L. HULL.

MACHINE FOR CUTTING CAOUTCHOUC, &c., INTO STRIPS AND THREADS.

No. 37,446. Patented Jan. 20, 1863.

Fig. 3.

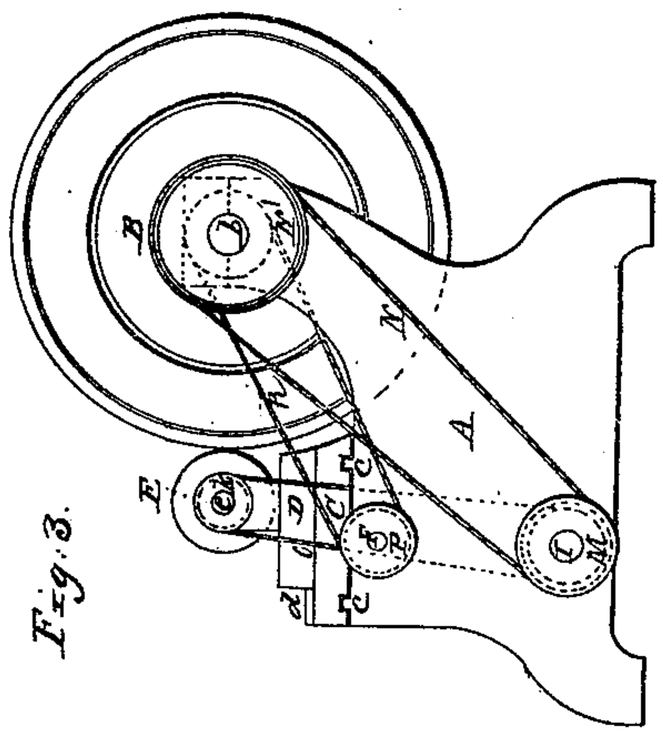


Fig. 4.

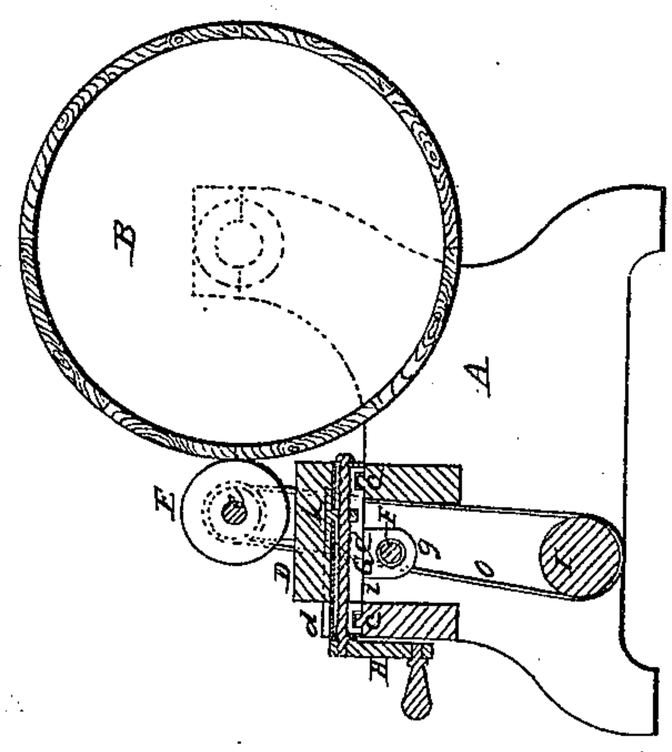


Fig. 1.

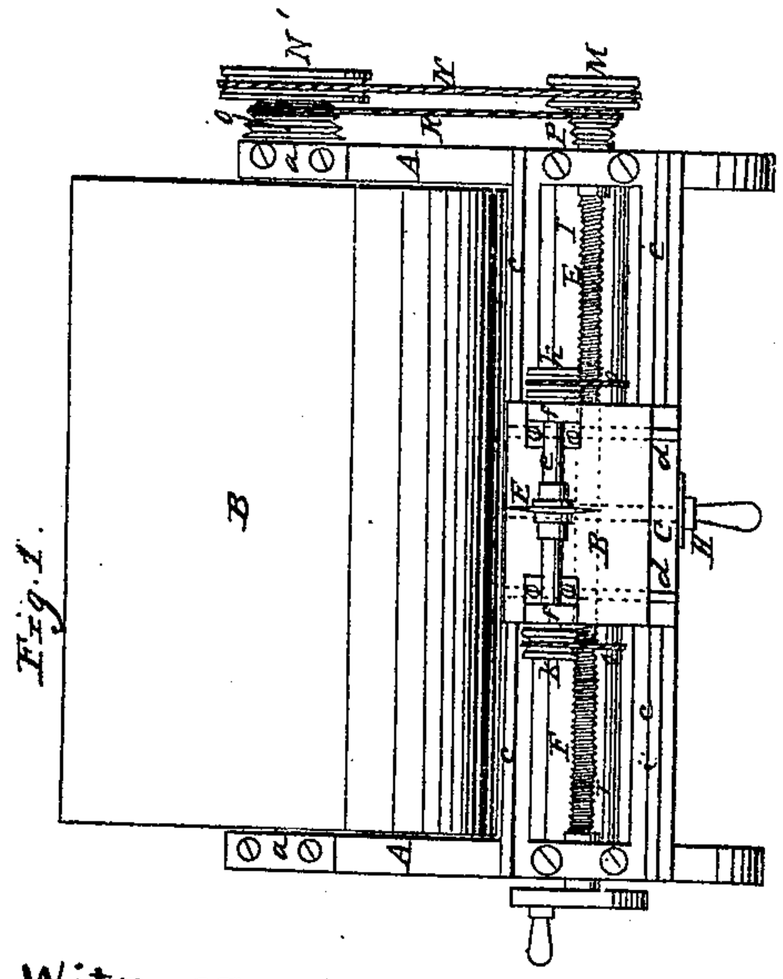
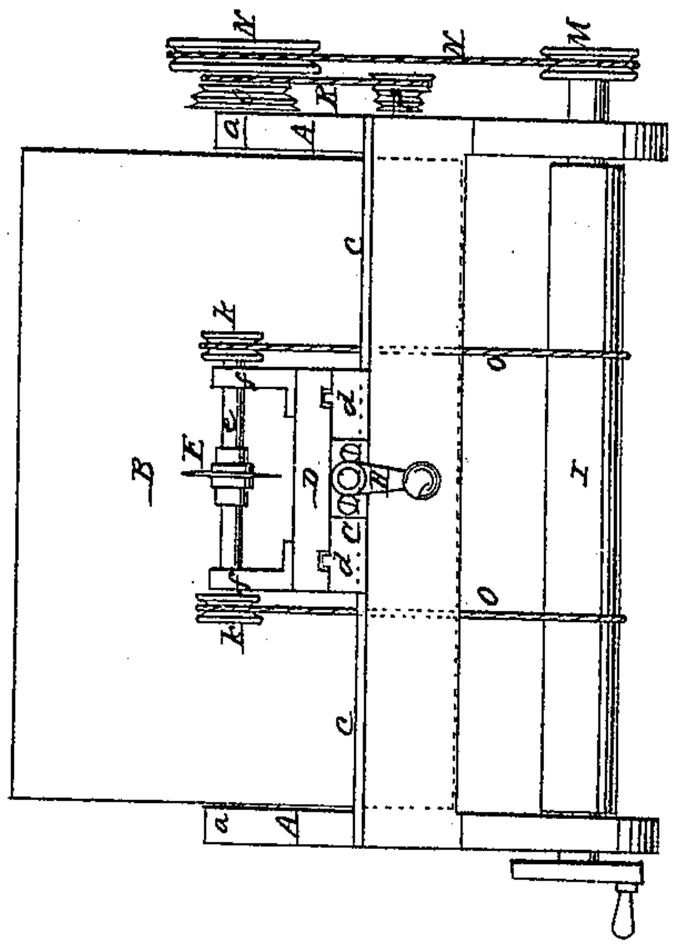


Fig. 2.



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UNITED STATES PATFNT OFFICE.

LIVERAS HULL, OF CHARLESTOWN, MASSACHUSETTS.

IMPROVED MACHINE FOR CUTTING CAOUTCHOUC, &c., INTO STRIPS AND THREADS.

Specification forming part of Letters Patent No. **37,446**, da'ed January 20, 1863.

To all whom it may concern:

Be it known that I, LIVERAS HULL, a citizen of the United States of America, and a resident of Charlestown, in the county of Middlesex and State of Massachusetts, have made a new and useful invention having reference to the separating of a sheet of caoutchouc into narrow filaments or strips; and I do hereby declare the same to be fully described in the following specification, and represented in the accompanying drawings, making part thereof.

Of the said drawings, Figure 1 exhibits a a top view, Fig. 2 a front elevation, Fig. 3 a side elevation, and Fig. 4 a transverse section, of a machine for cutting or separating caoutchouc in the manner herein proposed.

A sheet of caoutchouc, as usually made for ~~being cut into~~ shreds or strips for being woven into suspenders or other elastic fabrics, is usually formed of considerable length, forty yards being no uncommon length, the width being such as may be desirable within the capacity of the machine by which the sheet may be produced. Such a sheet is, by the machine above mentioned, and hereinafter described, to be separated lengthwise into a series of narrow bands or strips, all the cuts through the piece being made by one continuous cut of the cutter of the machine.

I do not employ a series of knives or rotary cutters, placed parallel to each other, and arranged at small distances asunder, and run them in a body over the sheet from end to end of it; but I make use of but one cutter, and with the same employ a cylindrical drum or its equivalent, so arranged with respect to the cutter that the latter, provided with suitable mechanism for putting it in motion, shall be caused to travel across the cylinder or drum from end to end of it with a regular velocity, and to cut in a helical path through a piece of caoutchouc, when wound around the external curved surface of the drum or cylinder one or more times—that is, either once or less than once, or in a "spiral" about the said surface. By the term "spiral," about such surface, I mean the curve, which is inherent to the mainspring of a watch.

In the drawings, A denotes the frame of the machine, as supporting in boxes *a a* the shaft *b* of a cylinder or drum, B, and as provided with two parallel ways or rails, *c c*, for sustaining and guiding a carriage, C. On the upper surface of the carriage C are two ways or rails, *d d*, which are arranged to extend at right angles to the surface of the cylinder, or crosswise of those on which the carriage C travels. The said rails *d d* support and guide a puppet-head or cutter-carriage, D, which carries a revolving circular knife or a cutter, E, whose shaft *e* is arranged within standards *f f*, projecting upward from the said carriage D. A long screw, F, fixed in the frame A, except in being capable of being rotated transversely, screws through a projection, *g*, extending from the under side of carriage C. There is also another screw, G, arranged within the carriage C, and so fixed therein as to be stationary with respect to such carriage, except in being capable of being revolved by a crank, H. This latter screw screws through another projection, *h*, which extends downward from the cutter-carriage D and into a groove *i*, which is made in the carriage C. A long rotary driving-drum, I, is arranged within the frame A, and underneath the screw F, as shown in the drawings. Two endless bands, *o o*, go around the said drum, and two grooved pulleys, *k k*, fixed on the rotary cutter-shaft. There is a pulley, M, on the end of the shaft of the driving-drum. An endless band, N, goes around this pulley and another pulley, N, fixed on the shaft of the main drum B. Furthermore, there is a cone-pulley, O, on the main drum-shaft, and there is also another such cone-pulley, P, on the journal of the screw F. An endless band, R, runs around the two cone-pulleys.

From the above it will be seen that when the driving-drum is put into revolution, not only will the main drum and the rotary cutter be revolved, but the latter will have a uniform lateral movement imparted to it in a direction parallel to the axis of the main drum.

Preparatory to a sheet of caoutchouc being reduced to strips by the said machine, it is to be carried around the curved surface of the main drum, and to be suitably affixed thereto by cement or other means. As each strip, as usually made for being converted into strips for elastic webbing, would be several times longer than the circumference of the main drum, it is to be wound about the drum in a watch mainspring curve or spiral. After being so wound, the knife or rotary cutter is

to be forced into the strip, so as to cut at once entirely through all the layers of caoutchouc, and when the machine may be put in action, although the path cut by the rotary cutter will be a helix extending around the main drum from end to end, it will be found afterward, or when the piece of caoutchouc may have been removed from the drum, that such piece will be cut lengthwise from end to end of it in a series of parallel strips.

I am aware of the rawhide-cutting machine patented January 9, 1841, by Philip B. Holmes and William Pedrick, and therefore I do not claim such as my invention, it having its parts so arranged as to cause it, when in operation, to cut a hide spirally and into one long piece or strip in the shape of a watch mainspring spiral. My invention is intended to operate differently. It cuts the sheet of caoutchouc by one continuous helix, and by means of a drum or cylinder, instead of a flat rotary table operating in connection with the knife or rotary cutter, and my said machine cuts the sheet of caoutchouc longitudinally, or in the direction of its grain, rather than in all directions, as is the case with the other machine referred to. When caoutchouc is cut in a spiral, as by the machine of the said Holmes and Pedrick, it is apt to twist more or less, and to render more or less uneven the fabrics into which it may be interwoven; but when cut in straight strips in the direction of its grain it is far better for use in making elastic woven goods.

I am also aware that machines are not new in which are employed a rotary knife to cut and a single cylinder to carry or support, the sheet of caoutchouc, and therefore I lay no claim to such. These machines have been so constructed that the cylinder of each had a lateral movement in the line of its axis, the rotary cutter to each cylinder being stationary, except in being revolved while in operation. Nor do I claim machines which have been made not only with two cylinders to carry or support an endless belt of caoutchouc, but with two rotary cutter or shears, provided with mechanism not only for rotating them on their axes, but for imparting to them a traversing motion parallel to the axes of the cylinders. Each of these systems of machines last mentioned, although having in common with my machine a rotary cutter, and one or more cylinders to support the material to be cut, differs from my machine in important particulars, for in my said machine but one cylinder or drum is employed to sustain the caoutchouc, and the cutting-knife, instead of the drum or cylinder, has a traversing motion. The consequence is that a machine constructed on my improved plan will not take up half or near so much the space as would be required for either the second or third of the machines above mentioned and disclaimed. The machine for operating on the endless belt of caoutchouc differs from mine, because it requires two cylinders to support the caoutchouc; and, furthermore, it is necessary for the operation of the double-cylinder machine that the caoutchouc should be reduced to the state or be made in the form of an endless belt. It may also be remarked that in this latter machine there is no mechanism for moving the rotary shears of or cutters up to and away from the surface either of the drums or cylinders.

I claim—

My improved caoutchouc-cutting machine, having its several parts constructed and arranged in manner and so as to operate substantially as described, such machine not only having a single drum or cylinder to support, and a revolving knife to cut, a sheet of caoutchouc, as explained, but having machinery for traversing the rotary knife with reference to the drum, and also having machinery for moving such knife toward and away from the drum, as specified.

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Witnesses:

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