No. 781,249. PATENTED JAN. 31, 1905.

O. J. WEIL.

PROCESS OF MANUFACTURING FEATHERBONE CORSET OR GARMENT STIFFENERS.

APPLICATION FILED OCT. 6, 1902.

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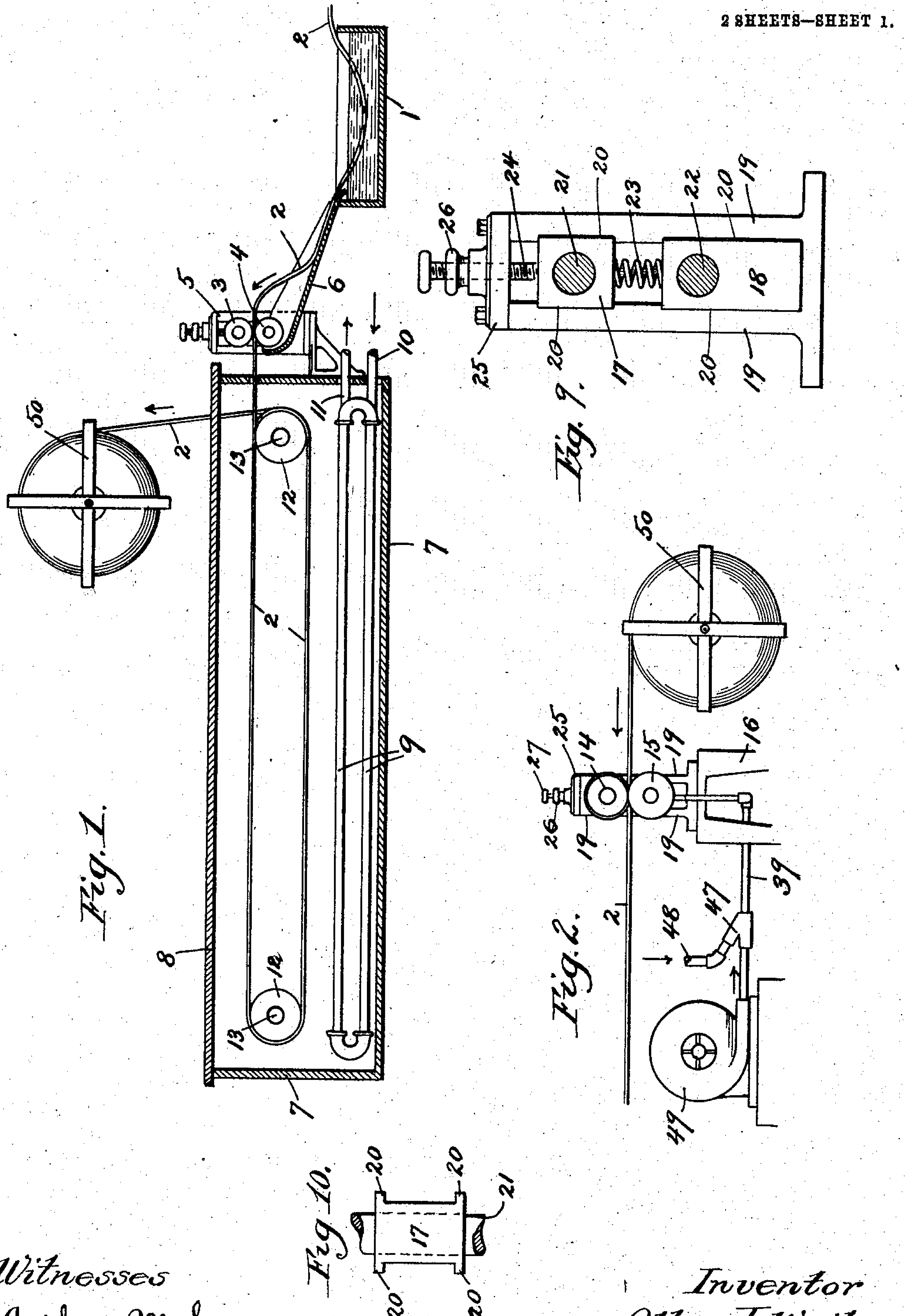

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Jack Rothschild.

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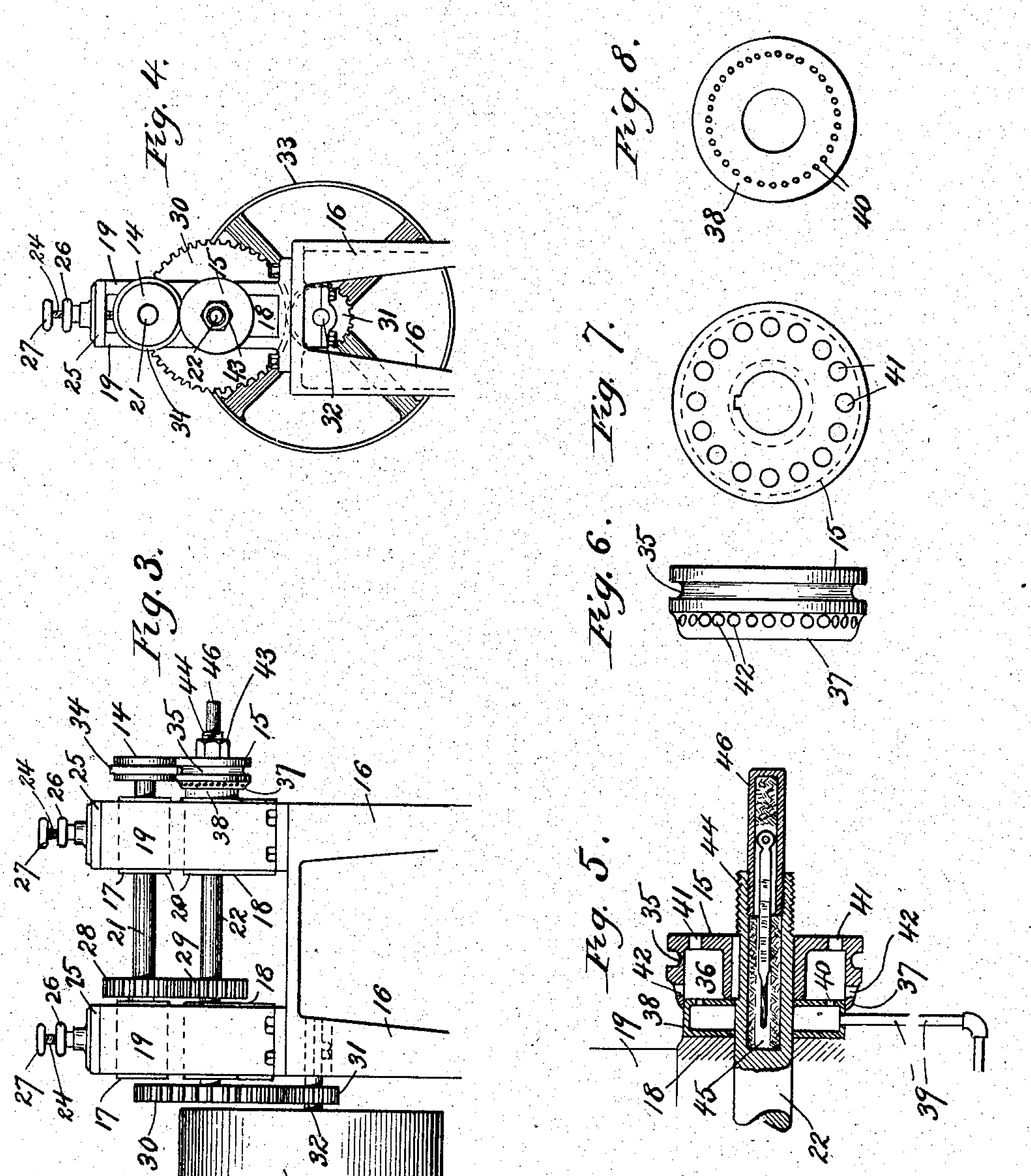

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UNITED STATES PATENT OFFICE.

OTTO J. WEIL, OF CHICAGO, ILLINOIS, ASSIGNOR TO AMERICAN FEATHERBONE COMPANY, OF CHICAGO, ILLINOIS, A CORPORATION OF ILLINOIS.

PROCESS OF MANUFACTURING FEATHERBONE CORSET OR GARMENT STIFFENERS.

SPECIFICATION forming part of Letters Patent No. 781,249, dated January 31, 1905.

Application filed October 6, 1902. Serial No. 126,124.

To all whom it may concern:

Be it known that I, OTTO J. WEIL, a citizen of the United States, residing in the city of Chicago, county of Cook, and State of Illinois, have invented a new and useful Improvement in Processes of Manufacturing Featherbone Corset or Garment Stiffeners, of which the following is a specification.

My invention relates to the manufacture of corset and garment stiffeners and dress-stays of featherbone; and the object of my invention is to facilitate the manufacture of featherbone and to produce an article which shall be unaffected by the heat of the body.

Featherbone is made from the shafts or quills of the feathers of turkeys and other fowls, these shafts or quills being split into fibers and the fibers subsequently bound together by means of thread or yarn to form cords. If a flat blade is desired, two or more of these cords or bundles of feather fibers are fastened together side by side by means of thread, yarn, or wire interwoven among them. It is usual in manufacturing featherbone to employ continuously-operating winding-machines, so that by properly distributing the fibers a continuous blade or cord is produced. The resulting continuous strip is then subjected to one or more further treatments, and the novelty in my process is concerned merely with the treatments occurring after the unsized strip of thread-bound fibers is produced. The preferred mechanism employed in this process is illustrated in the accompanying drawings, in which—

Figures 1 and 2 show the general arrangement of the apparatus and the successive steps in which the same is used. Figs. 3 and 4 are side and end views, respectively, of the preferred heating and rolling machine employed in this process. Fig. 5 is an axial sectional view showing the distributing-box, combustion-roller, and adjacent parts of the heating and rolling machine. Fig. 6 is an edge view, and Fig. 7 is a face view, of the combustion-roller. Fig. 8 is a face view of the distributing-box. Fig. 9 is a detail view showing the method of mounting the roller-shafts. Fig. 10 is a top view of one of the journal-bearings of the roller-shafts in the heating and rolling machine.

Similar numerals refer to similar parts throughout the several views.

1 is the vessel for containing the sizing, which is a viscous glutinous fluid and adheres to the strip 2 as it passes through said fluid. Said strip consists of feather fibers bundled together in any suitable manner to form featherbone. In order to remove the surplus sizing from said strip after leaving the sizing-bath, an equalizer is provided, which consists of two rollers 3 and 4, so mounted in the framework 5 as to be approximately tangential and exert a constant pressure upon the strip. The trough or drain 6 extends from said equalizer to the vessel 1, so as to carry the drippings back into said vessel. After the strip has passed the equalizer it enters the drying-box 7, which is of considerable length and is provided with a cover 8 for preventing the loss of heat. The drying-box is heated by means of the steam-coils 9 with an inlet 10 and outlet 11. Said box is provided with the drums 12 12, located near its opposite extremities and revolubly mounted on the axles 13 13. In the final stage of the process the sized and dried strip is passed between the rollers 14 and 15 of the heating and rolling machine. Said machine has a table 16, whereon are mounted the standards for the shaft-bearings 17 and 18. The sides 19 of said standards form guides or ways in which said bearings are movable. Said bearings are held in position in said standards by means of the flanges 20 20, which engage said guides 19, and thereby permit an adjustment of the roller-shafts 21 and 22.

By preference the lower bearings 18 rest upon the bottom of said guide-standards, while the upper bearings 17 are supported at a proper distance above said bearings 18 by means of the compression-springs 23. The tendency of said springs is to force the bearings 17 upward, and this tendency is overcome by means of the screws 24 in the caps 25, bolted to the upper extremities of the sides 19 of said guide-standards. Said caps 25 are threaded to receive said screws 24, and said screws are locked at a predetermined point in said caps by means of the locking hand-wheels 26. For convenience said screws terminate at their upper extremities in the hand-wheels 27.

The construction of the parts is such that the position of the upper shaft 21 may be regulated by backing off the hand-wheel 26 and subsequently rotating the screws 24 in a proper direction until the bearings 17 come to the desired position.

The shafts 21 and 22 are each provided with gear-wheels 28 and 29, respectively, which are of the same size and mesh with each other, so that said shafts rotate in opposite directions but at the same rates of speed. The shaft 22 is also provided with a driving-gear 30, rotated by means of the driving-pinion 31 on the shaft 32, mounted in a suitable bearing in the table 16. A band-wheel 33 is also screwed to the shaft 32 to drive the same and effect the rotation of the roller-shafts 21 and 22.

The upper shaft 21 has the above-mentioned roller 14 keyed or otherwise rigidly secured thereto. Said roller is provided with an annular flange 34, which fits into the corresponding annular channel 35 in the lower roller 15. By preference the groove in said lower roller is concave at the bottom, as clearly shown in Figs. 5 and 6. Said lower roller 15 is keyed or otherwise secured to the shaft 22, so as to rotate therewith, and is interiorly recessed to afford a chamber 36 for the combustion of the heating-gases. At its inner edge said roller 15 has a flange 37, which fits over the gas-distributing box 38 in such a manner as to make sliding contact therewith. Said distributing-box is a hollow annular receptacle surrounding the shaft 22 and is non-revoluble. The outer periphery of said distributing-box fits within the flange 37 of the roller 15 in such a manner that the gases of combustion from the chamber 36 are prevented from escaping. A pipe 39 supplies combustible gas to said distributing-box, and said gas escapes through the small apertures 40 in the face of said box into the combustion-chamber 36, above mentioned. Said apertures 40 are preferably arranged in a circle concentric with the center of the shaft 22, so as to effect an even distribution of the combustible gas as it escapes from said distributing-box 38 into the said combustion-chamber 36.

In order to supply sufficient air to the combustion-chamber 36, a series of apertures 41 are provided in the outer face of the roller 15 and a second series of apertures 42 are provided near the flange 37 thereof.

The roller 15 is held in proximity to the box 38 by means of the retaining-nut 43, which screws onto the threaded portion 44 of the shaft 22. In order that the temperature of the roller 15 may be accurately determined, the outer extremity of the shaft 22 is bored out to form a chamber 45 for receiving a thermometer. The chambered cap 46 is threaded to screw into the outer extremity of shaft 22 to form a closure for the chamber therein. To prevent breakage of the thermometer, it is desirable to line said chamber 45 and cap 46 with cork, asbestos, or other suitable material.

The above-mentioned pipe 39 is connected to a branch coupling 47. The gas-supply pipe 48 and blower 49 both connect with said coupling, the object of the blower being to increase the pressure of the gas escaping into the combustion-chamber 36 and also to effect a more perfect mixture of air with the gas to thereby facilitate combustion.

The successive steps in this method of manufacturing featherbone are as follows: The strip 2 of unsized material, consisting of feather fibers bound together, is first passed through the sizing-bath 1, where it becomes thoroughly covered with the sizing fluid. From the bath said strip passes between the equalizing-rollers 3 and 4, where the excess sizing fluid is forced off and runs back through the trough 6 to the vessel 1. From the equalizer the strip 2 passes into the drying-box 7 and is carried backward and forward around the drums 12 12, so that any one portion of the strip will travel a long distance before leaving said box. Said box is heated by the steam-coils 9, and the necessary quantity of strip 2 in the box at any one time will depend upon conditions; but a usual quantity is about six hundred feet. From said drying-box the strip passes onto and is wound upon the reel 50, as shown in Fig. 1. After said reel is sufficiently filled and the strip is thoroughly cold and dry the strip is severed and the reel is placed in a position similar to the one shown in Fig. 2, when the strip is finally passed between the rollers 14 and 15 of the heating and rolling machine. Shortly prior to the time when the said heating and forming machine is to be used the blower 49 is started and gas is admitted into the coupling 47 through the supply-pipe 48. As a result the mixed air and gas is forced through the pipes 39 into the box 38 and finally escapes through each one of the apertures 40 into the combustion-chamber 36 in the roller 15. As said roller revolves while the box 38 remains stationary, the burning gas in the chamber 38 causes all parts of said roller to become uniformly heated. The gases of combustion pass out through the apertures 41 and 42. The flow of gas is so regulated that the roller 15 will remain thoroughly hot during the time it is in use. A suitable temperature is from 175° to 240° Fahrenheit, which is far in excess of the normal temperature of the body, the latter being usually about 98.4° Fahrenheit. An objectionable characteristic of some of the featherbone heretofore produced lies in its tendency to become softened and lose its elasticity when heated by proximity to the body of the wearer. In the present process this objection is overcome, for the subjecting of the cold sized and dried strip to the action of the hot rollers under pressure in the heating and rolling machine renders the finished product substantially unsusceptible to the heat of the body.

In the present process the sized and dried strip does not remain stationary between the hot rollers 14 and 15, but is continuous in its motion. Every portion of the strip, therefore, is subjected to exactly the same degree of heat and pressure as every other portion, and the result is a featherbone strip of great uniformity of thickness. Moreover, the action of the hot rollers produces a smoothness of surface on the product and an elimination of irregularities which cannot be obtained by an intermittent process, such as the subjecting of the strip to heated dies a portion at a time.

What I claim as new, and desire to secure by Letters Patent, is—

1. The process of manufacturing featherbone consisting in bundling together feather fibers to form strips; sizing said strips; drying the same, and subsequently rolling and simultaneously heating the same.

2. The process of manufacturing featherbone consisting in bundling together feather fibers to form strips; sizing said strips; subjecting the same to dry heat and finally reheating the strip to a temperature above 175° Fahrenheit and at the same time rolling it under pressure.

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