

M. GANDY.

APPARATUS FOR STRETCHING BELTS.

No. 388,551.

Patented Aug. 28, 1888.

Fig. 1.

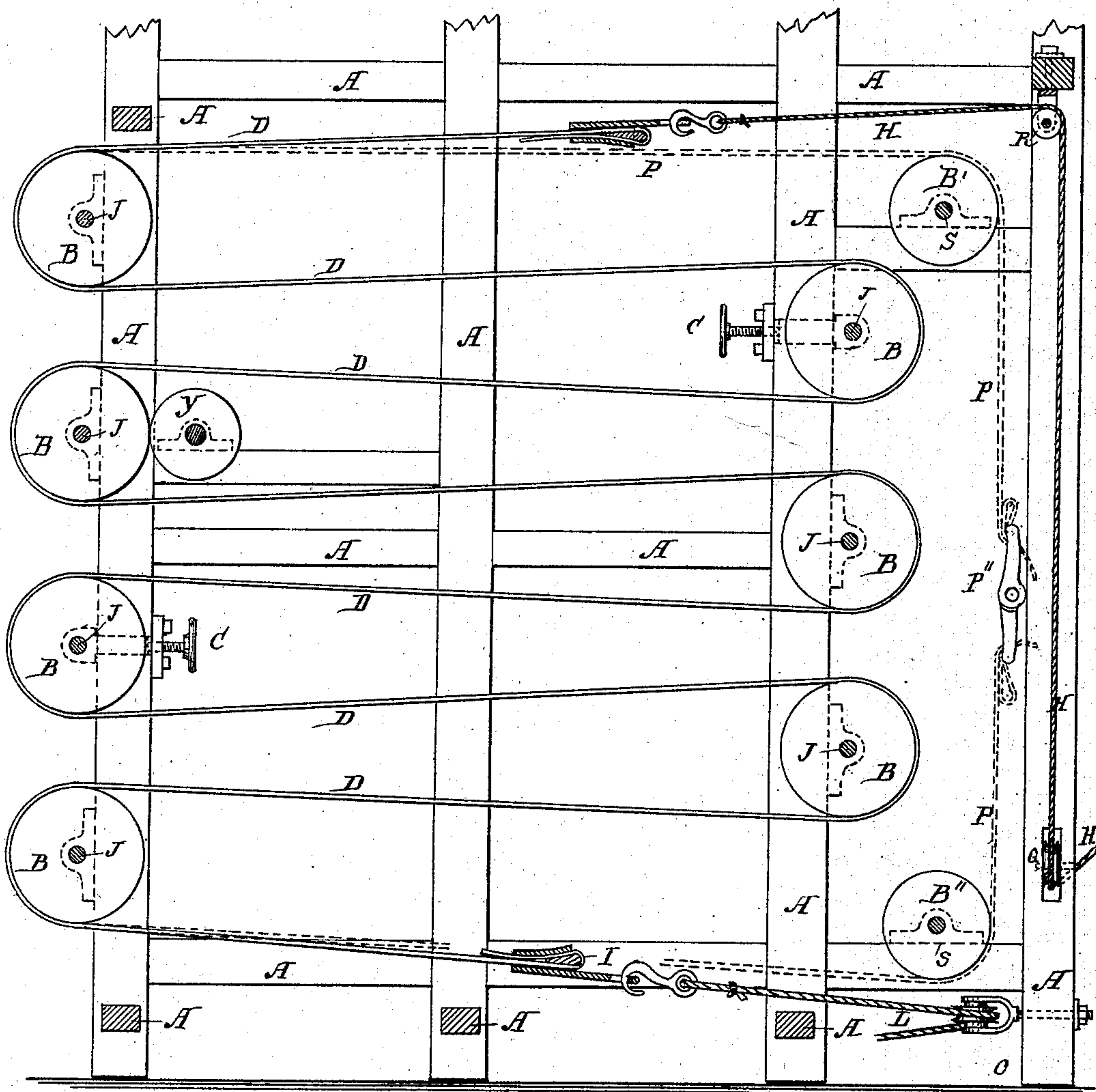


Fig. 8.

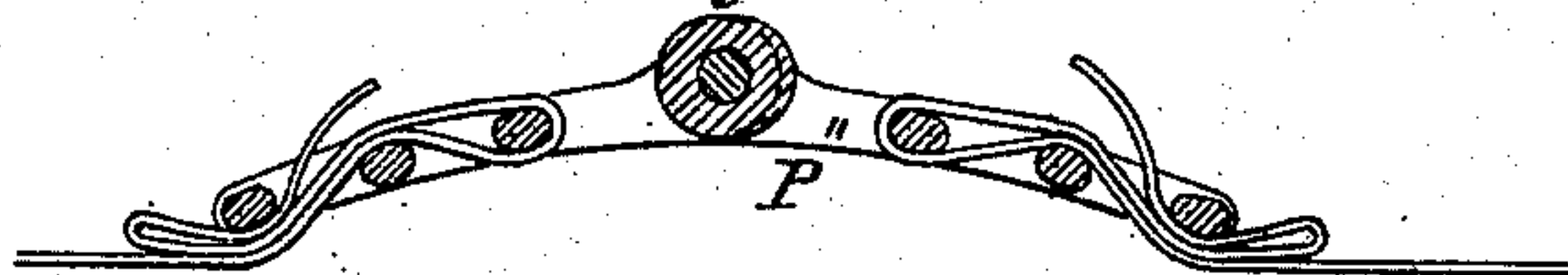
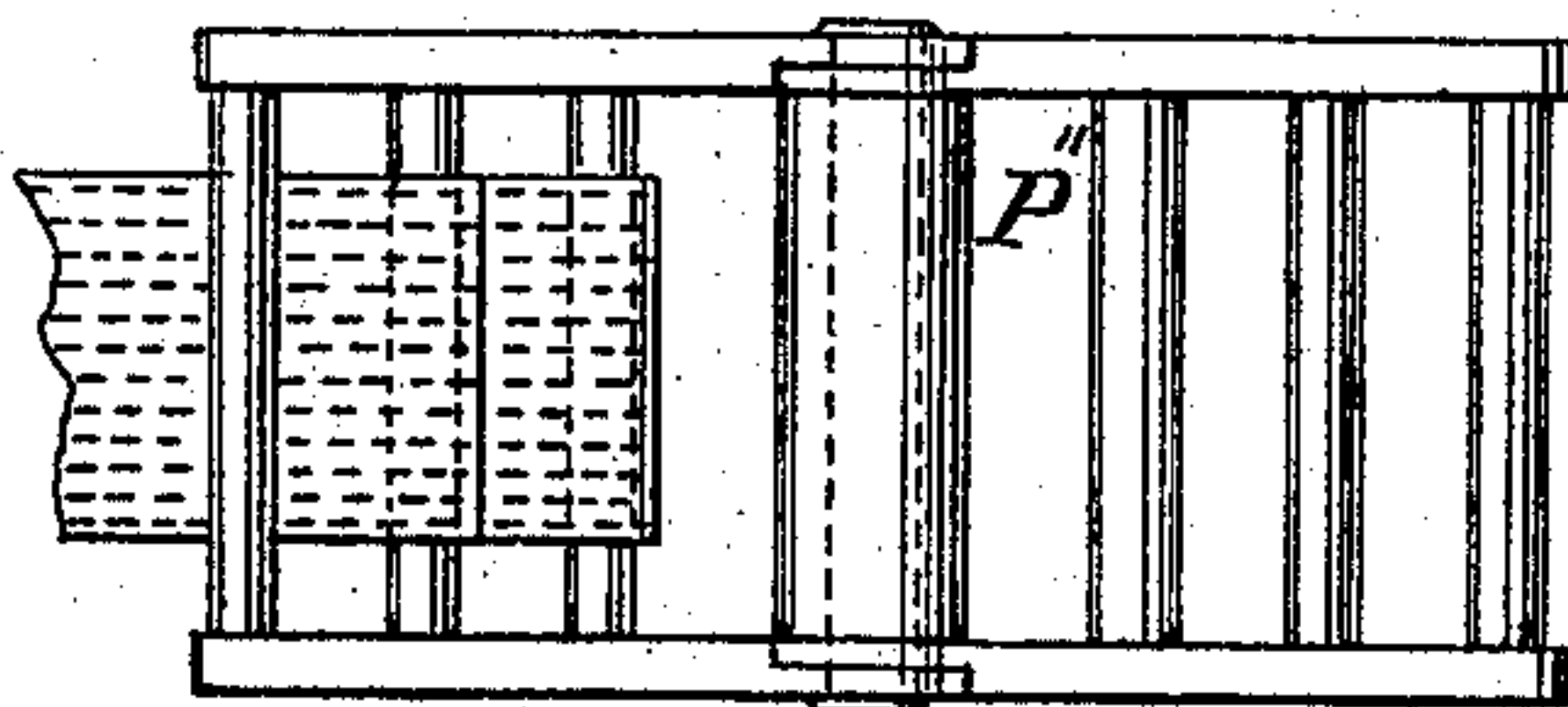


Fig. 7.

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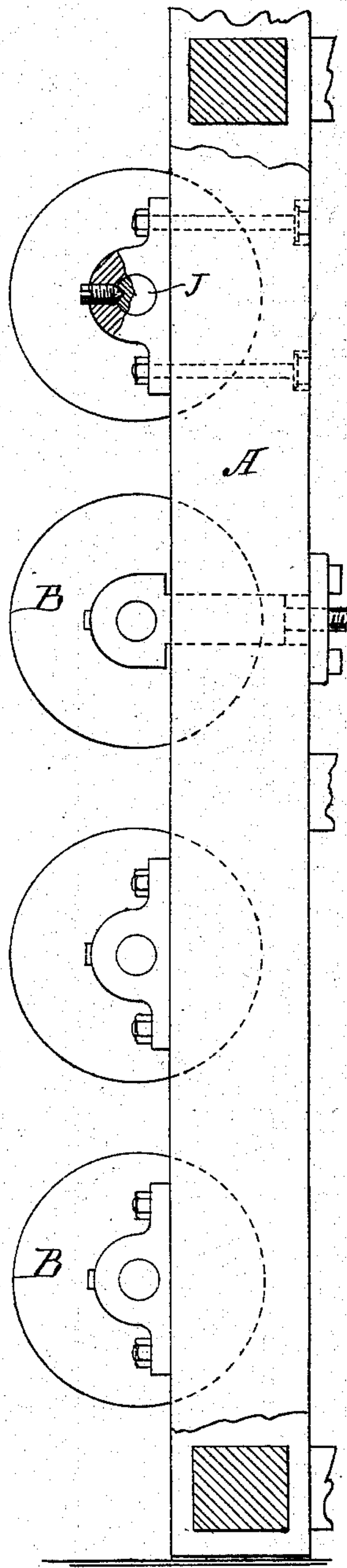
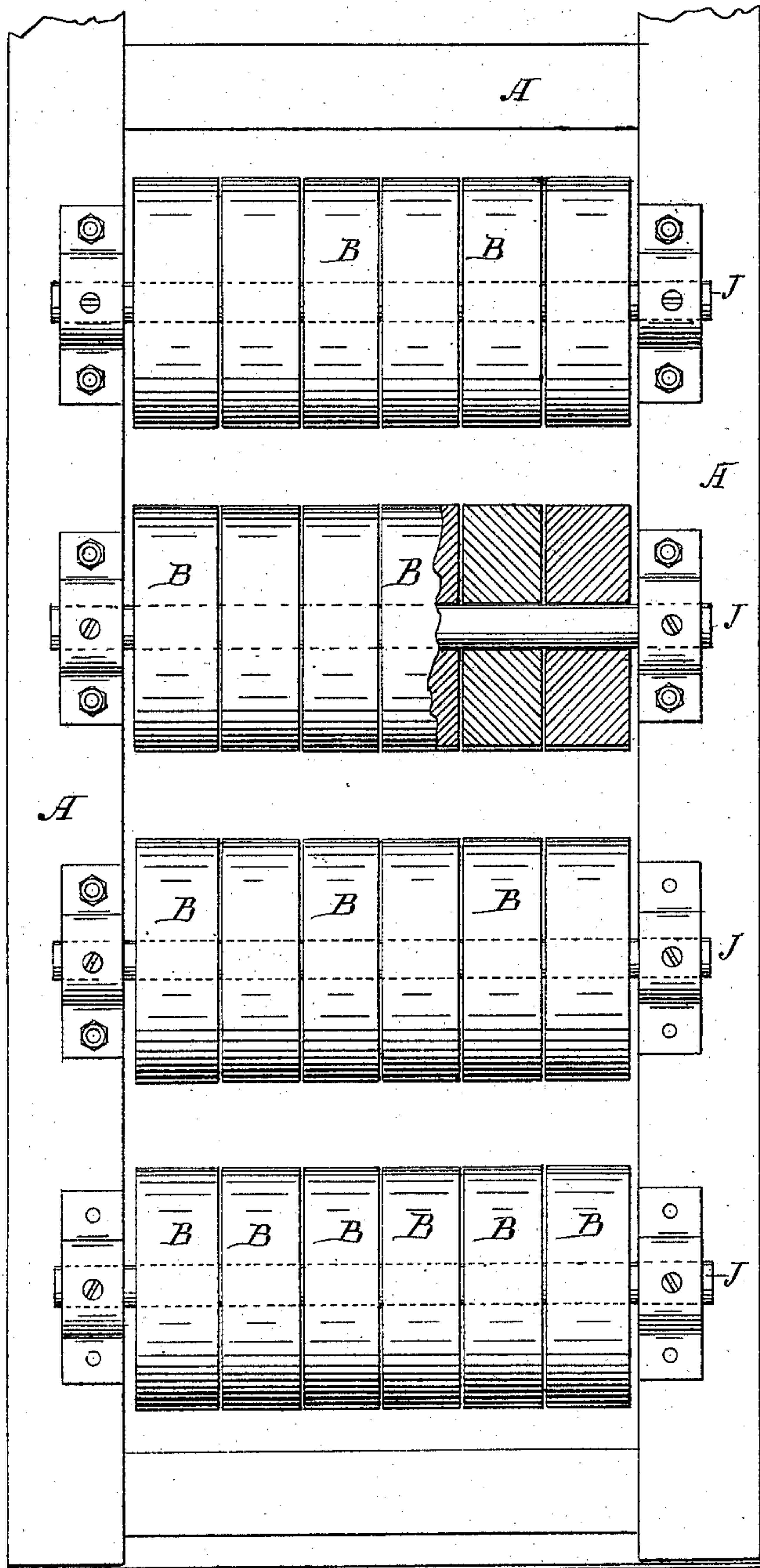
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Fig. 2

Fig. 3



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(No Model.)

3 Sheets—Sheet 3.

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Fig. 4.

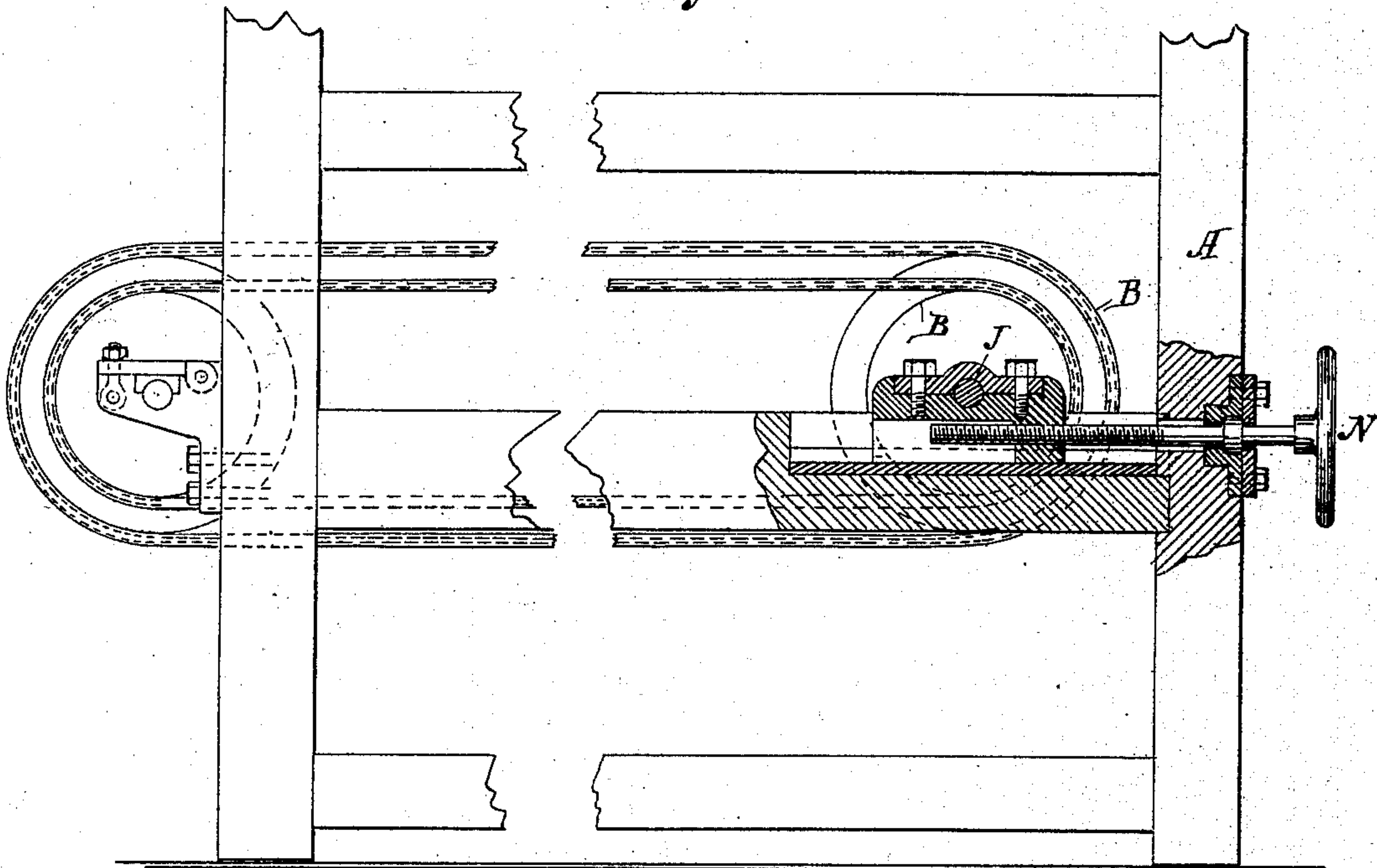


Fig. 6.

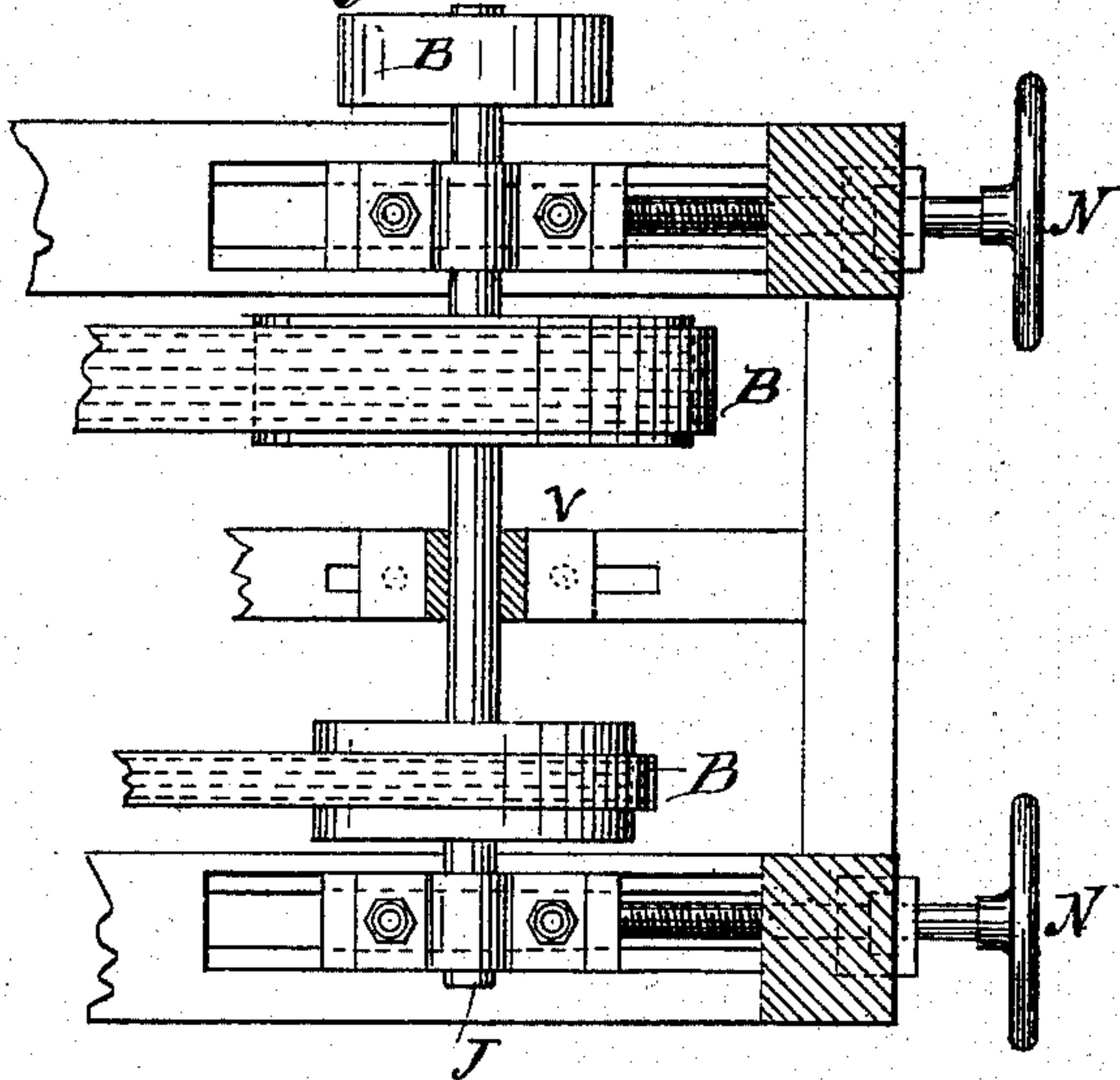
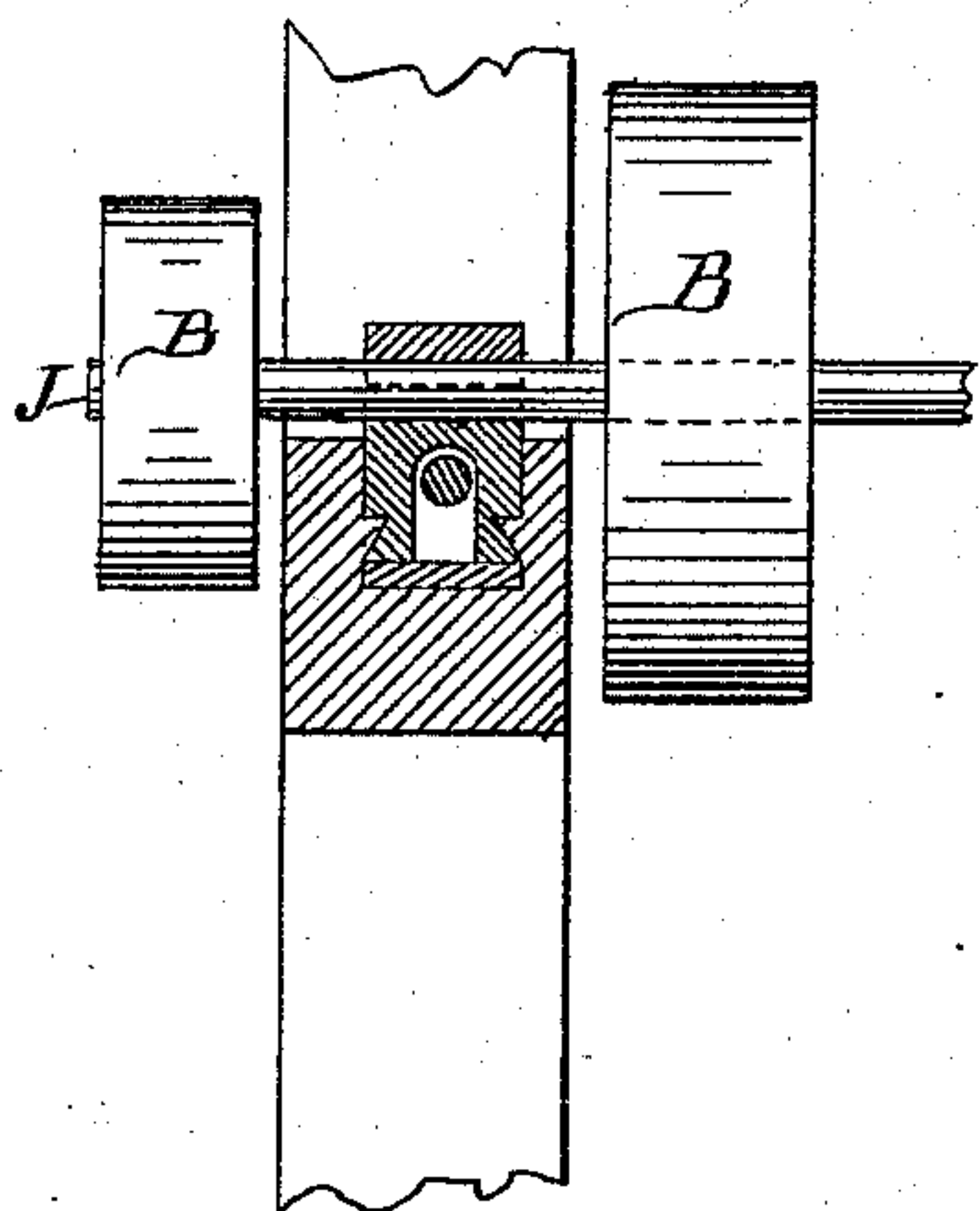


Fig. 5.



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR STRETCHING BELTS.

SPECIFICATION forming part of Letters Patent No. 388,551, dated August 28, 1888.

Application filed September 2, 1884. Serial No. 142,072. (No model.)

To all whom it may concern:

Be it known that I, MAURICE GANDY, a subject of the Queen of Great Britain, residing in Liverpool, county of Lancaster, England, have invented a new and Improved Apparatus for Stretching Belts for Driving Machinery, of which the following is a description in such full, clear, concise, and exact terms as to enable any one skilled in the arts to which said invention appertains, or with which it is most nearly connected, to make and use the same, reference being had to the accompanying drawings, making part of this specification, and to the figures and letters of reference marked thereon.

Figure 1 of said drawings is a side elevation of one form of my said apparatus, illustrating a belt in process of being stretched; Fig. 2, an elevation of one end of the same, showing one set of pulleys partially in section; Fig. 3, a side elevation of said end view, showing the plan of carrying the pulleys upon the frame of the apparatus. Fig. 4 is a side elevation of a modified form of said apparatus adapted more especially to the stretching of endless belts. Fig. 6 is a top view of Fig. 4. Fig. 5 is a drawing of one of the parts in detail applicable to all the figures. Fig. 7 is a plan, and Fig. 8 a longitudinal section, of a clasp device for uniting the ends of the belt to each other in the stretching-machine.

The object of my invention is to stretch machine-belted as a part of the process of manufacturing it, and especially cotton belting, to its ultimate elasticity, in all its parts exactly alike, and in such manner that the normal condition of the new belt, when placed upon the pulleys, in point of elasticity will be the same as after it has been a long time in actual service. This object can only be accomplished by placing the belt in the stretching apparatus and stretching it under precisely the same conditions that obtain when the new belt is first put in operation and stretches upon the pulleys while in actual service. The belt should be stretched alike in all its parts by an equal strain applied to various points along its entire length and until the fiber and threads of the fabric have been drawn out to their ultimate elasticity. The belt should then be held and operated in that condition in the stretching apparatus until the

tendency of the fabric to react has disappeared and the elongated condition of the new belt becomes a part of its normal status. Taking the elasticity out of the belt during the operation of manufacturing it and as an element in its manufacture is a matter of very great importance, as well upon the score of economy as upon that of convenience. A belt, say of one hundred feet in length, made of the best material and in the best manner now known to belt-makers, will stretch from seven to fifteen per centum of its length. If, then, this elasticity is taken out of the belt and provided for by and during the process of making it, this percentage of material and labor is saved, as is also the annoyance and inconvenience of "taking up" the belt after it has been put in service.

It will be readily understood that a belt may be so long and heavy that a power gripped to one end of it merely for the purpose of moving it lengthwise would have to be so great as to tear the fabric at the point of gripping in merely overcoming the inertia of the belt. In this case the fabric would be stretched to its maximum at and near the point of gripping, while at the opposite end it would not be stretched at all. This is a principle that holds good in all cases in stretching belts by the application of power to one or both of its ends, as described and illustrated in my patent of December 26, 1881. The fabric will be sufficiently stretched at and near the point of gripping, but will be insufficiently stretched as the distance increases from that point; whereas the strain upon a belt in actual service is continually shifting to every point of its length, and is therefore stretched exactly alike through its entire length.

Another object of my invention is to stretch a number of belts in the same machine at the same time, and also to stretch a number of endless belts of different lengths in the same machine at the same time, and also to save the very great labor of handling heavy belts in the operation of stretching them.

Fig. 1 of the drawings illustrates a stretching apparatus consisting substantially of a frame composed of stout timbers A. Upon each end of this frame, in suitable bearings or journal-boxes, is mounted a series of shafts or gudgeons, J, upon each of which there is

placed a series of loose pulleys, B, as illustrated by Fig. 2, the corresponding pulleys on the several shafts, as they raise one above the other, being all made of the same width, the belt rising from the lowest pulley to the next above in the same vertical plane to the top, there being six pulleys on each shaft, making room for six distinct belts in the same machine at the same time, the belts all being of the same widths with the pulleys. The belts, however, may vary in width. One belt may be of the width of two or more pulleys, while another may be not more than half the width of any one pulley, without in any way affecting the principle or operation of the machine.

In operating this machine I make use of an ordinary hoisting-engine to draw the belt over the pulleys and stretch it in the first instance. I begin by securing one end of the belt, at I, say, to the end of a stout rope, L, provided with a suitable hook, as shown, the opposite end of the rope L being secured in the block O, or drawn through it to the hoisting-engine, as may be desired. The other end of the belt is then secured to a stout rope, H, the same as at I. This rope is then laced over the several loose pulleys, one above the other, as shown by D, the end being carried through the blocks R and O, and thence to the barrel of the hoisting-engine, by which the belt is drawn over the pulley, as shown by D D. As much strain is then put upon the belt by the hoisting-engine as it will bear in that position, the strain being applied to either one or both ends of the belt by connecting one or both ropes L, and H, upon the barrel or barrels of the stretcher, as may be desired. The belt being thus drawn up to its proper tension, may now be moved to and fro on the pulleys under high tension by reversing the motion of stretching apparatus, thus continually changing the points of support and strain upon it as it passes over the pulleys, either in one direction or the other, following the rope over the barrel or barrels of the hoisting-engine or other suitable apparatus, of which there are many that may be employed to draw and stretch the belt in the machine. A modification of this method of stretching the belt is shown in the drawings by the dotted line P. By this method the belt is drawn over the pulleys, as above described; but in this case the two ends of the belt, after being drawn over the pulleys, instead of being connected upon the barrel or barrels of the hoisting-engine, are joined together at P' by means of a clasp or coupling device, illustrated by Figs. 7 and 8, or any equivalent device which, while firmly securing the ends of the belt, will run freely around the pulleys, which are the essential characteristics of the device illustrated.

The respective ends of the belt being laced through the bars of the clasp in the manner shown, are securely held by it, making the belt continuous over the pulleys B', in addition to the pulleys B. The belt being drawn over these pulleys and the ends joined, as above de-

scribed, it is comparatively slack and must be drawn tight to stretch it. To obtain the necessary stretching strain or tension upon the belt in this case, I apply to each of the pulley-shafts J and S, or as many of them as may be necessary, a stretching screw N, as shown in Fig. 4, or any suitable substitute for such a screw—as, for example, that shown by C, Fig. 1. By means of these stretching or tension screws I can get any desired strain on the belt at many different points in its length, and by making the pulleys on one of the shafts “fast pulleys” and applying power to that shaft I can run the belt over the whole of the pulleys as an endless belt, tightening up the stretching-screws from time to time until the ultimate stretching capacity of the belt is reached, the clasp P' being hinged together in the center, so as to pass readily over the pulleys. By these means I get precisely the conditions that obtain in operating a belt in actual service, and in stretching it I get precisely the same result. I get a new belt out of which the elastic element has been permanently taken in the process of making and preparing it for market.

By Figs. 4 and 6 of the drawings is shown a modified form of the machine especially adapted to the stretching of endless belts. In this machine, as in the others, the stretching-screws N are applied to both ends of the pulley-shafts J, and the pulleys B are of different diameters, by which several endless belts of different lengths may be stretched on the same machine at the same time. The pillow-blocks that carry the shafts J and connect to the stretching-screws are set in recesses cut in the timbers, and slide in dovetail or grooved bearings, as shown in section by Fig. 5. For stretching endless belts the pulley-shaft J should project beyond each side of the frame far enough to carry a pulley, as shown by Figs. 5 and 6. By these means the belts are readily slipped on the pulleys; but should the pulley be put inside of the frame, as also shown by Figs. 5 and 6, the caps of the pillow-blocks must be made removable, that the shaft may be raised out of its bearing far enough to enable the belt to be slipped onto the pulley.

In the construction of the machine, where the work is heavy, to keep the shafts J from springing I place bearing-pieces V between the pulleys, as in Fig. 6, to support the shafts, and also to serve as guides to keep the belts in their proper position on the pulleys. I have also contemplated the use of a second shaft fitted with loose pulleys Y and set directly behind the shafts J, the face of the pulleys Y bearing against the face of the pulleys B and acting as a support to the shaft J, both shafts to be carried by the sliding block of the tension screws in all cases where they are applied to the pulley-shaft, the supporting-pulleys to be applied to all the pulleys, B and B', in case of need.

I am aware that the objects proposed to be accomplished by the above-described apparatus have for the most part been attempted

by others by means of machines of different construction and operation. It must be understood, therefore, that my invention is limited to the means, substantially hereinafter claimed, of stretching my belts.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The means substantially herein described of stretching belts as part of the process of manufacturing and preparing them for the market, which means consist of a frame, a series of shafts carried by said frame placed at suitable distances apart, a series of stretching pulleys mounted upon each of said shafts, and stretching devices with which said pulleys are provided.

2. In a belt-stretching machine, the combination of a frame, a series of shafts carried by said frame and placed at suitable distances apart, a series of stretching-pulleys mounted upon each of said shafts, and mechanism, substantially as described, independent of the belt and the tension applied thereto, for communicating motion to said pulleys, substantially as described.

3. In a belt-stretching machine, the combination of two or more shafts mounted one above the other upon the opposite ends of a suitable frame, said shafts being provided with

a series of loose pulleys and combined with tension-screws, substantially as described.

4. In a belt-stretching machine, a frame carrying a series of shafts and pulleys placed at suitable distances apart, combined with bearing-rollers *y*, substantially as and for the purpose set forth.

5. In a belt-stretching machine, the combination of a plurality of stretching-shafts provided with tension-screws, and upon each of which are mounted pulleys of different diameters, by which the capacity of the machine for stretching endless belts of different lengths on the same shafts is materially augmented, substantially as described.

6. In the process of stretching belts, the means substantially herein described of securing the ends of the belt, while at the same time the belt is kept taut and is permitted to run freely around the pulley in the operation of stretching, which means consists of the adjustable clasp into which the respective ends of the belt are drawn and secured, substantially as described.

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