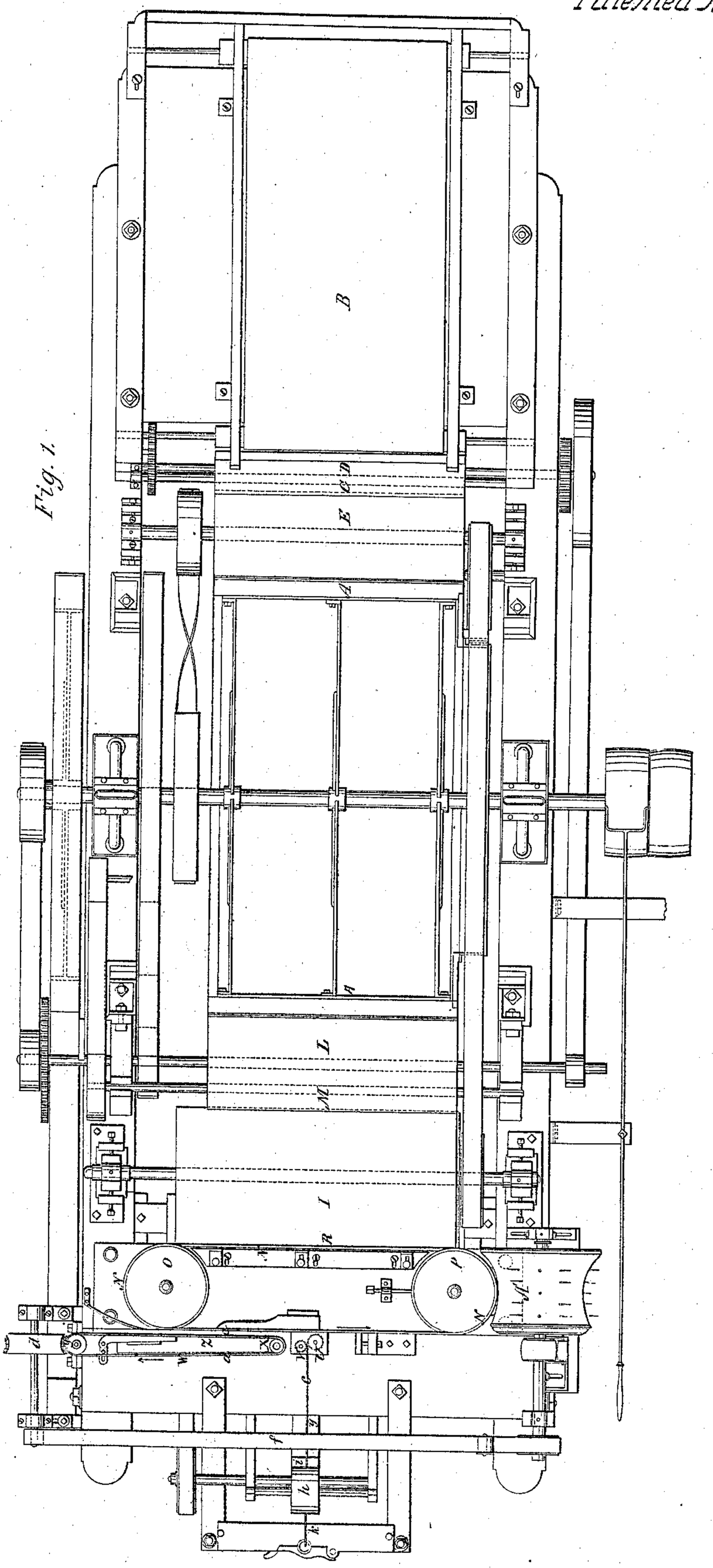
Sheet 1. 4 Sheets

M. H. Simpson.
Wool Combing Mach.

No. 16,864.

Patented Mar. 17, 1857.

Fig. 1.



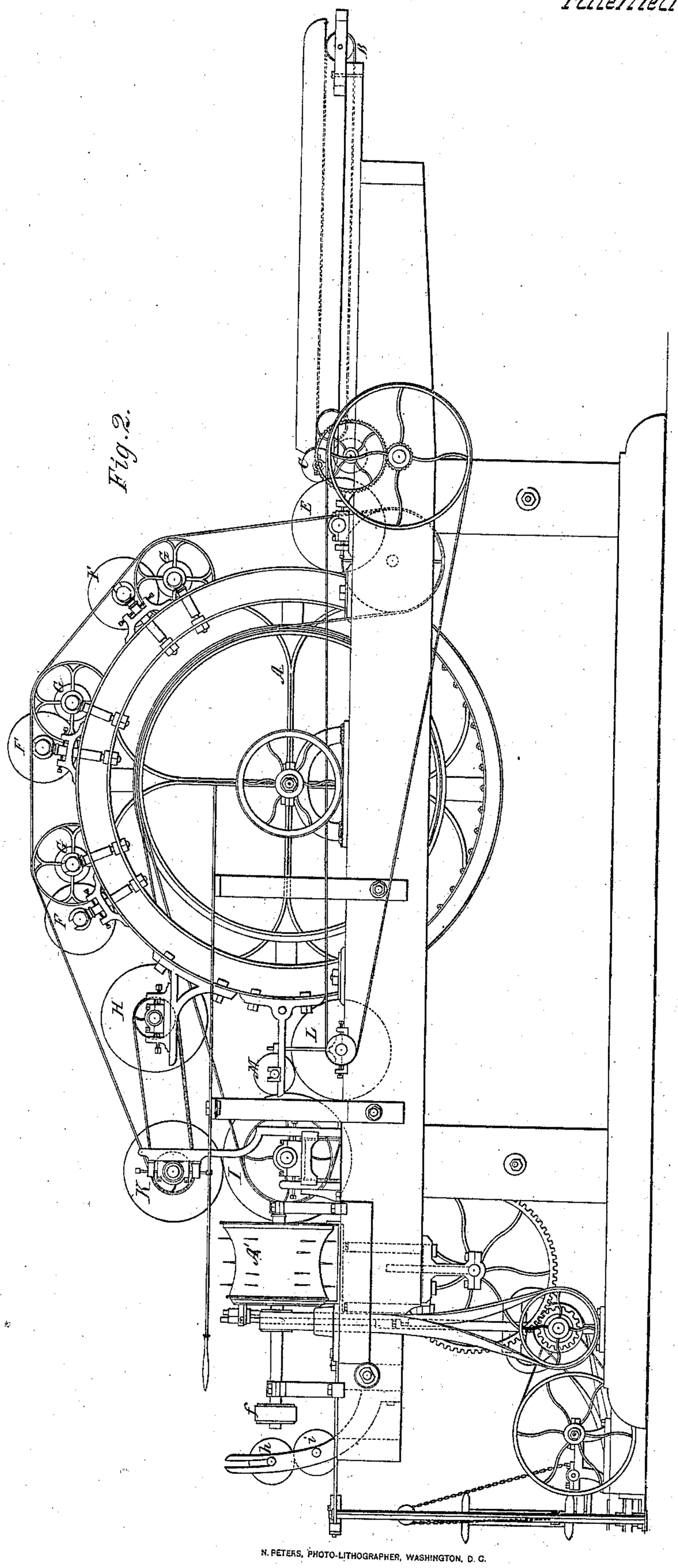
M. H. Simpson.
Wool Combing Mach.

Sheet 2. 4 Sheets.

No. 16,864.

Patented Mar. 17, 1857.

Fig. 2.



M. H. Simpson.
Wool Combing Mach.

Sheet 3. 4 Sheets.

No. 16,864. Patented Mar. 17, 1857.

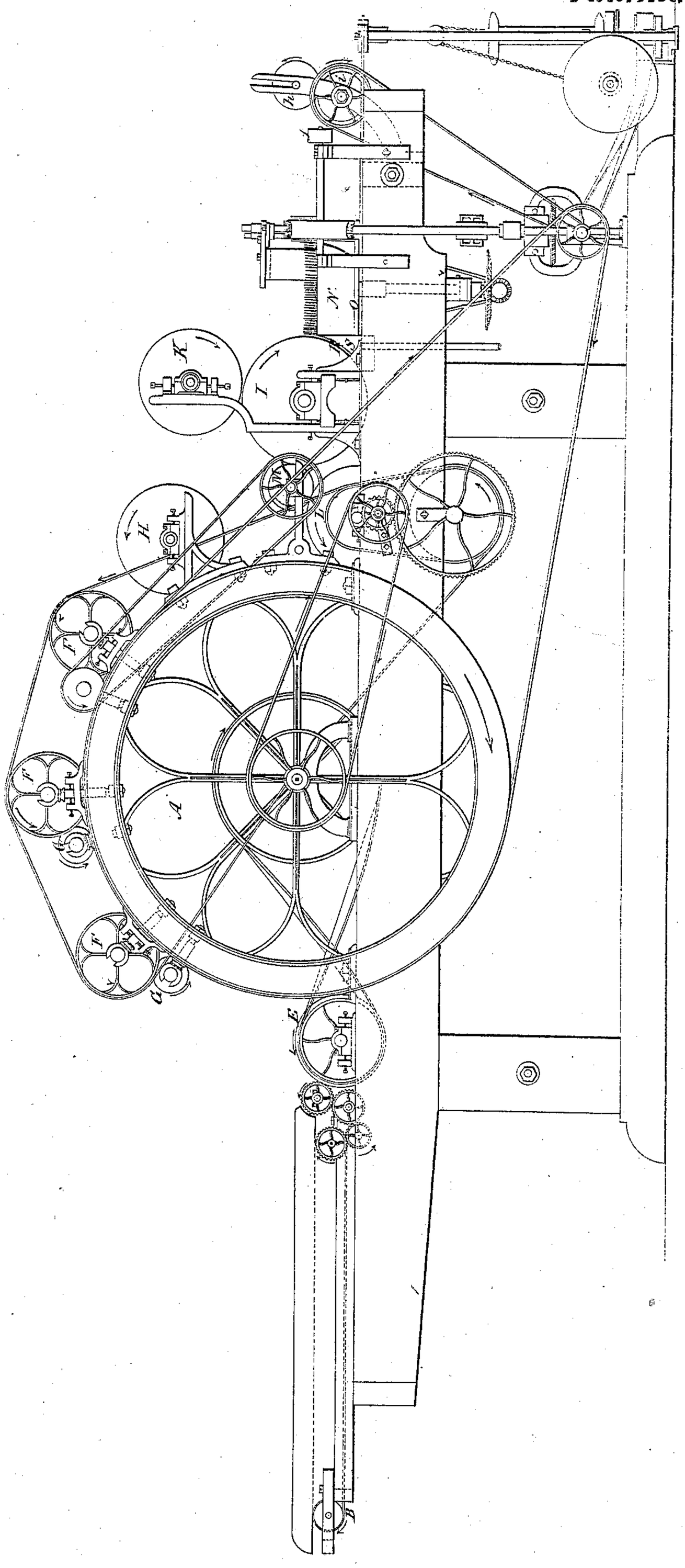


Fig. 3.

Sheet 4. 4 Sheets.

M. H. Simpson.
Wool Combing Mach.

No. 16,864. Patented Mar. 17, 1857.

Fig. 5.

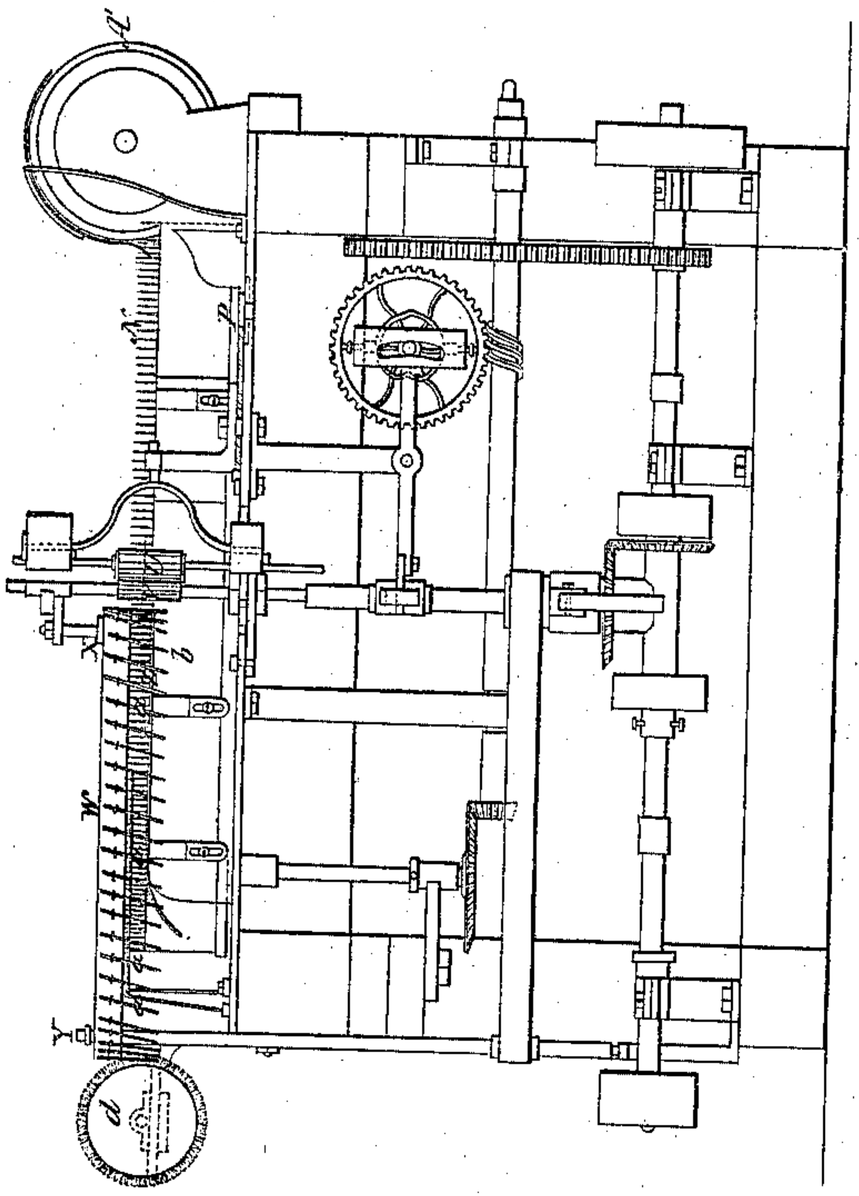


Fig. 7.

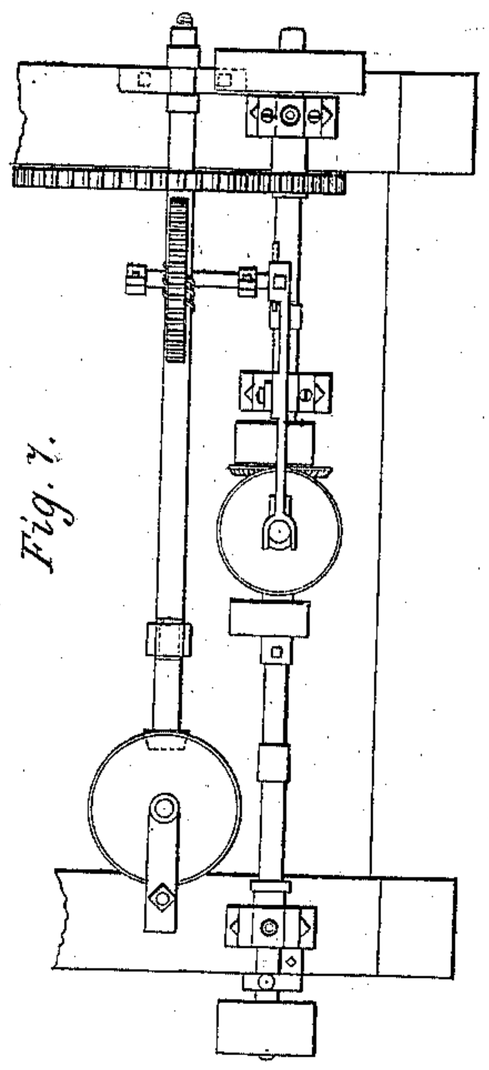


Fig. 4.

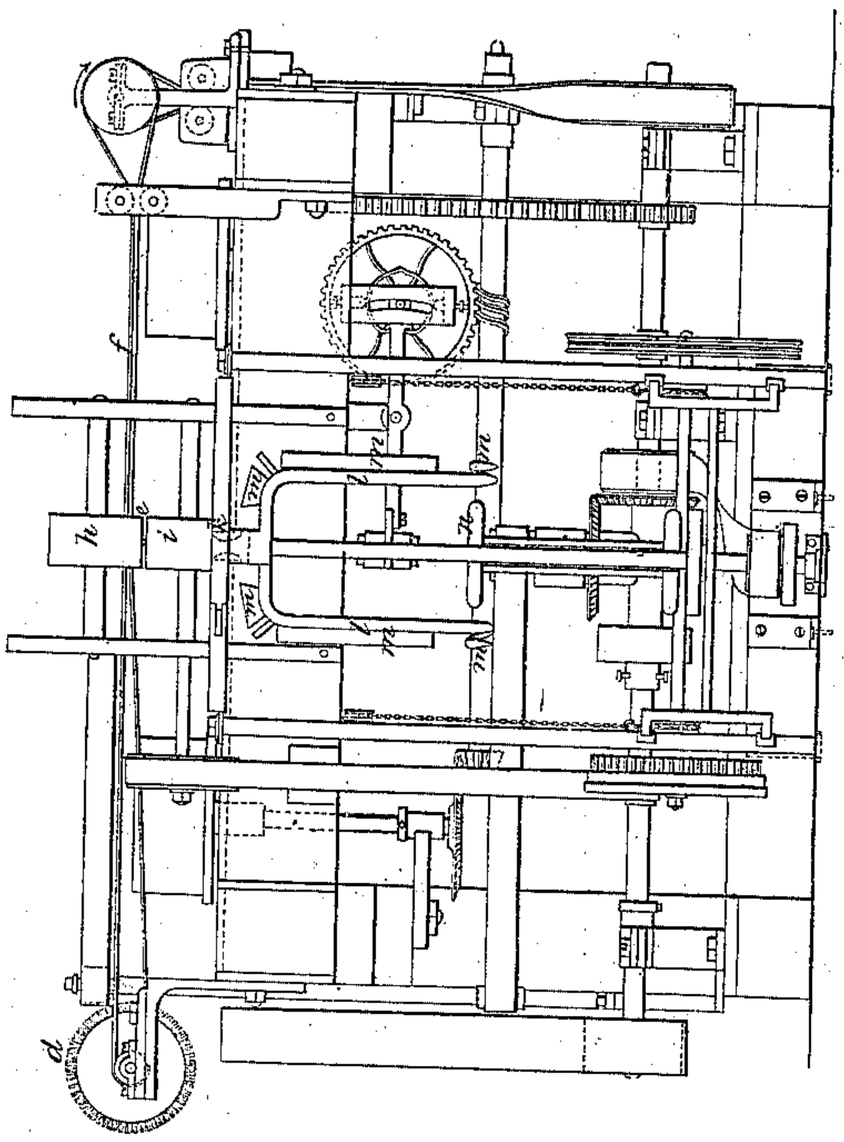
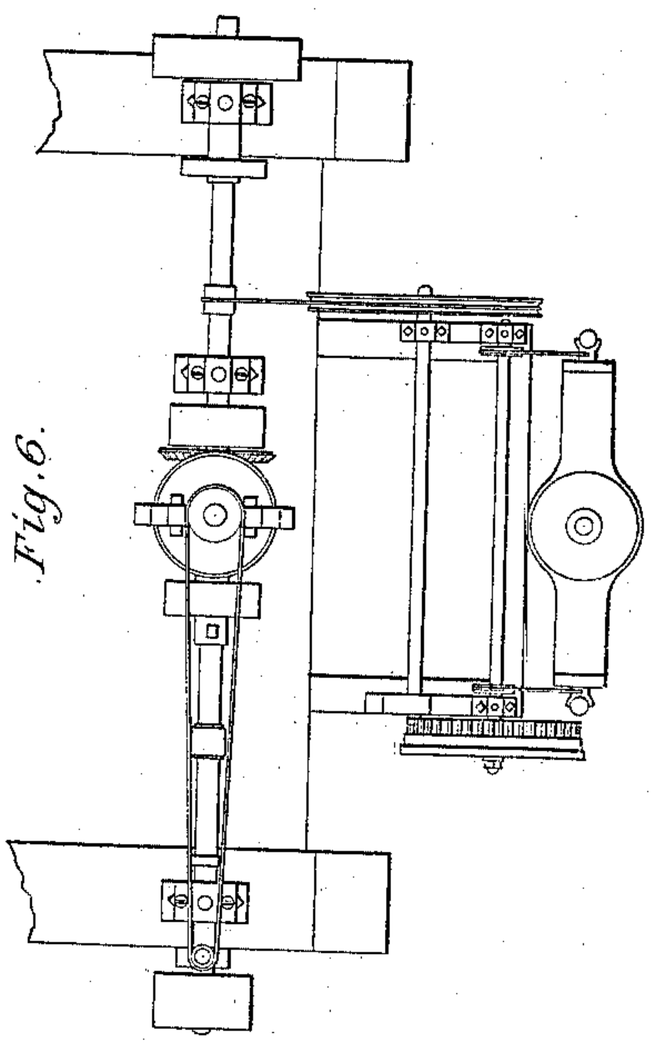


Fig. 6.



UNITED STATES PATENT OFFICE.

MICHAEL H. SIMPSON, OF BOSTON, MASSACHUSETTS.

MACHINERY FOR COMBING WOOL.

Specification of Letters Patent No. 16,864, dated March 17, 1857.

To all whom it may concern:

Be it known that I, MICHAEL H. SIMPSON, of Boston, in the county of Suffolk and State of Massachusetts, have invented certain new and useful Improvements in Machinery for Combing Wool or Various other Fibrous Substances; and I do hereby declare that the same is fully described and represented in the following specification and the accompanying drawings, of which—

Figure 1, exhibits a top view of the main frame of my machine and several of the operative parts applied thereto. Fig. 2, an elevation of one side of it. Fig. 3, an elevation of its other side. Fig. 4, a front end elevation of it. Fig. 5, a transverse and vertical section taken just in front of the fringe belt of said machine. Figs. 6 and 7, are top views of some of the mechanism used for imparting vertical motions to the draw rollers, as well as to the bobbin on the spindle of the flier, the parts to which such figures refer, being exhibited in the other figures.

My invention has reference to a wool combing machine, which was invented by Samuel Couillard and was the subject of a patent granted to him by the United States Commissioner of Patents on the 7th day of July A. D. 1835: I having made sundry important improvements thereon. The principal elements of such machine, or the combination invented by the said Couillard consisted of a feeding apron, one or two carding cylinders, a combing belt, a curved plate arranged between the main card cylinder and said combing belt, a fringe belt, a condenser tube, draw rollers, reel or bobbin and a drum for receiving the sliver. While I retain most of these features or mechanical contrivances, I have connected therewith certain valuable and important additions or improvements which will be hereinafter particularly specified and described.

In the first place, I employ a main card cylinder, as shown at A, in the drawings, such as is usually employed in machinery for carding wool, and I provide such with an endless feeding apron, B, and a pair of feed rollers C, D, arranged as seen in the drawings. Between such feed rollers, and the main card cylinder, A, I make use of a card cylinder F, which I term the "licker in," its object being to transfer the fibrous material from the feeding rollers to the main card cylinder, A. To such card cylinder, I apply a series of "workers" F, F, F, and a series of "strippers," G, G, G, arranged as seen in Figs. 2 and 3, I also apply to said card cylinder, what is termed by carders, a "fancy" card cylinder H, the same being arranged as seen in Figs. 2 and 3.

In front of the main card cylinder, I dispose a "combing doffer" cylinder, I, above which I place a clearing "fancy" or card cylinder, K, such combing doffer and clearing fancy having been used in the machine of the said Couillard. Between the combing doffer I, and the main card cylinder, I arrange as seen in Figs. 1, 2, and 3, another doffer, L, and a stripper M, the doffer L, being employed to remove the fibrous material from the main card cylinder A, and lay it on the doffer, I. The stripper M, takes the surplus fibrous material from the doffer L, and transfers it to the combing doffer I.

The object I have in view in employing the extra doffer, L, and the stripper M, in combination with the main card cylinder and the combing doffer I, is to enable me to rotate the latter at such a moderate speed as will prevent it from breaking or tearing away the teeth of the horizontal combing belt N, arranged in front of and operating with the doffer, I, such belt being placed and made to work around two pulleys O, P, disposed as shown in Figs. 1, 3 and 5. Although while the machine is in operation, the speed of the combing doffer I, is about three hunderd turns, or less in a minute that of the main card cylinder is not far from one hundred revolutions in such time, yet owing to their difference of size, the speed of the doffer would have to be materially increased in order that its cylindric or card surface may run at a greater speed than that of the cylinder A, for were the doffer made to act directly against the card cylinder A, and so as to properly remove the fibrous material therefrom, as a general thing, the speed of the doffer, would have to be so great, as to cause the said doffer to damage the combing belt, N. In order to avoid this and impart to the doffer, I, a proper speed, I employ another doffer, L, and a stripper, M, as described.

Directly between the combing doffer, I, and the endless combing belt, N, I apply or arrange a curved guard plate, R, the same being made to extend from one end to the

other of the doffer, I, and with respect to the same and the endless band or belt N, as seen in Figs. 1, and 3. This plate forms one side of a hollow steam chest or box S, arranged between the cylinder and belt, and provided with some means by which heat may be introduced into it. For convenience of heating said steam box, so as to heat the plate R, steam may be introduced into it, by a pipe T, which may be lead into said box S, from a steam boiler or generator. For the purpose of moistening the wool, said box may have sundry small holes arranged in suitable parts of it, steam being discharged through said holes directly upon the wool. The purpose, however, of such steam box, is more particularly to apply heat to the wool, by heating the teeth of the doffer I, than it is to moisten said wool—but as sometimes it may be desirable to impart more or less moisture to it, I have thought it proper to suggest how such might be accomplished. Heating the wool when on the doffer, serves to improve it, or enable it to be operated upon to much better advantage.

There are various other modes by which the curved guard R, may be heated, instead of having steam directly applied to it as hereinbefore described. The said guard R, by extending downward from the lower part of the teeth of the belt N, as shown in Fig. 3, serves to keep the fibrous material, on the teeth of the belt, in contact with the teeth of the doffer I.

Directly in advance of the combing belt N, are two draw rollers V, V, and what is termed the fringe belt W, they being arranged as shown in Figs. 1 and 5. This endless fringe belt works around two vertical rollers X, Y, and carries a series of wires or teeth *a*, *a*, extending down from it as seen in Figs. 1 and 5.

It will be observed by inspection of Figs. 1 and 5, that the roller, U, is larger in diameter than the roller, V, and is placed or arranged as close as it can be in practice to the teeth of the combing belt N, the roller V, being made of a different material and disposed at a greater distance from the belt.

I would remark, that the roller, V, should be made of hardened steel, while the roller, U, should be constructed of a more elastic yielding material, such as leather applied to a vertical metallic shaft, the two rollers being fluted rollers. In practice the roller V, may be about an inch in diameter, while the roller U, has a diameter of about one inch and a half.

In using draft rollers, where each has the same diameter and is placed close up to the combing belt, it has been found that the staple of the wool was more or less broken during the operation of drawing it from the combing belt. As the draft is in a direction away from the pulley O, the farther we place the roller, V, from the belt, N, the less will be the arc of surface of the roller, V, against which the fibers will lay and be bound or compressed; and the nearer we carry the roller, U toward the belt, the more we diminish the aforesaid arc. Consequently, making the two rollers of different sizes and arranging them together as described with respect to the belt, N, is a matter of great importance, as by it, I am enabled to effect a great improvement in the operation of the machine—such not only permitting a larger roving to be drawn, but allowing the same to pass between the rollers, in a manner less liable to injure the fibers, in comparison to what would take place were the rollers of equal size and arranged in the common way.

The rollers may be made of equal diameters and the roller, V, be arranged at a greater distance from the combing belt, than the roller U. It is better, however, to make a difference in the size of the rollers as described.

I have denominated the toothed belt, W, the fringe belt, in order to distinguish it from the combing belt N, although said latter belt has sometimes been, and in the specification of the said Couillard's patent, is termed the fringe belt. Instead of causing the wires or teeth, *a*, *a*, to work entirely above a smooth metallic table, Z, (see Figs. 1 and 5,) I arrange said table so that the wires may extend somewhat below it as well as above it, and work through a slot or passage *c* made in said table, or between the said table and the combing belt; this serving not only to prevent the teeth from injury, but to carry along the fringe of the wool more perfectly toward the draw-rollers.

In practice the fringe belt, W, has been found to accumulate upon its wires quantities of wool, such operating to interfere more or less, with the correct action of the draw rollers, Z, V. In order to obviate this difficulty, I combine with said belt a rotary clearer or brush, *d*, arranged with respect to the fringe belt as seen in Figs. 1, 4, and 5, the same being put in rotation so as to brush or clear off the surplus wool from the wires, *a*, *a*, as they pass around in contact with it, and thus is saved the attention and labor of an attendant, who during the operation of the original or Couillard machine has generally been employed to pick such wool, from the belt. From the draw rollers, U and V, the roving or sliver seen at *e*, in Figs. 1, and, 4, is carried through an endless condenser belt, *f*, arranged as seen in the drawings, and made to run over and upon the top surface of a standard, *y*, the said condenser belt being caused to perform two functions, viz, that of twisting or

condensing the sliver, *e*, and that of conveying motion to the shaft of the brush *d*. From the belt, *f*, the sliver, *e*, is carried between the guide rollers, *h*, *i*, and thence through the neck, *k*, of a flier, *l*, *l*, it being carried down either of the legs of said flier in guides *m*, *m*, and to a bobbin, *n*, placed on the spindle of said flier. The object of the flier is to twist the roving and wind it up on the said bobbin; and for this purpose, the bobbin should have suitable vertical movements imparted to it whereby, during the revolutions of the flier, the roving may be properly packed or laid on the bobbin, in order that the mass when completed may have a cylindrical or any other desired form.

A′ is a revolving toothed wheel arranged and applied to the combing belt N, as seen in the drawings. The object of such toothed wheel is to remove from the teeth of the revolving comb the short fibers and knobby portions of the wool, which remain on said combing belt, after the longer fibers have been withdrawn from it by the action of the draw rollers, U, V. Such toothed wheel constitutes one of the material parts of the Couillard machine.

Although I have represented in the drawings, mechanism, such as I have employed for imparting to the bobbin its suitable vertical movements on the flier spindle, and the mechanism for moving the draw rollers vertically, yet I do not deem such as making part of my invention, but as more properly matters of construction, intending to employ any suitable mechanism for so operating the bobbin and draw rollers. Furthermore, although, I have represented in such drawings, various belts, pulleys, gears, and other mechanical devices, for the purpose of imparting to the main operative parts of the machine, their movements, I deem such as matters of construction more than invention and as capable of being modified and otherwise arranged as circumstances may require.

I have confined my description more particularly to a simple enumeration and short explanation of the material parts or members of the machine of the said Couillard, particularly specifying and representing such additions as constitute my invention, and which may be termed improvements on the original machine, showing by arrows, the directions in which most of the operative parts are moved.

The general operation of the machine, does not vary essentially from that of the machine of the said Couillard. There is one important difference, however, the same being found in the winding apparatus. In the Couillard machine, either a reel or a can was employed to receive the roving, the reel being made in the form of a bobbin. In addition to the bobbin, I employ a flier, and this for the purpose of twisting the roving as well as winding it on the bobbin, thereby rendering the mechanism more perfect and useful in its action.

In operating with this machine, the wool or fibrous material, as in the original machine of Couillard, is spread upon the endless apron B, and by means of the feed rollers and a licker in it is taken from said apron and transferred to the main cylinder A, and during the revolutions of the same, the fibrous material is subjected to the action of the workers and strippers, situated above said card cylinder. Next, by means of the extra doffer L, and stripper, M, it is removed from the main card cylinder and laid upon the combing doffer, I, by which it is thrown upon and among the teeth of the revolving comb N. From the latter, the longer fibers are drawn by the drawn rollers U, V, and from thence in the form of a sliver, they pass through the condensing belt, *f*, thence between the rollers, *h*, *i*, and into the neck of the flier, and are finally wound upon the bobbin.

The proper modes of arranging the card teeth or the clothing of the various carding drums or cylinders will be understood by persons skilled in mechanism for carding and combing wool.

Having thus described my improved machine, what I claim therein is as follows:

I claim—

1. The combination and arrangement of an extra doffer L, and stripper M, (or the equivalents therefor) with the main card cylinder, the combing doffer, I, the combing belt, N, the whole being substantially in manner and for the purpose as hereinbefore specified.

2. I also claim the above described improved arrangement and construction of the draft rollers, U, V, with respect to each other and the combing belt, N.

3. I also claim making the wires of the fringe belt, W, to extend below the table, Z, and to run through a passage *c*, formed between the part, Z, and the combing belt, or in the table as specified.

4. I also claim combining with the curved plate, R, when such is employed in connection with the doffer, I, and the combing belt, N, a steam heating chamber, S, or other suitable means of heating such plate as set forth.

In testimony whereof I have hereunto set my signature this fourth day of April A. D. 1856.

M. H. SIMPSON.

Witnesses:

R. M. EDDY,

F. P. HALE, Jr.