to any suitable forming device to give it the desired shape in cross-section. One means of thus
 30 forming the sheet or strip of fibrous material 13 consists of a cylindrical roller 15, over which the strip 13 passes after it leaves the steam-heated rollers 14, while a conical roller 16 bears upon the upper surface of the sheet
 35 immediately above the roller 15, the conical form of the roller acting to impart the desired taper in cross-section to the heated sheet or strip 13. After the strip or sheet 13 of fibrous material leaves the former it passes
 40 over the upper surface of the large roller 1, downward between the two large rollers or cylinders 1 and 3, and under the large cylinder 3. In so doing it is subjected to the action of the small cylinders 4 on its upper
 45 surface as it passes over the large cylinder 1 and to the action of the other small cylinders 4 on its under surface as it passes under the large cylinder 3, after which it is delivered to any suitable carrier, as a continuously-
 50 moving belt 17, by which it is carried off to any desired point of delivery.

The specific construction of the means for delivering the steam to the interior of the revolving cylinders 1 and 3 and to the small
 55 cylinders 4 is the same, and a description of one will suffice for all. Reference is had to Figs. 4 and 5, in which 18 is the trunnion of one of the small cylinders 4, this trunnion being hollow and being counterbored, as at
 60 19. A tube 20, whose interior diameter is substantially equal to that of the hollow trunnion 18, is inserted in the counterbore 19, said tube 20 being such as to make a snug fit within the counterbore at its lower end,
 65 but presenting a slight annular space around

it between the tightly-fitting portion 20 and the end of the trunnion. Occupying a portion of this annular space is a suitable packing 21, which is held under compression by
 an annular follower 22, which is retained in
 70 position by bolts 23, secured into the trunnion 18 of the cylinder and also passing through the flange of the follower 22, to which it is secured by nuts 24. By tightening the nuts 24 the follower may be forced
 75 tightly down against the packing 21, thereby effecting a steam-tight joint between the inserted tubing 20 and the interior of the trunnion. The packing 21 and the follower 22 turn with the trunnion of the cylinder, while
 80 the tube 20 is stationary, having its outer end connected by any suitable coupling 25 to the steam-pipe 26, the admission of steam through said pipe 26 being controlled by any suitable valve or stop-cock 27. (See Fig. 1.)
 85 Passing through the coupling 25 and also through the interior of the tube 20 and the trunnion 18 is a smaller pipe 27', which after it enters the cylinder at its extremity 28 is led downward into close proximity to the
 90 lower surface of the interior of the cylinder, as is clearly shown in Fig. 2. This pipe 27' extends to any suitable exhaust, as pipe 29, Fig. 1. It will be readily understood that the pipe 27' does not revolve with the cylinder
 95 and that consequently its downwardly-inclined end 28 is always at the lowest part of the cylinder.

The operation of this part of the device is as follows: Steam is admitted through the
 100 pipe 26 and passes in through the hollow trunnion 18 around the pipe 27' and serves to effectively heat the cylinder. Should there be any condensation of the steam or
 105 water of condensation, it will flow to the bottom of the cylinder, and the pressure of the steam on the interior of the cylinder upon the surface of the water will act to force the water outward through the pipe 27' and to
 110 the exhaust 29.

In the operation of the device as a whole it will be understood that the heat of the several cylinders will serve to soften such a binding material as a resinate, and thereby place
 115 it in condition to be effective in seizing upon and binding any of the projecting fibers constituting the roughened surface of the sheet of fibrous material, and the pressure to which
 120 said sheet or strip is subjected while in this condition acts to firmly force the fibers down into the binding material, this action being repeated by the several rollers, the cut-away
 125 portions 6 of the smaller rollers insuring that there shall be a substantially equal pressure applied to the entire tapering surface of the sheet or strip of fibers, if it is one tapering in
 130 character. In case, however, it should be desired to treat a sheet or strip of fibers of uniform thickness such cut-away portion may either be omitted or the cut-away por-

tion may be of the character shown at 30 in Fig. 2, where the removed or cut-out portion of the cylinder is of uniform thickness.

The process disclosed in this application, which forms the subject-matter of my United States Patent, No. 810,935, dated January 30, 1906, is not herein claimed.

What is claimed is—

1. In an apparatus for smoothing sheets or strips of fibrous material, the combination of a pair of heated cylinders having the sheet or strip to be treated passed over one and under the other, a plurality of pressure-cylinders mounted in substantial contact with the upper portion of one of said cylinders, and a plurality of pressure-cylinders mounted in substantial contact with the under surface of the other of said heated cylinders.

2. In an apparatus for smoothing the surface of matted or felted fibers, the combination of a hollow closed cylinder, means for admitting a heating medium thereinto, and means for revolving said cylinder, a second cylinder having a portion of its surface cut away or depressed, said second cylinder revolving in substantial contact with the surface of the first cylinder.

3. In apparatus for smoothing the surface of matted or felted fibers, the combination of a pair of heated cylinders revolving upon parallel axes, means gearing said cylinders together so that they move at a uniform rate of speed in reverse directions, a plurality of heated pressure-cylinders geared to the upper surface of one cylinder, and a plurality of heated pressure-cylinders geared to the lower surface of the other cylinder.

4. The combination of a pair of pressure-cylinders of uniform diameter, intermeshing gearing secured to each of said cylinders whereby the same will revolve at a uniform rate of speed in opposite directions, a plu-

rality of pressure-rollers in contact with the surface of each of said cylinders, each of said pressure-rollers being geared to its respective cylinder so as to revolve at a uniform rate of surface speed therewith but in the opposite direction therefrom.

5. In an apparatus for smoothing the surface of sheets or strips of fibrous material, the combination of a cylinder of approximately large diameter, means for heating the same, means for revolving said cylinder, a pressure-cylinder having a cut-away portion conforming in outline to the cross-section of the sheet or strip of material to be treated, and means for revolving said pressure-cylinder in the reverse direction to the first-named cylinder but at a uniform rate of speed.

6. In apparatus for smoothing the surface of matted or felted fabrics, the combination of a pair of feed-rolls having means for heating the same, forming-rollers, heating-cylinders geared to each other and each having a plurality of pressure-cylinders mounted in more or less contact therewith; said forming-rollers being intermediate the feed and pressure rollers.

7. In apparatus for smoothing the surface of matted or felted fabrics, the combination of feed-rollers, conical forming-rollers, heating-cylinders geared to each other and each having a plurality of pressure-cylinders mounted in more or less contact therewith; said forming-rollers being intermediate the feed and pressure rollers.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

GUSTAV GOLDMAN.

Witnesses:

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GUSTAVE R. THOMPSON.