

(No Model.)

G. A. GOLDSMITH & A. K. MERRILL.  
MACHINE FOR MAKING PYROXYLINE COLLARS.

No. 505,399.

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Fig. 1.

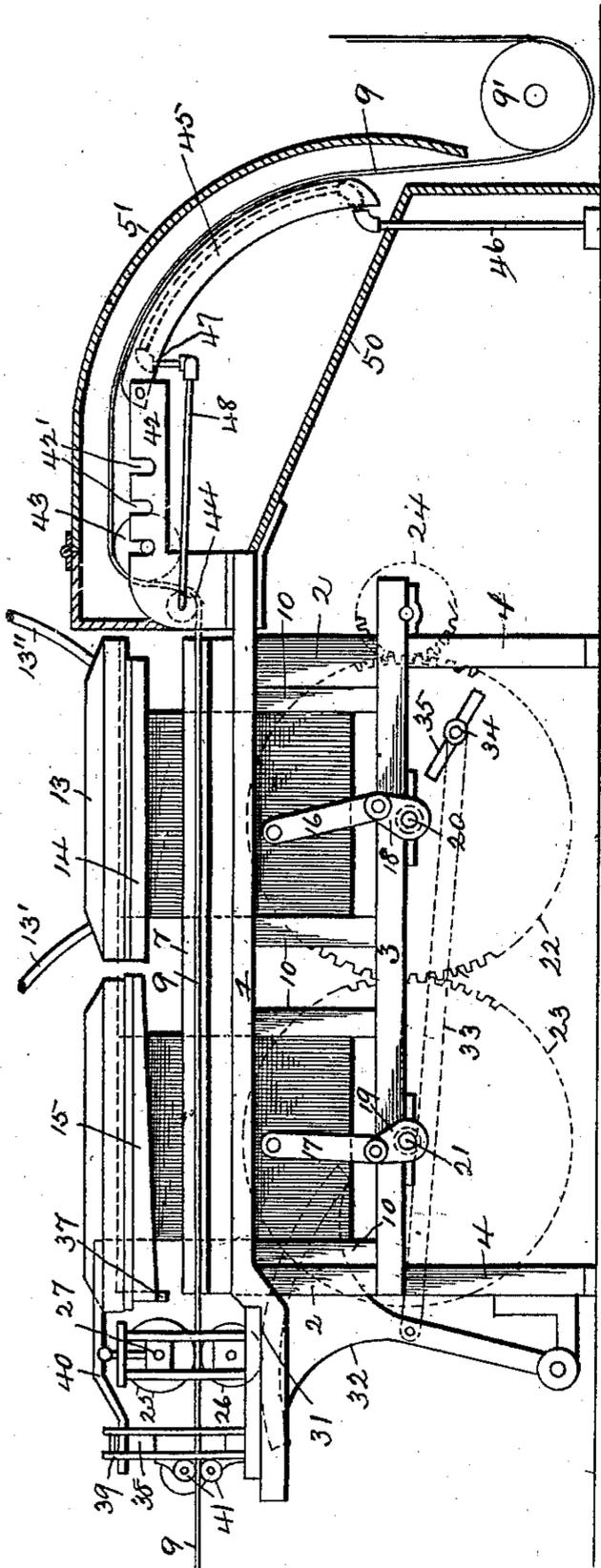
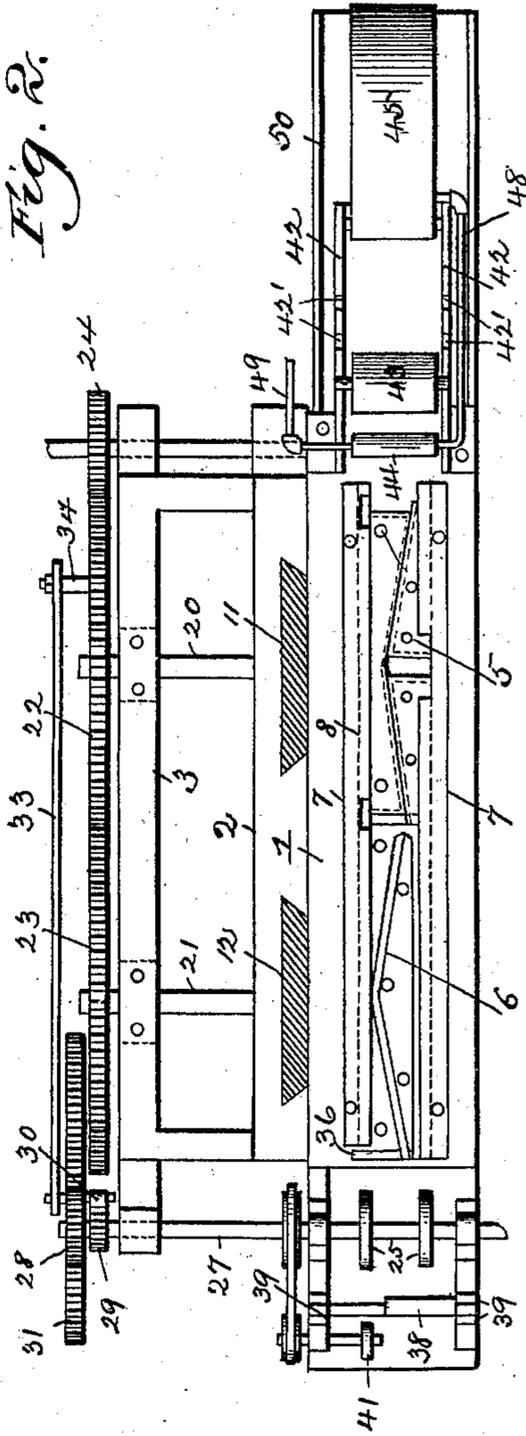


Fig. 2.



Witnesses:

J. B. McGivver.  
F. J. Chapman.

Inventors,  
Gustavus A. Goldsmith and  
Alfred K. Merrill,

By Joseph Lyon.  
Attorney.

# UNITED STATES PATENT OFFICE.

GUSTAVUS A. GOLDSMITH, OF NEW YORK, AND ALFRED K. MERRILL, OF BROOKLYN, NEW YORK; SAID MERRILL ASSIGNOR TO SAID GOLDSMITH.

## MACHINE FOR MAKING PYROXYLINE COLLARS.

SPECIFICATION forming part of Letters Patent No. 505,399, dated September 19, 1893.

Application filed May 11, 1893. Serial No. 473,773. (No model.)

*To all whom it may concern:*

Be it known that we, GUSTAVUS A. GOLDSMITH, residing at New York, in the county of New York, and ALFRED K. MERRILL, residing at Brooklyn, in the county of Kings, State of New York, citizens of the United States, have invented certain new and useful Improvements in Machines for Making Pyroxyline Collars, of which the following is a specification.

Our invention has reference to improvements in machines for cutting pyroxyline or celluloid collars from webs of that material on the interlocking principle, and incidentally to the cutting of the collar the same is also embossed along one or more edges in imitation of a line or lines of stitching.

It has been found that webs of pyroxyline when delivered by the manufacturer, are warped or buckled by reason of unequal contraction. This contraction continues for a very long time, and no means have so far been discovered for keeping sheets or webs of pyroxyline compound straight. It is invariably found that when placed upon a plane surface the web or sheet will touch that surface at only a few points. This is not the case immediately upon the completion of the manufacture of the sheet pyroxyline, but it is the case within a very short time after its manufacture, and continues so at all times thereafter. Another defect of sheet pyroxyline as delivered by the manufacturer is due to the peculiarities of the manner of making it. Sheets or webs of pyroxyline compound are cut from blocks or cylinders while the same are in a green or semi-plastic state, in about the same manner in which veneer is cut from wooden blocks or cylinders, that is to say, by taking shavings from such blocks or cylinders by means of sharp cutting blades. It then occurs that by reason of the unequal density of the material, the cutting edge does not take hold of the material with the same ease throughout its whole width, and at the places where greater resistance is met with by the cutting edge, the sheet becomes wrinkled. These wrinkles remain in the sheet or web after the material has become solidified and they become more pronounced

in the course of solidification. In consequence thereof, when sheet pyroxyline or web pyroxyline is received by the manufacturer of shirt collars the material, or as it is technically called, the "stock," is invariably warped, buckled and wrinkled. This condition of the pyroxyline stock causes considerable trouble in the cutting out of collars, and this is the reason why it has heretofore been found impracticable to cut collars of that material from webs upon the so-called "interlocking principle," which is commonly practiced in the manufacture of paper collars, and which has been found to offer great advantages both as respects the ease of manipulation and the saving of material.

The cutting of collars upon the interlocking principle requires that a strip or web, having a width equal to the widest part of the collar plus the narrowest part of the same, with parallel straight edges, be fed intermittently under suitably shaped cutters, which split the strip upon oblique lines, marking off both the narrowest and the widest parts of two collars, the narrow part of one collar corresponding to the wide part of the other. In this split condition the strip or web has to be farther fed through the machine and the next cut made must join the first cut without perceptible break or kink in the line of the cut. This is easily effected in the case of paper collars, since a paper web has practically no warp or buckle, and whatever trace of warp or buckle there may be in the paper, is laid down sufficiently well by the feed rollers between which or over which the paper passes to the cutters. When this practice is attempted upon pyroxyline stock, it is found that by reason of the warped condition of the strip or web, the feed rollers advance one edge faster than the other so that the strip is not presented to the cutters in the proper position to start with, and that at the next succeeding feed for the continuation of the first cut, the stock is presented to the cutters in a slightly different manner from that in which the first part had been presented, so that the second cut does not imperceptibly merge into the first, but either leaves a gap or a kink in the line of the cut, whereby the

collars are spoiled. For these reasons it has heretofore been found impracticable to cut pyroxiline collars upon the interlocking principle from strips or webs, and the practice  
 5 has been to cut them from wide sheets, which were piled upon each other, then forcibly compressed, and then stamped out with suitable cutting dies, which thus produced a dozen or more collars at one cut, but which  
 10 did not admit of the practice of the interlocking principle, and therefore caused a considerable waste of material.

Now it is the object of our invention to overcome these difficulties, and we do over-  
 15 come the same by providing means for treating the strips or webs of pyroxyline stock in such manner as to take out all warps or buckles immediately before the stock is fed under the embossing and cutting dies. This  
 20 result is effected by a heating table and accessory devices, whereby the stock is moved in contact with and pressed against a smooth surface and is heated to a temperature sufficient to make it slightly plastic. The warps,  
 25 buckles and wrinkles are thereby straightened out, and the web is then passed between the embossing and cutting dies in the same, if not a better, flat condition than paper strips. All this will more fully appear from  
 30 the following detailed description with reference to the accompanying drawings, in which I have illustrated, in—

Figure 1, a front elevation of the machine with parts in section and others removed, and  
 35 in Fig. 2, a plan view of the machine, partly in section.

That part of our machine by which the embossing and cutting of pyroxyline collars on the interlocking principle is performed, is  
 40 constructed substantially like other machines of this kind, heretofore used exclusively for the manufacture of paper collars but is modified in some particulars, as will appear farther on.

45 The embossing and cutting devices are mounted upon a table 1, projecting from one side of an upright frame 2, which in turn is mounted upon a suitable bench or support 3, and which in turn is supported at the ends  
 50 upon legs 4. Upon the table 1, is secured the lower die 5, of an embossing mechanism and the lower blade 6 of a shear or cutter, the embossing mechanism being near the feed end of the machine, and the cutter is in line  
 55 therewith near the delivery end of the machine, as shown. At each side of the die 5 and blade 6, are guide plates 7, elevated above the table 1, but parallel with the same, and in the inner edges of these plates are formed  
 60 grooves 8, shown in dotted lines in Fig. 2. These grooves receive and guide the edges of the strip or web 9, of the stock, which thus passes between the guide plates in a substantially horizontal plane, parallel with the plane  
 65 of the table 1.

Mounted on the frame 2, are the upright guides 10, 10, 10, 10, in which are mounted,

for vertical reciprocation, the slides 11 and 12. The slide 11 carries an overhanging head  
 13, to which is secured the upper embossing die 14; and the slide 12, carries the upper  
 70 cutter blade 15. The reciprocating die and cutter register with the lower embossing die and lower cutter blade respectively. The slides 11 and 12, and the die 14 and blade 15,  
 75 are reciprocated by pitmen 16, 17, respectively connected with the cranks 18, 19, fast on the shafts 20, 21, which carry the gears 22, 23, which mesh together, so that the two slides  
 80 11, 12, are reciprocated simultaneously. With one of these gear wheels 22, meshes a pinion 24, through which power is applied. It will thus be seen that if a web extends between  
 85 the guides 7, and the machine is set in motion, one portion of the same will be embossed in the lines of the edges of two interlocking collars, while another portion of the web will be cut in  
 90 two parts, longitudinally, along the lines of such interlocking edges, all as in ordinary paper-collar cutting machines. As will presently appear the web is fed forward after the  
 95 first cut has been made, and the next succeeding reciprocation of the dies will continue the embossing and the cutting of the web, and these new lines of embossing and  
 100 of cutting should join the preceding lines accurately, without break and without perceptible kink or change of direction. This can only be effected when the web is without  
 105 warps, buckles or wrinkles, as heretofore explained. The feeding of the web through the machine must be intermittent and any desired mechanism may be used for this purpose. In the present instance there is shown  
 110 the following mechanism: At the delivery end of the machine there are two sets of rollers 25, 26, between which the web is passed. The rollers 25 are mounted upon a shaft 27, at one end of which is a gear 28, loosely  
 115 mounted on the shaft, and another gear or ratchet wheel 29, adjacent thereto and fast on the shaft. The gear 28 carries a pawl 30, engaging the ratchet wheel when moved in one direction, but passing idly over it when  
 120 moved in the other direction. Meshing with the gear 28, there is a segmental rack 31, on the upper end of an arm 32, journaled in a suitable bracket on one of the legs 4. This  
 125 arm 32 is rocked so as to rotate the pinion 28 first in one direction and then in the other, by means of a pitman 33, secured to a wrist pin 34, fast on the gear 22, but adjustable thereon by means of a slot 35; so that the  
 130 throw of the arm 32, and consequently the length of the web fed, may be regulated. In addition to the feeding mechanism the delivery end of the machine is provided with suitable cutting off shears. The lower blade  
 135 of one of these cutting off shears is indicated at 36, in Fig. 2, as extending transversely at the end of the splitting center blade, while the upper blade of that cutting off shear is indicated in Fig. 1, at 37. The second cutting off shear is located forward of the feed

rollers 25, 26, and is indicated at 38. The lower blade of this second cutting off shear is fixed on the table 1, while the upper blade reciprocates in guides 39, and is actuated by a mechanical connection 40, with the cutter 15, as shown in Fig. 1. The cutting off shear 36, 37, severs one of the interlocking collars which is now taken hold of by one pair of the feed rollers, 25, 26, and then by a pair of smaller feed rollers 41, and is thus expelled from the machine. The cutting off shears 38, sever the companion interlocking collar from the web, which then falls into a receptacle below the forward edge of the table.

The machine so far described could not be used for working upon pyroxyline stock for the reasons heretofore stated, and my improvement upon this machine by which it is made possible for use upon pyroxyline stock, is in the nature of an addition or appendix to the same, co-operating, however, with the same in so far as it prepares the material for being embossed and cut on the interlocking principle. This co-operating addition to the ordinary collar machine is as follows: At the feed end of the machine there is mounted upon a table 1, an iron frame work 42, which is angular in shape as shown, and is provided with a number of spaced bearings 42', for the journals of a tension roller 43, and below this tension roller there is fixed in the frame a small and smooth hollow cylinder 44, parallel with said roller. To the forward end of the frame 42 is secured one end of a curved hollow casting 45, the other end of which may be supported in any suitable manner, and in the drawings it is shown as supported by the pipe 46, which leads into the hollow of the table. This pipe may be tapped steam tight into the table, or it may loosely pass into the same and extend in devious paths through the hollow of the table from which it emerges at 47, and is extended by a pipe 48, into the smooth hollow cylinder 44, and from the other end of this hollow cylinder an exit pipe 49 issues. Through this system of pipes, steam under considerable pressure is passed, so that the hollow casting or heating table 45, and the hollow cylinder 44 are heated to such temperature that a web of pyroxyline moved in contact over the same will be heated up to the point where it becomes slightly plastic. I have found that the steam pressure need not exceed eighty pounds. The whole heating table, hollow cylinder and frame 42, together with its accessories, are inclosed by a casing 50, of sheet iron or other suitable material, and this casing is provided with a hinged flap or door 51, which permits access to this part of the machine for inspection and repair.

For the purposes of our invention the head 13, of the reciprocating embossing die 14, is made hollow, and two flexible pipes 13' and 13'', are connected with the same. By these pipes, a chilling fluid is passed through the head 13, whereby the die 14, is maintained at

constant low temperature, for a purpose which will presently appear.

The operation is as follows: The web 9, of pyroxyline coming from a roll at any distance from the machine passes under a roller 9', below the flap or door 51, and is then received upon the cast iron heating table 45, then passes over the tension roller 43, and under the hollow cylinder 44, and between the guides 7, of the collar cutting mechanism. The tension to which the web is subjected in passing from the roller 43 under the hollow cylinder 44, may be varied by placing this roller nearer or farther away from the cylinder, in the bearings 42'. The web is dragged through the machine by the feed rollers 25, 26, which have to overcome the resistance produced by the tension roller 43, in conjunction with the hollow cylinder 44, and by the friction of the web upon the heating table which is still further increased by the weight of the loop which passes under the roller 9'. In this manner the pyroxyline web in its buckled, warped and wrinkled condition is moved in intimate contact with and over the smooth convex surface of the heating table and in contact with the heated hollow cylinder 44. The effect of this is that the pyroxyline web becomes slightly plastic, although less so than when it was in the green state in which it was cut from the block. Being in this condition, and being pressed against the smooth surfaces of the heating table, the tension roller and the heated hollow cylinder, it issues from the latter perfectly smooth and flat, and while traveling between the guides 7, it is acted upon by the embossing dies and cutters in the same manner as if it were paper, that is to say, the successive impressions of the dies and the successive cuts will join accurately without breaks and without sensible kinks or changes of direction. Thus pyroxyline collars and other like articles can be cut from the web on the interlocking principle. When in its travel through the machine the web arrives at the embossing dies, it is still slightly plastic and this is a great advantage, since it facilitates the production of the imitation of the stitching or the production of any other similar design, in that there is no danger of cracking the stock as would be the case if it were cold and consequently hard and brittle. The reciprocating embossing die, however, being chilled, as hereinbefore described, will, in turn chill the web while the same is being embossed so that by the time the stock arrives at the cutters it is quite chilled and is cut along the interlocking line quite smoothly. It will be understood that the casing 50 inclosing the frame 42 which supports the tension roller 43, in the space which is occupied by the heating table and the heated hollow cylinder 44, all these parts will be uniformly hot, or very nearly so, but that the rest of the machine will not be perceptibly heated thereby. The reciprocating embossing head can, therefore,

be easily maintained chilled, since it is only very slightly heated by the temporary contact with the heated web.

Having now fully described our invention, we claim and desire to secure by Letters Patent—

1. In a machine for cutting pyroxyline collars from a web upon the interlocking principle, the combination of suitably shaped cutters and web feeding devices, with a heated table supporting the web under tension in its travel to the cutters, and thereby heating and straightening the web, substantially as described.

2. In a machine for cutting pyroxyline collars from a web upon the interlocking principle, the combination of suitably shaped cutters with heated surfaces in the line of travel of the web to the cutters, and feeding devices for dragging the web over said surfaces and thereby heating and straightening the same, substantially as described.

3. In a machine for making pyroxyline collars, the combination of a heating table and feeding devices for moving a web of pyroxyline in contact with the table so as to heat and straighten the web; with suitably shaped cutters for splitting the web on the lines of two interlocking collars, and a chilled die or dies located in advance of the cutters for embossing and chilling the web before it is cut, substantially as described.

4. In a machine for cutting pyroxyline collars from a web upon the interlocking principle, the combination with suitably shaped cutters and web feeding devices, of a convexly curved heated table supporting the web under tension in its travel to the cutters and thereby heating and straightening the web, substantially as described.

5. In a machine for cutting pyroxyline collars from a web upon the interlocking principle, the combination with suitably shaped cutters and web feeding devices, of a heated table and a tension device comprising an adjustable roller and a fixed heated cylinder in the path of the web in its travel to the cutters, substantially as described.

6. In a machine for cutting pyroxyline collars from a web upon the interlocking principle, the combination with suitably shaped cutters and web feeding devices, of means located in advance of the cutters for removing warps, buckles, and wrinkles from the web which means comprise a curved heated table over which the web is drawn, a fixed heated cylinder in the path of the web, and a roller between the table and cylinder and adjustable relative thereto to regulate the tension of the web, substantially as described.

7. In a machine for cutting pyroxyline collars from a web, upon the interlocking principle, the combination with suitably shaped cutters, a chilled embossing die, and web feeding devices, of means located in advance of the collar shaping devices, for removing kinks and wrinkles from the web, which means comprise a curved, heated table and fixed heated cylinder in the path of the web, and a roller between the table and cylinder, adjustable relative thereto to regulate the tension of the web, substantially as described.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

GUSTAVUS A. GOLDSMITH.

ALFRED K. MERRILL.

Witnesses:

O. VAN VALKENBURGH,  
MORRIS COHEN.