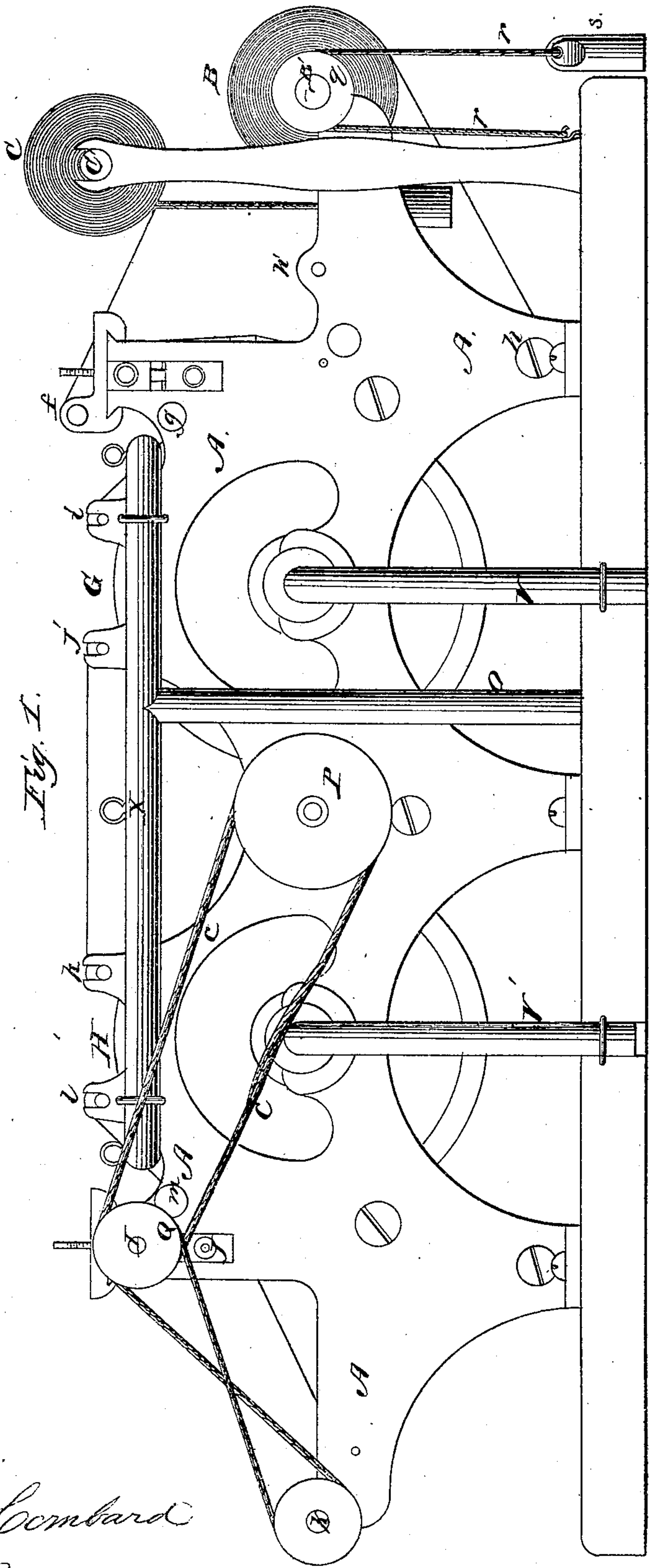


G. K. SNOW.

Machines for Uniting Paper and Cloth.

No. 134,105.

Patented Dec. 17, 1872.



Witnesses.

N. C. Lombard

F. H. Rogers

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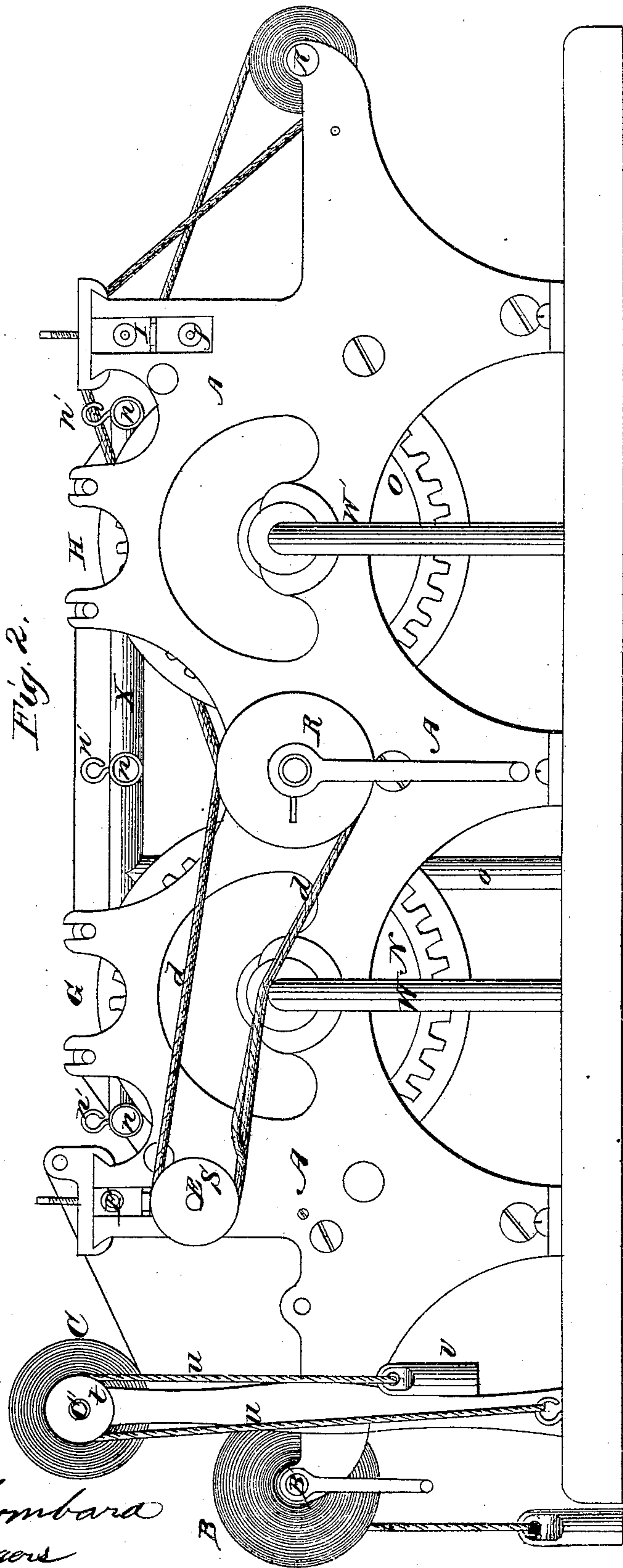
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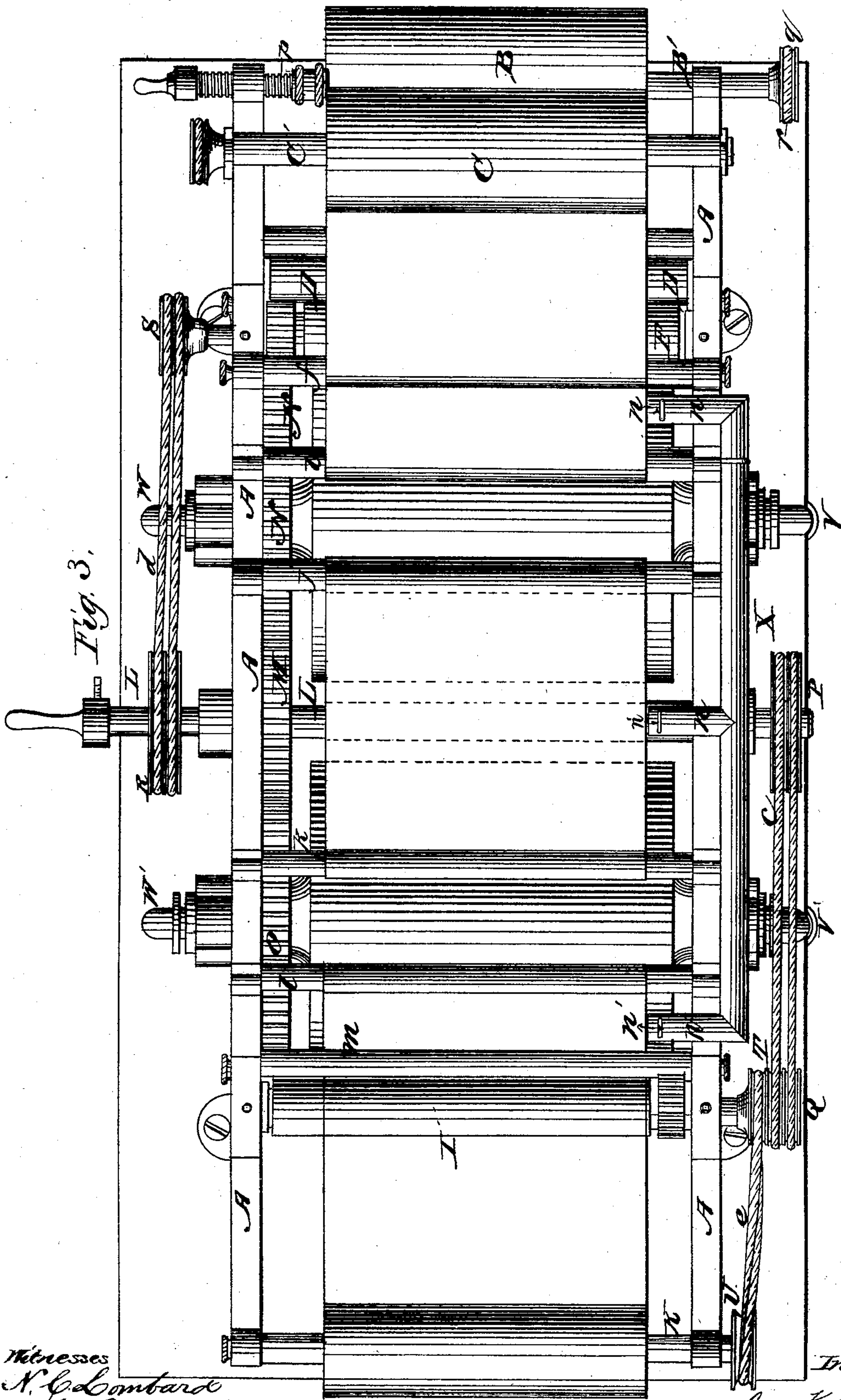
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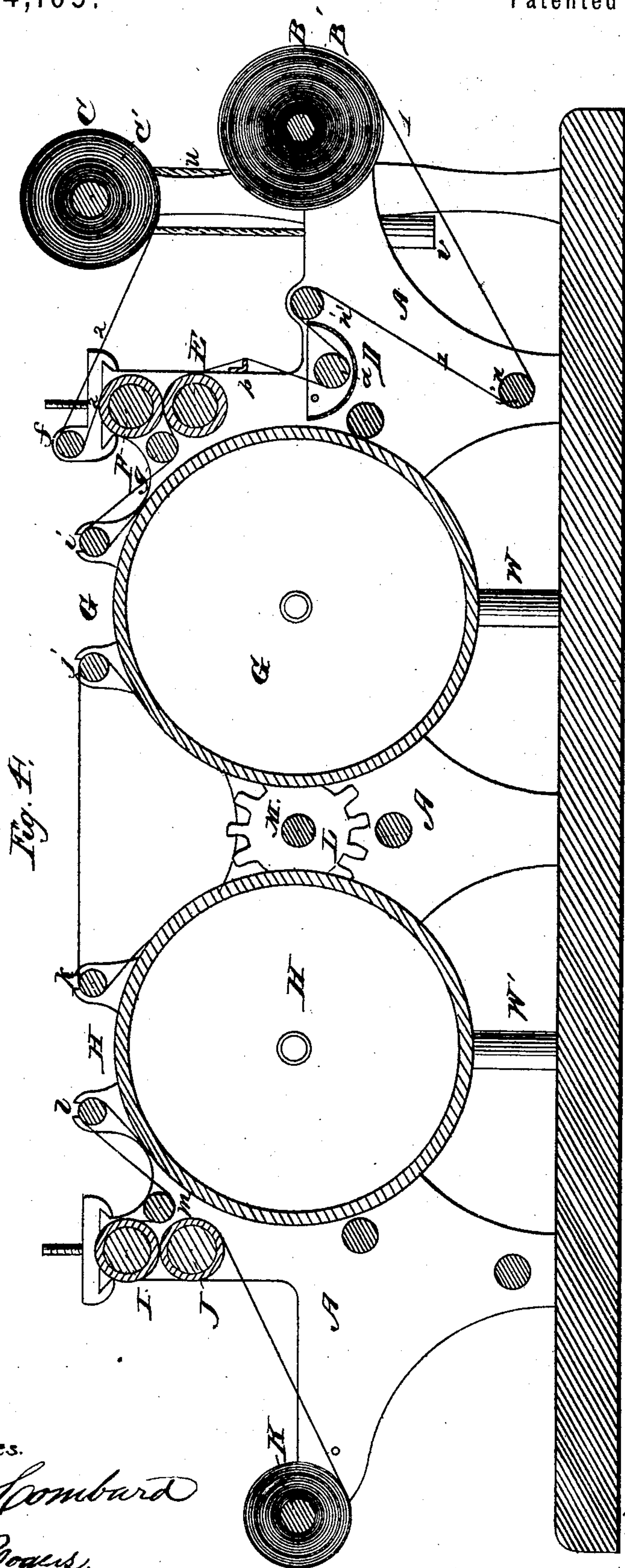
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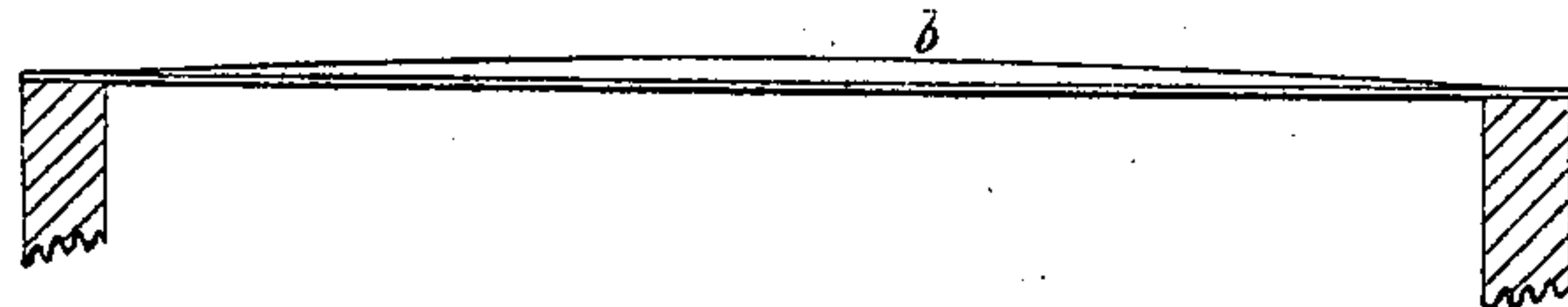


FIG. 6.

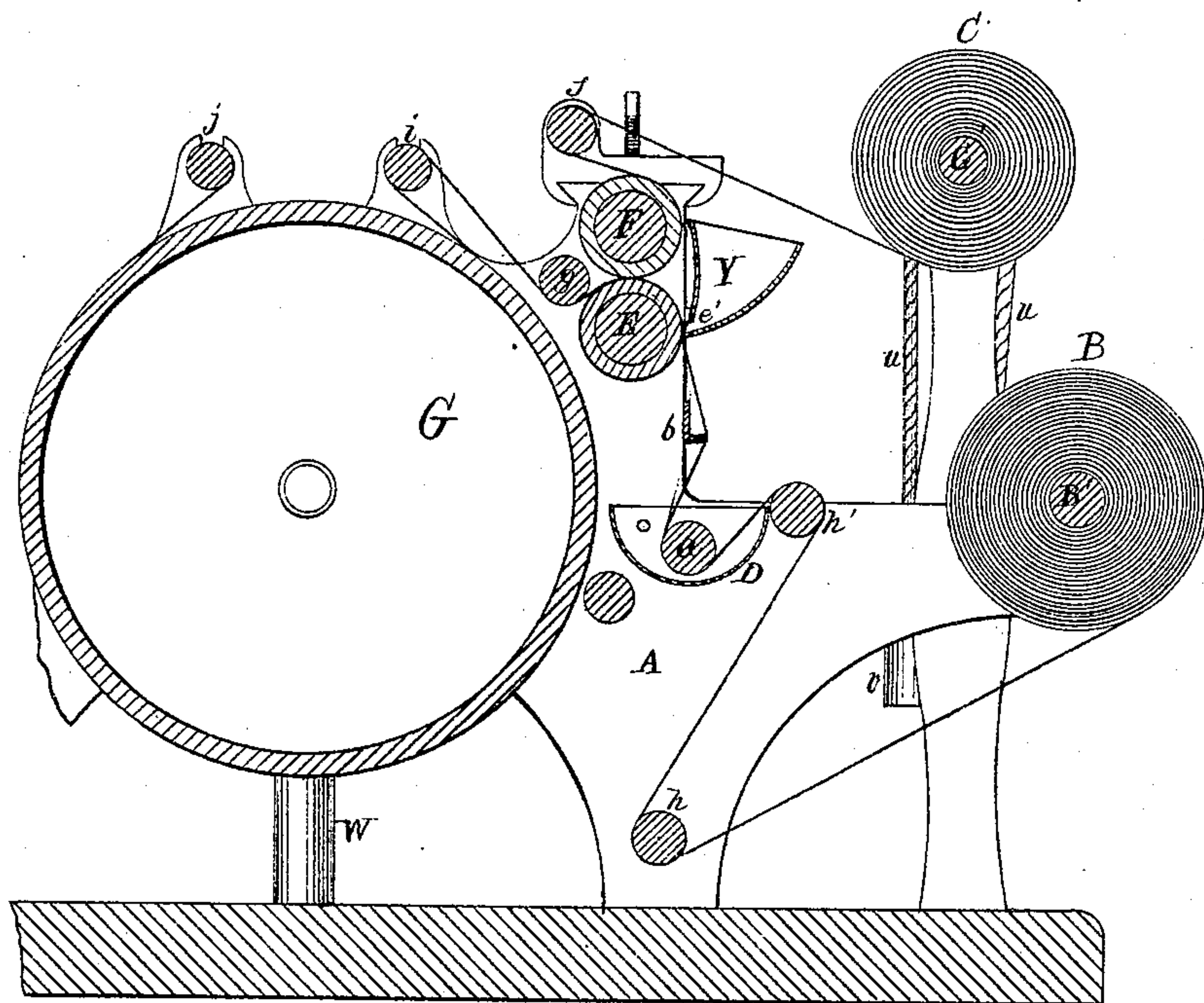


FIG. 5.

WITNESSES.

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UNITED STATES PATENT OFFICE.

GEORGE K. SNOW, OF WATERTOWN, MASSACHUSETTS.

IMPROVEMENT IN MACHINES FOR UNITING PAPER AND CLOTH.

Specification forming part of Letters Patent No. 134,105, dated December 17, 1872.

To all whom it may concern:

Be it known that I, GEORGE K. SNOW, of Watertown, in the county of Middlesex and State of Massachusetts, have invented a new and Improved Machine for Uniting Paper and Cloth, of which the following is a specification:

The art of uniting paper and cloth in comparatively-small sheets for the purpose of mounting maps, drawings, and other like articles to make them more durable has long been known and practiced. This has been done by stretching the cloth upon a frame or its equivalent and applying the paste to the back side of the paper upon which the drawing or map is made, and placing the paper thus prepared upon the cloth and stretching it out to its full extent thereon, and pressing the two materials together and allowing them to dry gradually. This process answered very well for the limited requirements of the purposes for which the compound material of combined paper and cloth were used a few years since, but recently a great demand has arisen for such a material in the manufacture of collars, cuffs, and other like articles for ladies' and gentlemen's wear, to supply which demand the process above described was entirely inadequate as well as being too expensive, though it had to be resorted to until the introduction of my improved process and the machine by which the process is made available.

I am aware that two strips of paper have been united continuously by passing them between pressure-rolls, with the paste lying between the two strips as they advanced over the upper sides of said rolls to the point of union, the pressure of said rolls expelling all superfluous paste, the united material being rolled up immediately after leaving the rolls, and allowed to set. This process, however, would not do for uniting thin cloth and paper, as paper expands and cloth shrinks when wet, and, in drying, cloth expands and paper shrinks, and therefore it could not be kept from warping or curling up unless it was rolled up, and if rolled up the paste, passing through the fibers of cloth, would adhere to the paper next to it, and thus stick the whole roll together in one mass.

The object of my invention is to unite paper and cloth continuously by means of paste, gum,

glue, or other adhesive material, as they are brought into contact from separate rolls or packages, and drying and rolling up the same at one and the same operation, for the purpose of producing a compound material of combined paper and cloth for the manufacture of collars, cuffs, &c., in large quantities, and at a less cost than heretofore.

The process by which I have been able to accomplish the above object, and by the use of which I am now successfully uniting thousands of yards daily, is as follows: I take a web of cloth suitable for the purpose, wind it upon a shaft or small roll resting in suitable bearings in the frame of the machine; and upon another shaft or roll similarly situated I place a roll of paper and take the loose or outer end of each material, and passing it over or around one or more small rolls, and passing the cloth through or past the paste in such a manner that one or both sides of the cloth receives a coat of paste, I place the ends of the dry paper and the pasted cloth together, and enter them between two pressure-rollers, to which a rotary motion is applied, said rollers serving the double purpose of feeding the material to the machine, and of expelling any surplus paste that may have been taken up by the cloth. The united material, after being delivered from the pressure-feed rolls, is carried over a small roll and thence on to and nearly around one or more hot drying-cylinders, care being taken to so lead the material onto said cylinders that the paper will always be next to said cylinders to prevent the paper becoming saturated with the paste, and so that the vapor arising from the moisture in the paste may more readily escape through the fibers of the cloth. After leaving the drying-cylinders the material is wound up upon a shaft or small roll. I also apply a blast of hot or cold air to the material, just above the drying-cylinders, for the purpose of driving away the vapor arising from the paste in drying, and thereby aiding the drying process.

In the drawing, Figure 1 is an elevation of one side of my improved machine; Fig. 2 is an elevation of the opposite side; Fig. 3 is a plan; Fig. 4 is a section on line *xx* on Fig. 1; Fig. 5 is a partial section on the same line, showing a modification of the machine adapted

to paste but one side of the cloth; and Fig. 6 is a plan of the doctor-plate.

A is the frame of the machine; B, the roll of cloth; and C, the roll of paper, mounted, respectively, upon the shafts B' and C', which are so mounted in the frame that they may be readily removed therefrom. D is a paste-trough secured to the frame, and having mounted therein the roll *a*. A "doctor-plate," *b*, is secured to the frame in a position just above the paste-trough D, the working-edge of said doctor-plate being curved, as shown in Fig. 6, for the purpose of straining the cloth for the purpose of taking out any wrinkles that may have formed therein, and spreading the cloth to its greatest width. E and F are a pair of pressure feed-rolls, which serve the purpose of feeding the material to the machine and pressing out any surplus paste that may be taken up by the cloth. G and H are the drying-cylinders, made hollow, and provided with hollow journals, through which steam is admitted and discharged in a well-known manner. I and J are draft-rolls, and K is the shaft on which the material is wound up at the end of the machine. L is the driving-shaft, mounted in suitable bearings in the frame and having secured thereon, just inside the frame, the pinion M, the opposite sides of which mesh into the spur-gears N and O secured to or cast upon the drying-cylinders G and H, respectively. The shaft L is driven by a belt upon a pulley (not shown in the drawing) upon one end of the shaft, while upon the other end is mounted a pulley, P, from which, by means of the belt *c* and the pulley Q, motion is transmitted to the draft-roll I, said pulleys being so proportioned that the peripheries of said draft-rolls will move somewhat faster than the peripheries of the drying-cylinders or the pressure feed-rolls, for the purpose of keeping a tension on the material at all times, and at all points between the feed-rolls and the draft-rolls. The shaft L also carries the pulley R, from which, by means of the belt *d* and the pulley S, motion is transmitted to the feed-pressure roll E. The draft-roll I carries the pulley T, by means of which, and the belt *e* and pulley U, motion is transmitted to the shaft K, upon which the finished material is wound as it is delivered from the draft-rolls. W and W' are steam-pipes, and V and V' exhaust-pipes, coupled to the hollow journals of the drying-cylinders in a well-known manner, so as to make a steam-tight joint. Small idle-rolls *f*, *g*, *h*, *h'*, *i*, *j*, *k*, *l*, and *m* are arranged, as shown, to aid in leading the paper and cloth from their respective rolls to the point of contact at the feed-rolls, and the united material from the feed-rolls to the drying-cylinders G and H, and thence to the draft-rolls I and J, the united material being so guided thereby as to keep the paper side thereof next to the drying-cylinders. X is a pipe arranged lengthwise of the machine, and at one side thereof, and having both ends closed up, said pipe being provided with any suitable num-

ber of nozzles *n* and dampers *n'*, through which blasts of hot or cold air may be discharged under or over the material while passing around the hot cylinders for the purpose of driving away the vapor arising from the wet material passing over the hot cylinders, the air being supplied to said pipe through the pipe *o* by means of a blower. A suction-blower may be used instead of a blast-blower and the vapor be drawn away through the pipes, if desired. The shaft B', which carries the roll of cloth B, is mounted at one end upon the end of the screw *p* in such a manner that the roll of cloth may be adjusted endwise for the purpose of guiding it into the machine, so as to match the paper at the point of junction. Said shaft is also provided with a grooved pulley, *q*, over which the cord *r* passes, one end of said cord being attached to the frame of the machine or to the floor, and to the other end is attached the weight *s*, to serve as a brake to prevent the cloth from being unwound too fast. A similar device is also applied to the shaft C', consisting of the pulley *t*, cord *u*, and weight *v*. Y is a supplementary paste-trough, to be used when it is desired to paste but one side of the cloth, the trough resting against the cloth as it passes the feed-roll E, and the paste flowing to the cloth through the slit *e'*, there being no paste in D.

The operation of my improved machine and the manner of carrying out the process are as follows: The cloth 1 is unwound from the roll B, and the end is passed under the tie-rod *h* over the roll *h'*, and is laid across the top of the paste-trough D filled with paste, the roll *a* having been previously removed therefrom, when the roll *a* is laid upon the cloth and pressed down into its place in the paste-trough, where it is secured by means of the pins *a'*. The end of the cloth is then drawn up past the outer edge of the "doctor-plate" *b* to the feed-pressure roll E, where it is joined to the end of the paper 2, which has been unwound from the roll C, passed over the roll *f*, and over the feed-roll F. The ends of the two strips of material, being joined together, are inserted between the pressure feed-rolls E and F, under the roll *g*, over the roll *i*, nearly around the steam-cylinder G, over the rolls *j* and *k*, nearly around the steam-cylinder H, over the roll *l*, under the roll *m*, and between the draft-rolls I and J, and wound onto or secured to the shaft K. Steam being admitted to the drying-cylinders G and H, and the machine being set in motion, the paper and cloth will be unwound from their respective rolls. The cloth being drawn through the paste in the trough D will be completely saturated with the paste, the surplus of which is removed from one side by the "doctor-plate" *b*, and from the other side by the pressure feed-rolls E and F, the paste pressed out thereby, and that removed by the doctor-plate falling into the paste-trough D again. The united material after leaving the feed-rolls is carried to the drying-cylinders with the paper side against

the cylinder, so that the drying may commence immediately, and the moisture may pass out through the pores of the cloth. In this way the paper does not become moistened so as to expand to any appreciable degree. Cloth, when left to itself, shrinks materially in drying, and its tendency to do this must be counteracted in order to insure a smooth and even surface of the united material. It is important also that the cloth and paper should be held in close contact while drying to insure their firm adhesion. While the material is passing around the drying-cylinders a blast or blasts of cold or hot air are forced upon, over, or under the same, for the purpose of driving away the vapor arising therefrom to facilitate the drying process, the blast being regulated by the dampers *n'*. The united material may be led directly from the feed-rolls E and F to the drying-cylinder G without passing over the idle rolls, if desired. The draft-rolls I and J are driven at a somewhat greater speed than the feed-rolls E, so as to keep a tension upon the material all the way through the machine, and cause it to hug close to the drying-cylinders.

I am aware that a compound material consisting of paper and cloth has been manufactured to some extent, by uniting cloth previously prepared by sizing with the paper while in the process of formation from the pulp in a paper-machine, the moisture in the pulp being sufficient to dampen the size in the cloth so as to make it adhere to the paper; but a very material loss is sustained in preparing the material in this way over my process, first, on account of the extra labor of sizing the cloth; and, second, the process of sizing the cloth and allowing it to dry causes the cloth to shrink so that it will not cover so large an area of paper as when applied by my process.

What I claim as new, and desire to secure by Letters Patent of the United States, is—

1. The process, herein set forth, of contin-

uously uniting paper and cloth by taking the cloth and paper from separate rolls or packages, applying paste or other adhesive material to the cloth, passing the pasted cloth and dry paper placed in contact between pressure-rolls; thence around heated drying-cylinders in such a manner that the paper shall always be next to said cylinders, and winding the finished material into a roll, substantially as described.

2. In combination with one or more hot cylinders for drying a damp or wet material passing over or around the same, a blast or blasts of hot or cold air, for the purpose specified.

3. In combination with the drying-cylinders G and H, an air-pipe so arranged that blasts of hot or cold air may be discharged upon the exterior surface of material passing over or around said cylinders, substantially as described.

4. In a machine for uniting paper and cloth in the web or roll, the draft-rolls I and J, so arranged and operated as to run at a high rate of speed and keep a tension upon the material as it passes through the machine, substantially as described.

5. The paste-trough Y, provided with the slit *e'* extending the whole length of the trough, for applying paste to one side of the cloth, in combination with the guide-roll E, substantially as described.

6. In an organized machine for uniting paper and cloth by means of paste or other adhesive material, a doctor-plate having its working-edge curved, whereby the surplus paste is removed and the fabric kept distended widthwise, substantially as described, for the purpose specified.

Executed at Boston, this 23d day of July, 1872.

GEO. K. SNOW.

Witnesses:

N. C. LOMBARD,
F. K. ROGERS.