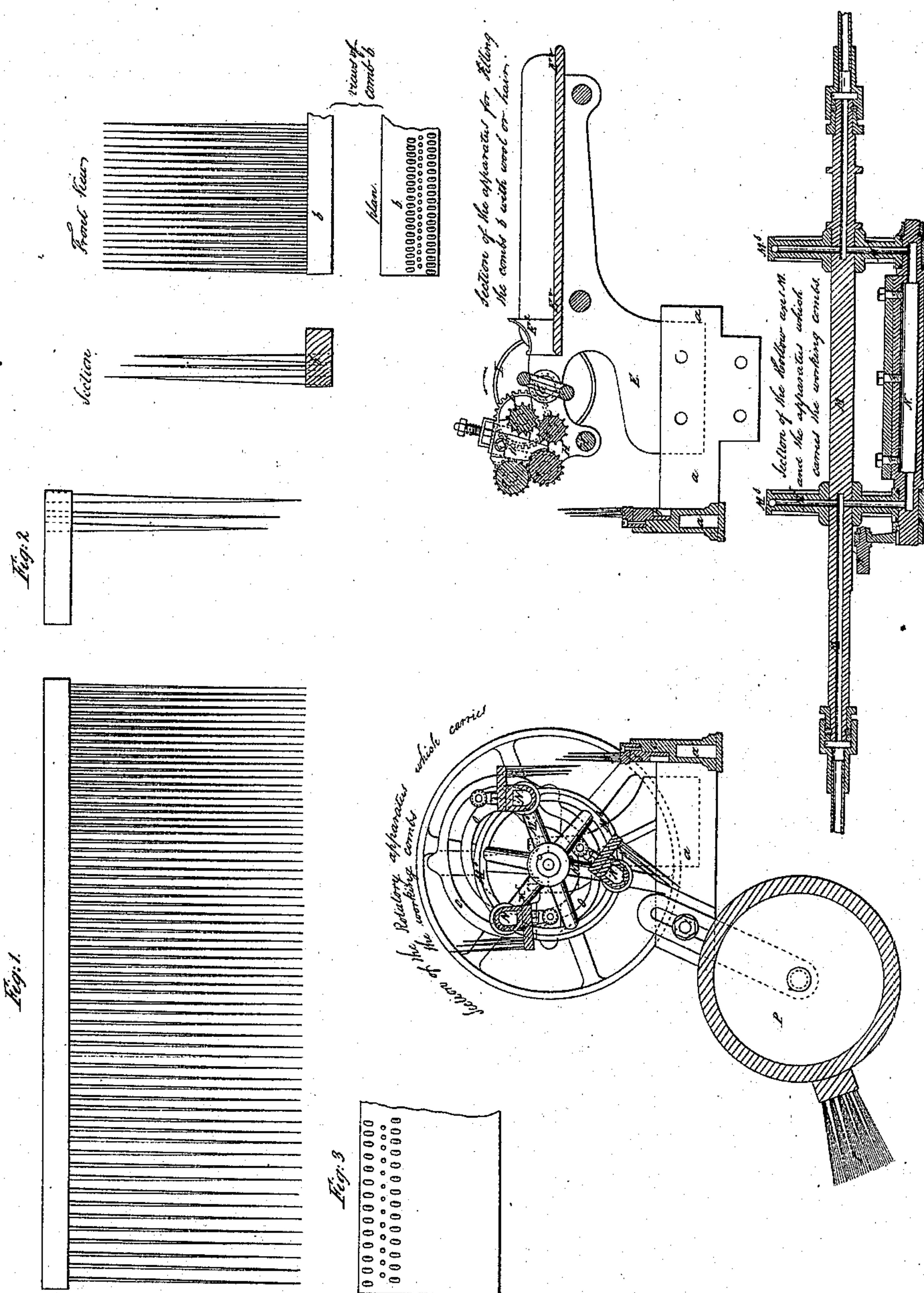


G. E. Donisthorpe,

Combing Wool.

N^o 3,734.

Patented Sept. 11, 1844



Witnesses.
Wm. Richter
Th. Meyer.

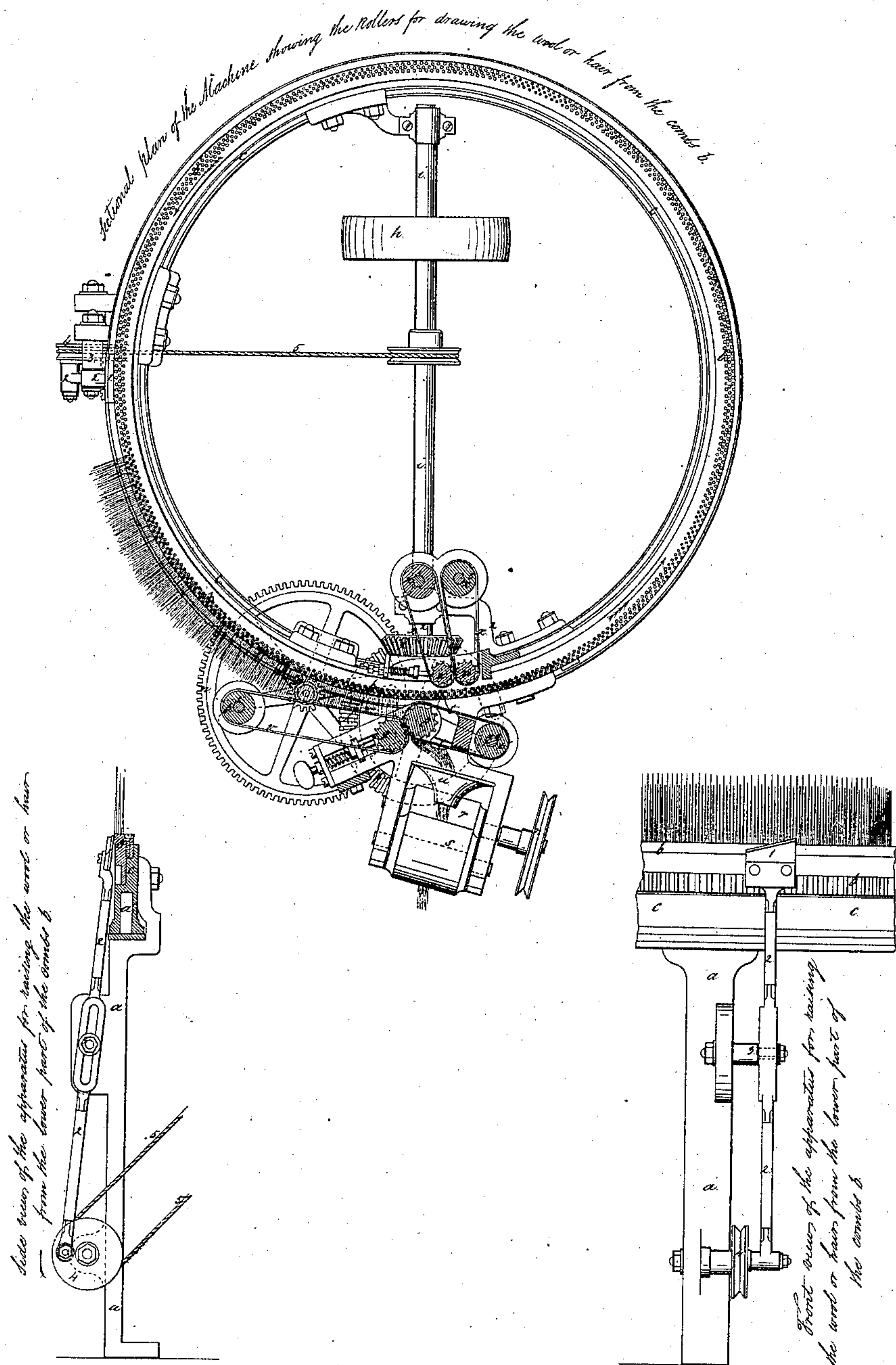
Inventor
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G. E. Donisthorpe,

Combing Wool,

N^o 3,734,

Patented Sept. 11, 1844.



Witnesses.
W. H. Hatcher
W. H. Hatcher

Inventor.
G. E. Donisthorpe.

G. E. Donisthorpe

Combing Wool,

N^o 3,734,

Patented Sept. 11, 1844.

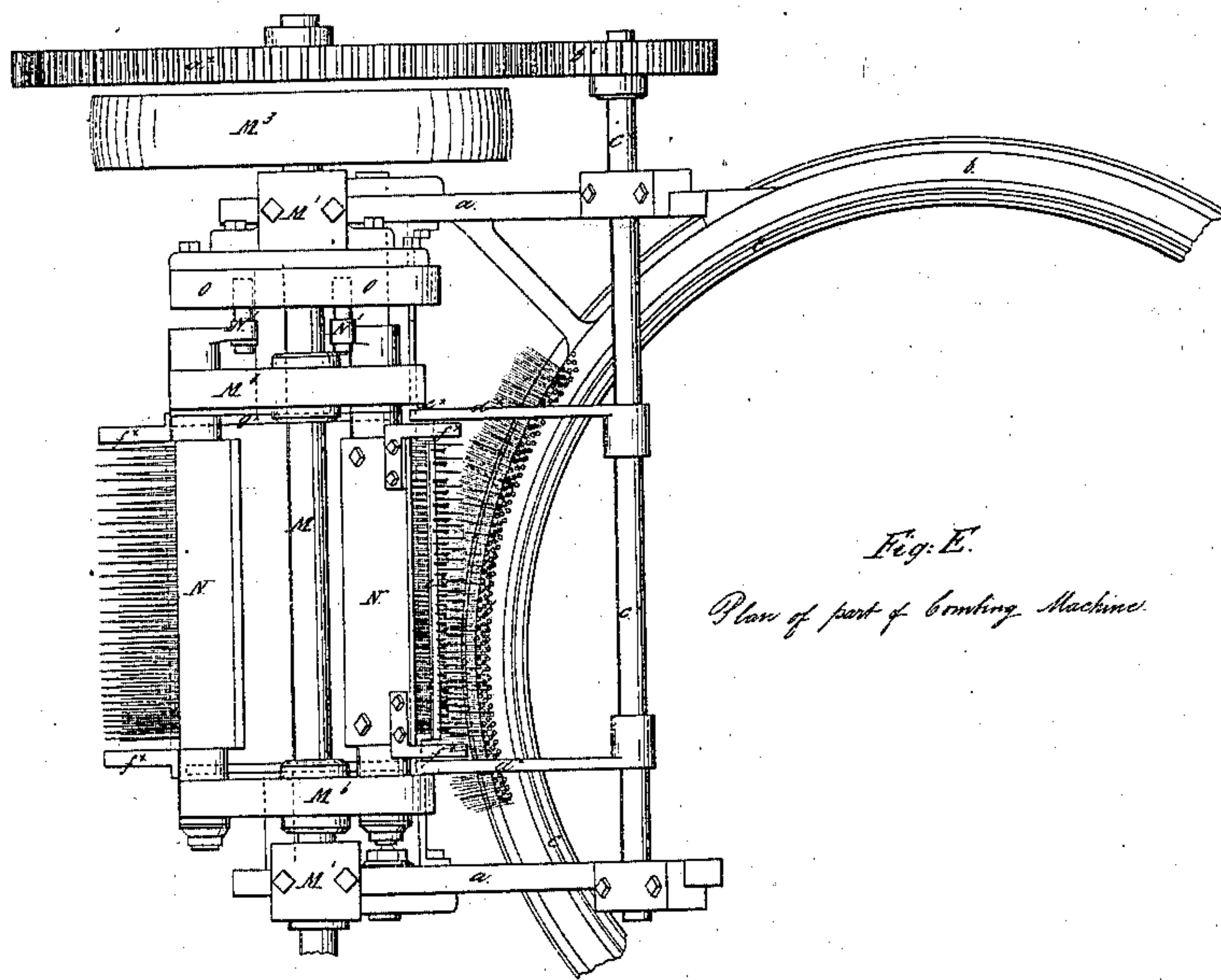


Fig. E.

Plan of part of Combing Machine.

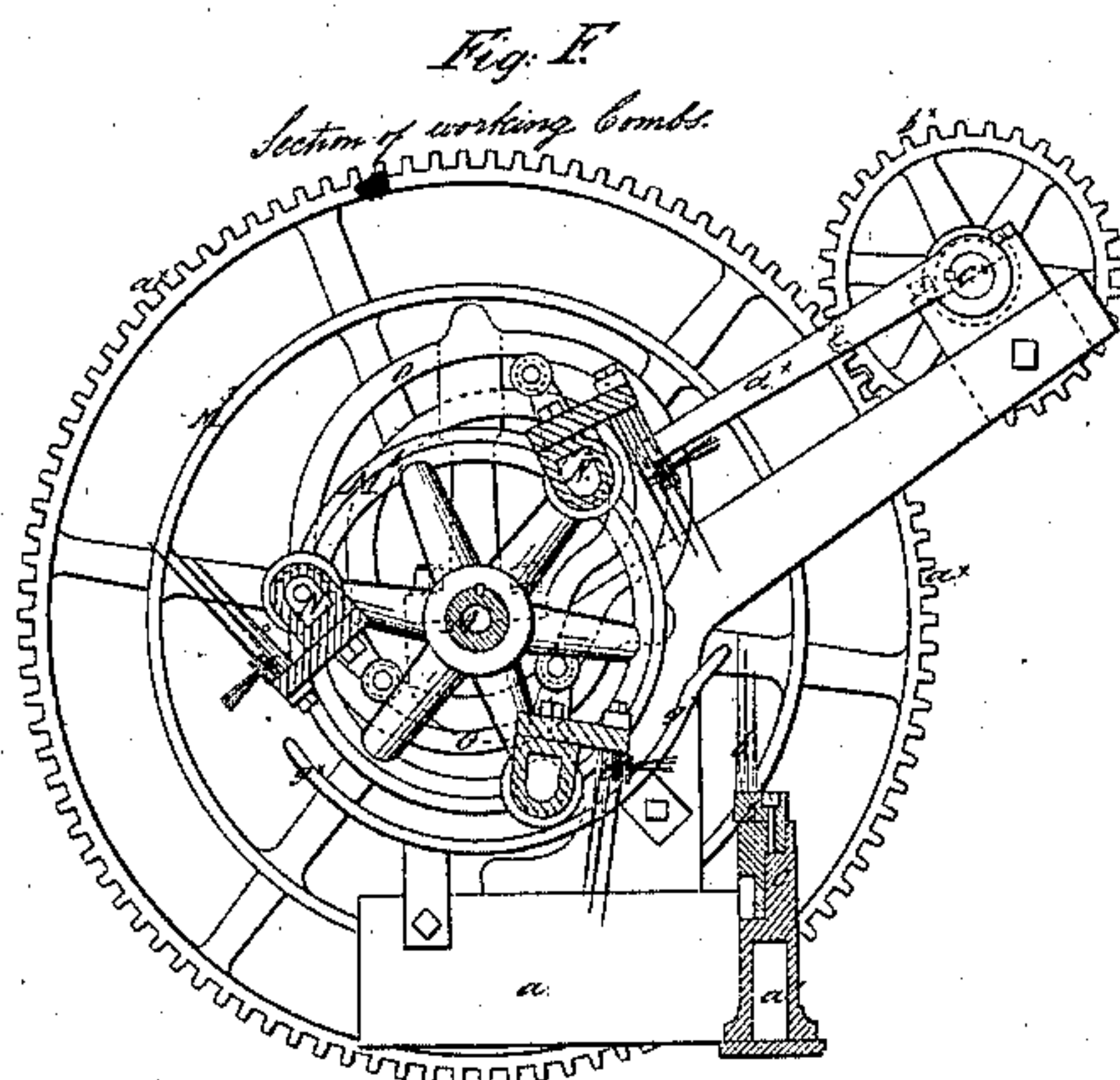
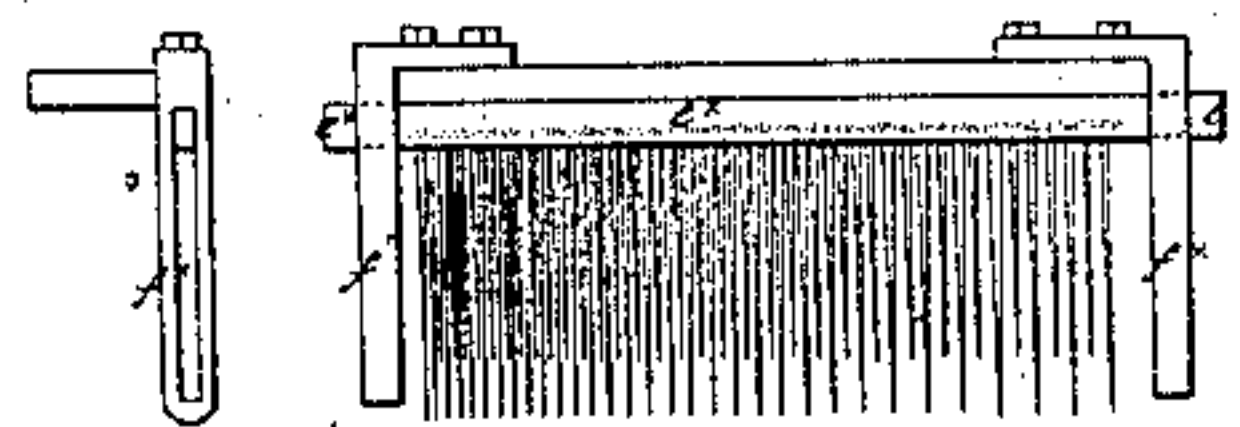


Fig. F.

Section of working comb.

End and front view of working comb.



Witnesses
W. H. Fisher
J. R. Taylor

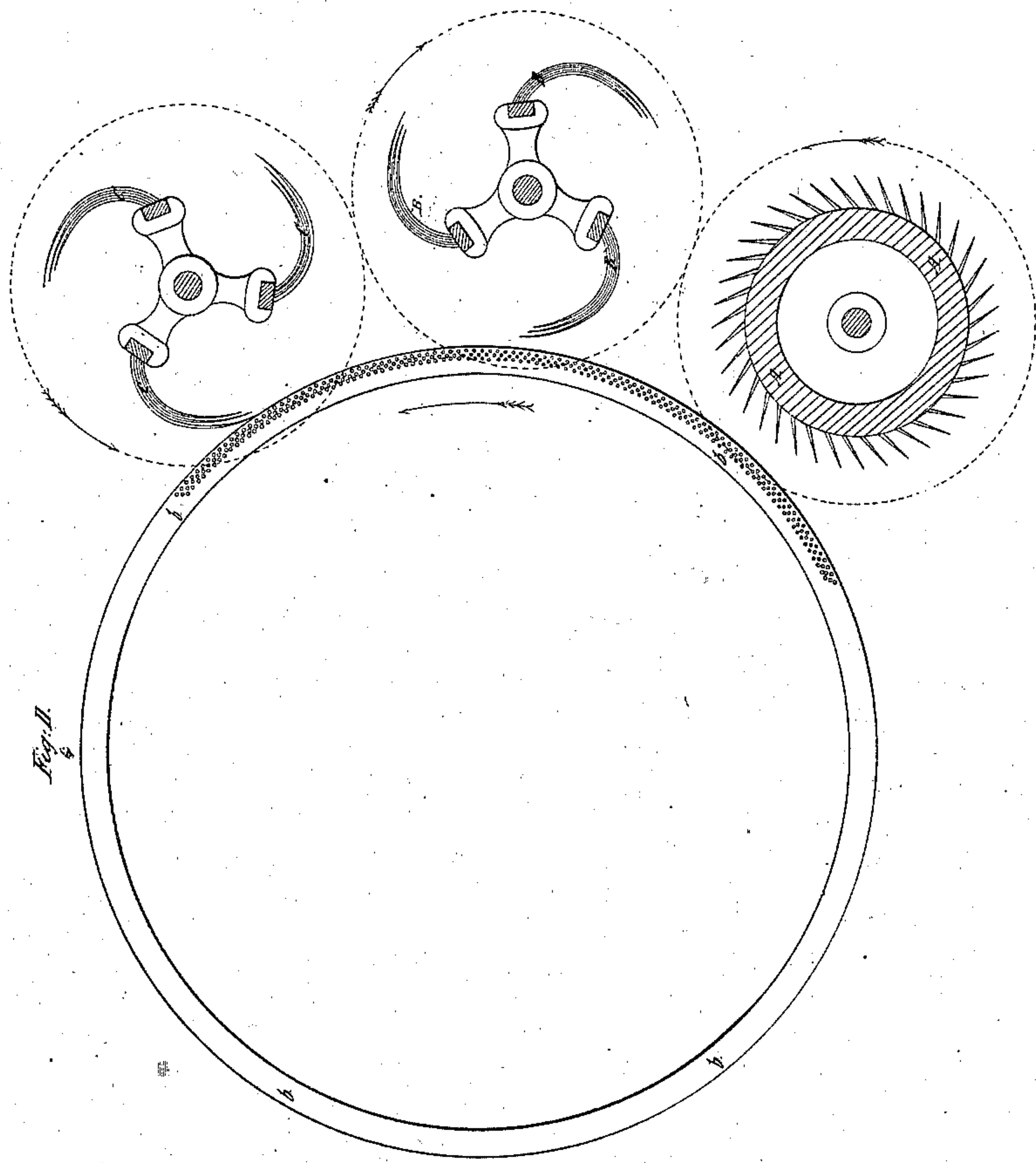
Inventor
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G. E. Donisthorpe,

Combing Wool,

N^o 3,734,

Patented Sept. 11, 1844.



Witnesses
W. H. Litcher
W. H. Litcher

Inventor
G. E. Donisthorpe

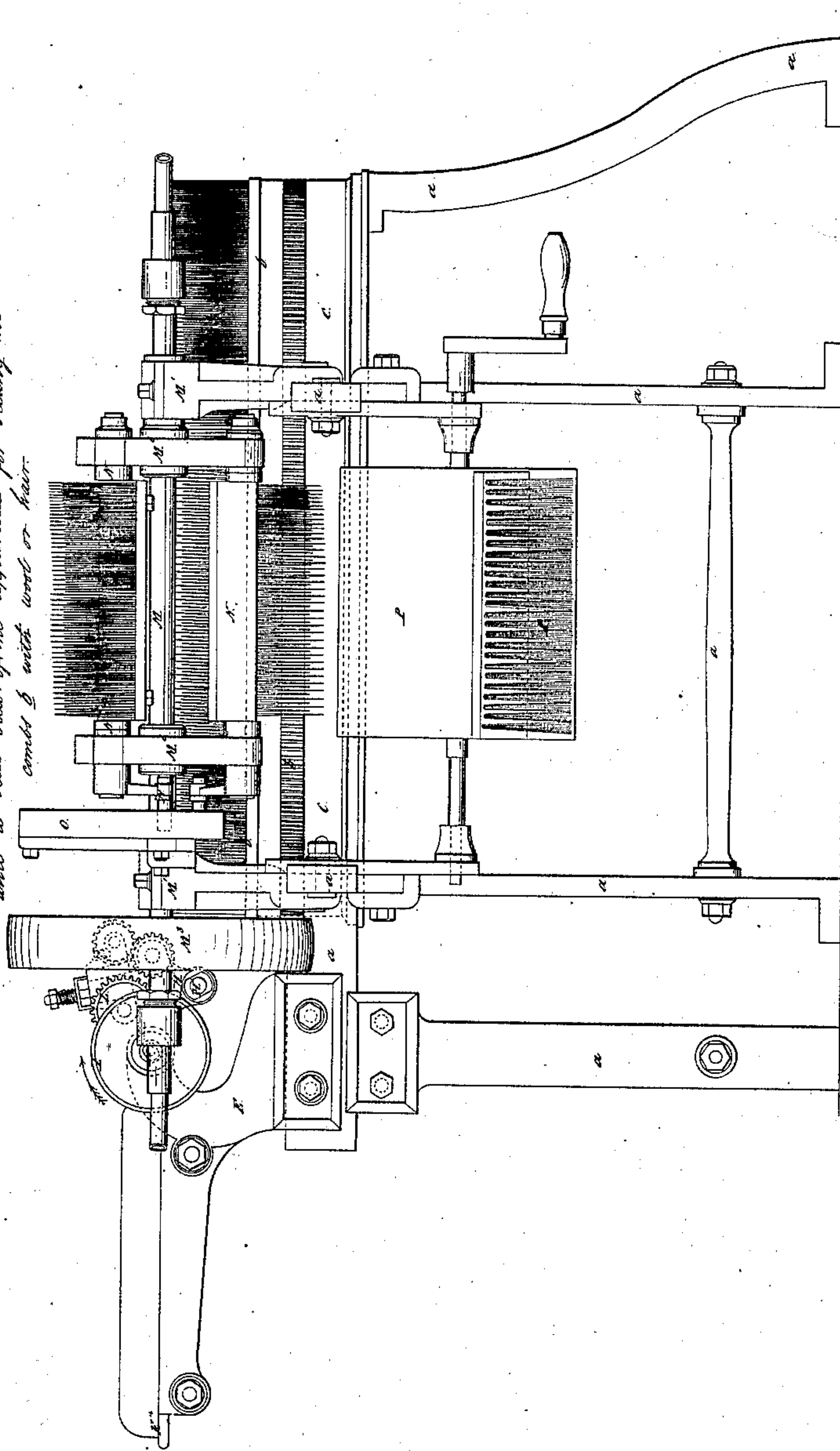
G. E. Danisthorpe,

Combing Wool,

No 3,734.

Patented Sept. 11, 1844.

Elevation of the Machine showing a front view of the working comb and a side view of the apparatus for filling the comb with wool or hair.



Witnesses.
W. B. Fisher
H. Taylor.

Inventor
G. E. Danisthorpe

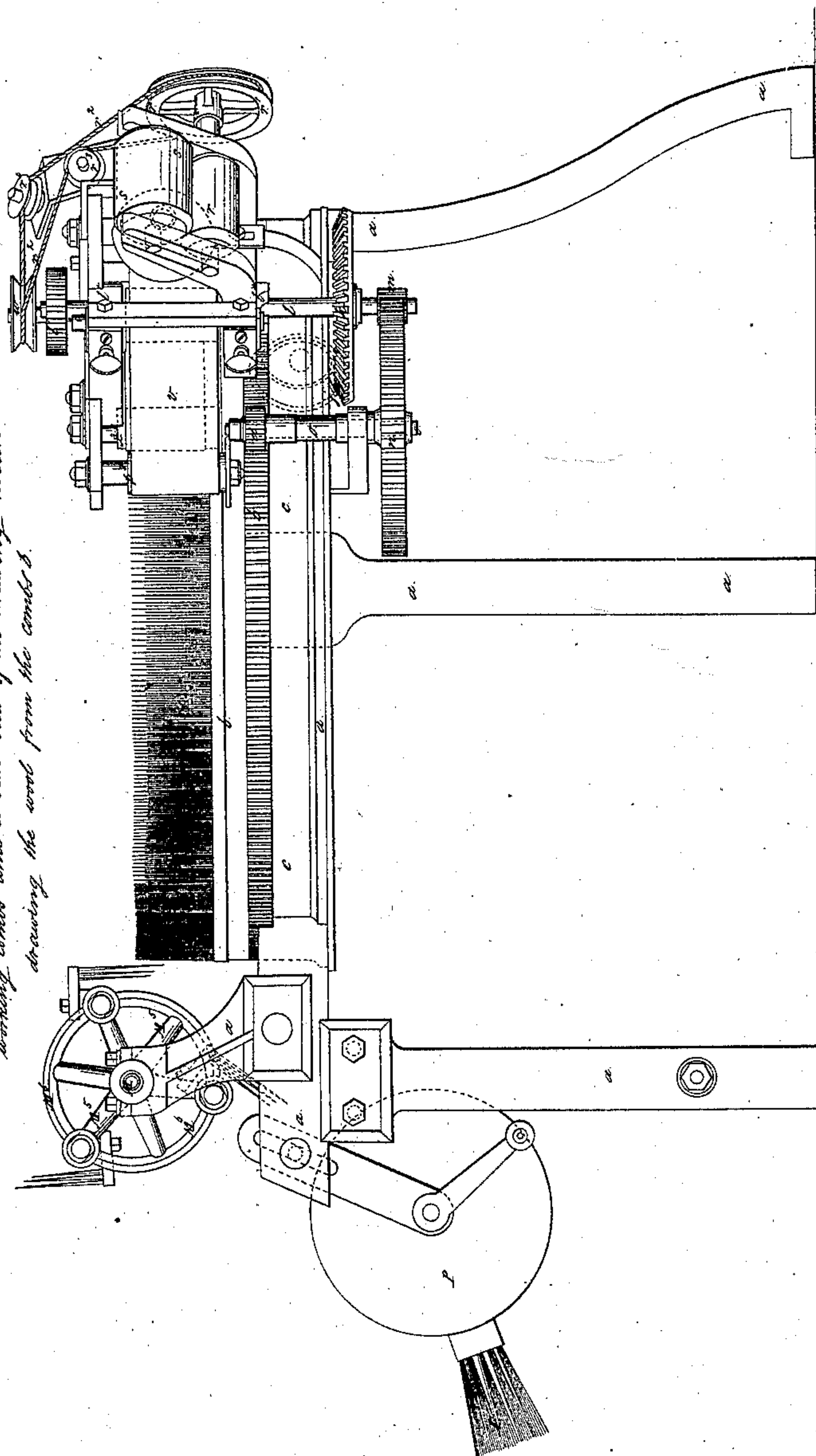
G. E. Danisthorpe,

Combing Wool,

N^o 3,734.

Patented Sept. 11, 1844.

Elevation of the Machine showing a side view of the
working combs and a side view of the drawing. Rollers
drawing the wool from the combs.



Witnesses
W. H. Kitcher
H. Taylor

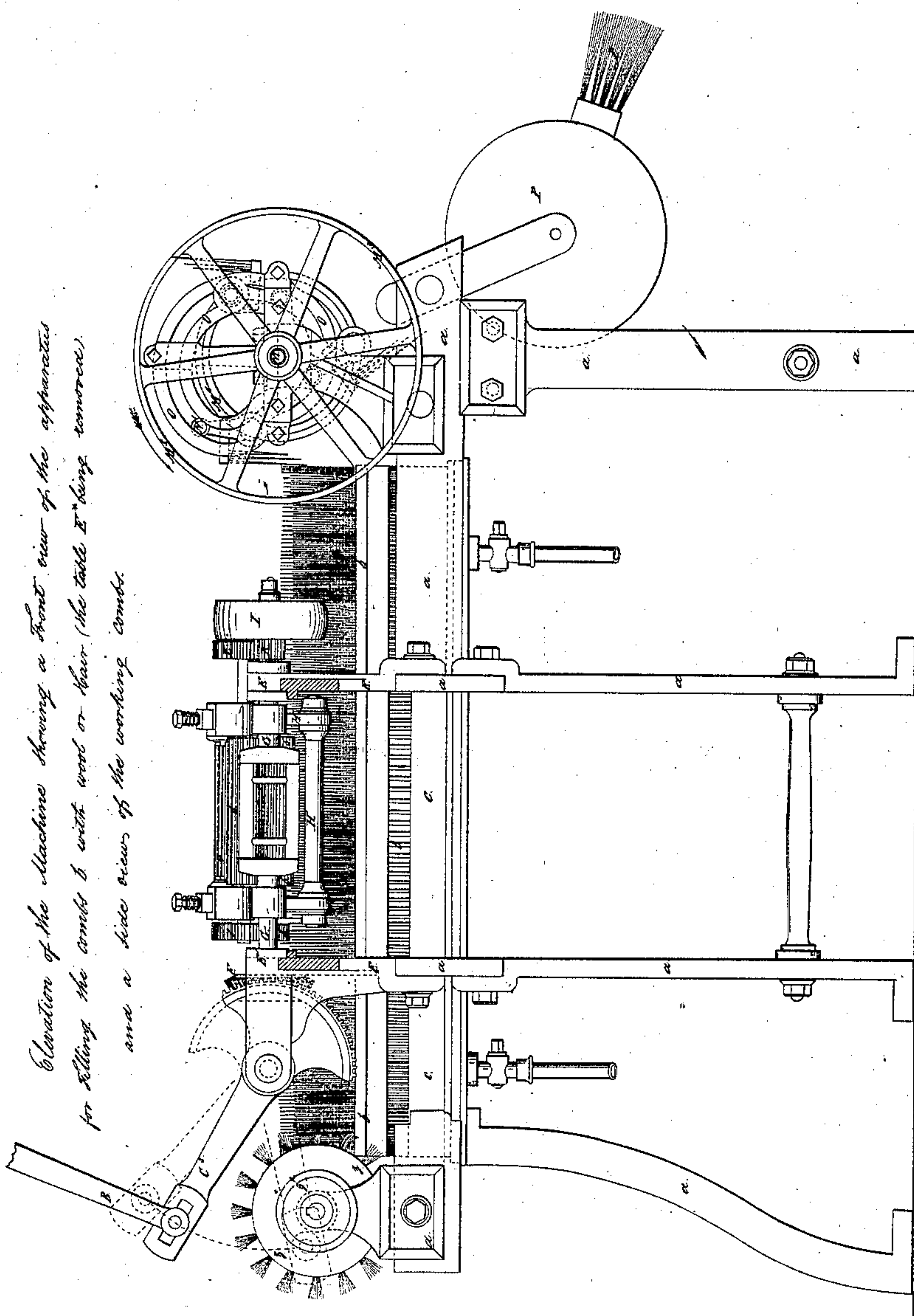
Inventor
G. E. Danisthorpe

G. E. Danisthorpe,

Combing Wool,

N^o 3,734,

Patented Sept. 11, 1844.



Elevation of the Machine showing a front view of the apparatus
for setting the comb to with wool or hair (the table & being removed).
and a side view of the working comb.

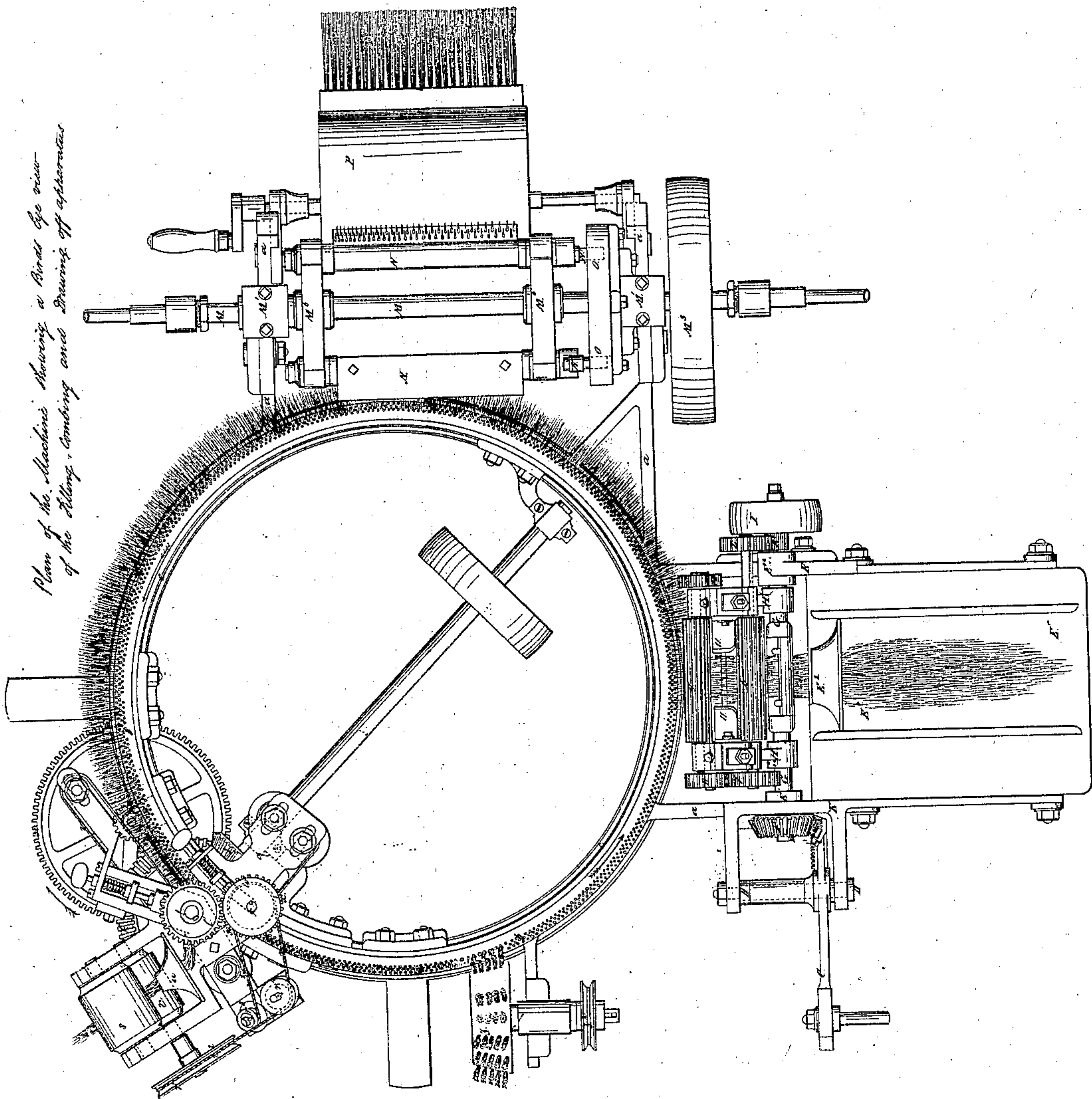
Witnesses
W. H. Fletcher
H. H. Hager.

Inventor
G. E. Danisthorpe

G. E. Donisthorpe,
Combing Wool,

N^o 3,734,

Patented Sept. 11, 1844.



*Plan of the Machine showing a Birds Eye view
of the Helms, Combing and Drawing off apparatus*

Witnesses.
W. H. R. R. R.
W. J. J. J.

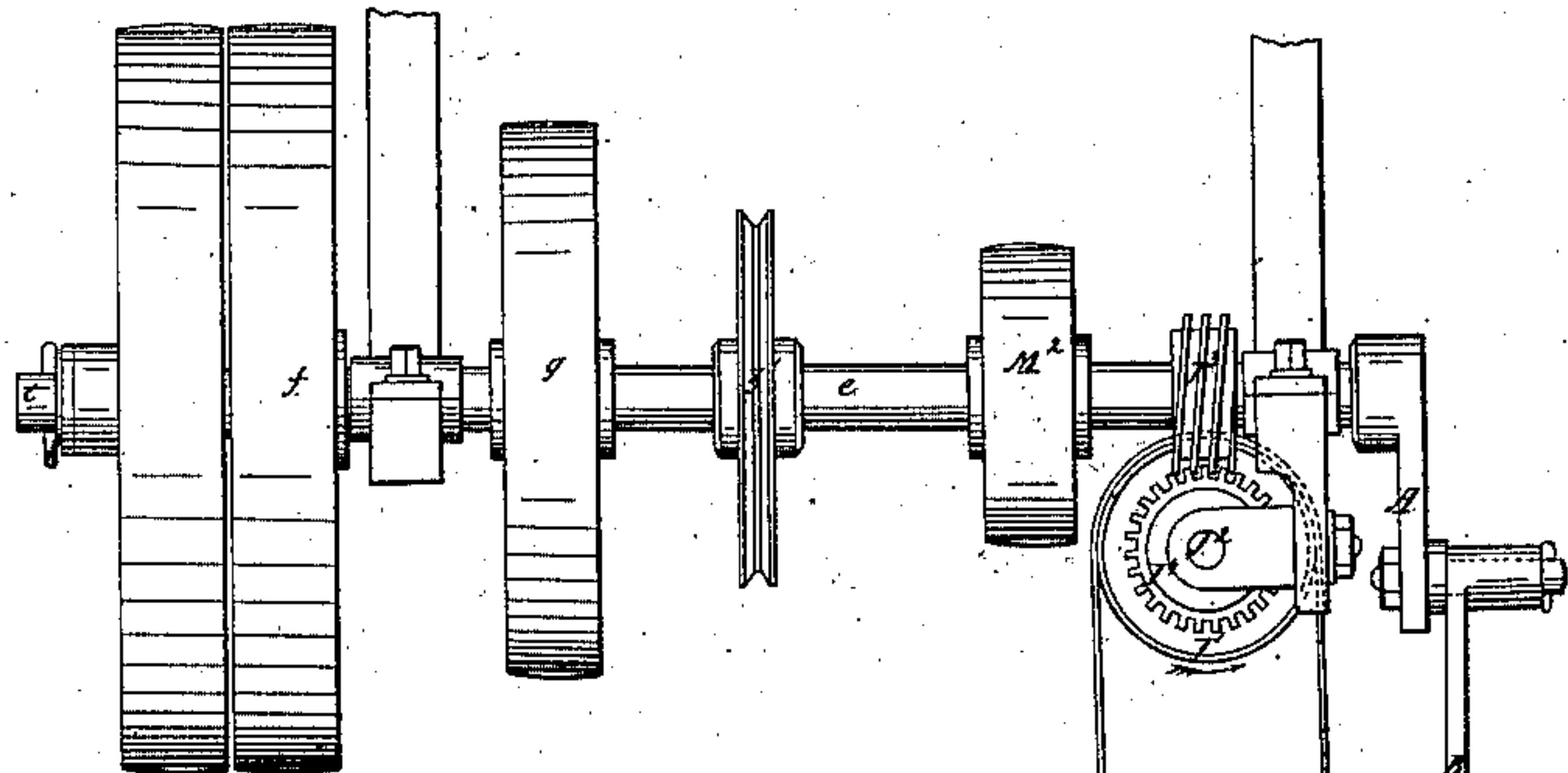
Inventor.
G. E. Donisthorpe

G. E. Danisthorpe,

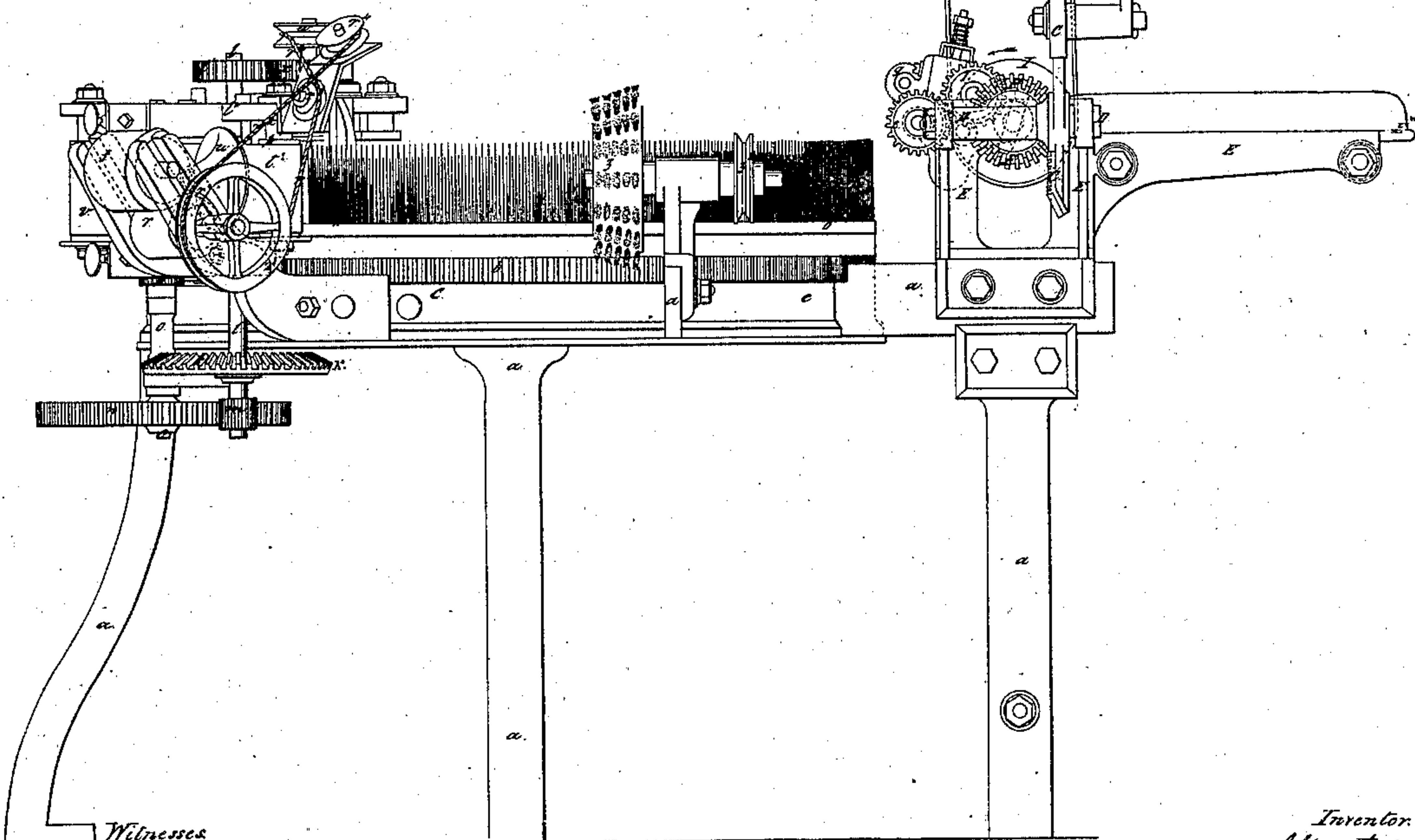
Combing Wool,

No 3,734.

Patented Sept. 11, 1844.



Elevation of the Machine showing a side view of the apparatus for filling the combs *b* with wool or hair and a side view of the apparatus for drawing off the wool or hair from the combs *b*. This figure also shows the various driving pulleys on the driving shaft *e*.



Witnesses
H. S. M. L. C. H. S.

Inventor
G. E. Danisthorpe

UNITED STATES PATENT OFFICE.

GEORGE E. DONISTHORPE, OF BRADFORD, ENGLAND.

MACHINERY FOR COMBING WOOL.

Specification of Letters Patent No. 3,734, dated September 11, 1844.

To all whom it may concern:

Be it known that I, GEORGE EDMOND DONISTHORPE, a subject of the Queen of Great Britain, and now residing at Bradford, in the county of York, England, top manufacturer, have invented or discovered new and useful Improvements in combing Wool and other Suitable Fibrous Materials; and I, the said GEORGE EDMOND DONISTHORPE, do hereby declare that the nature of my said invention and the manner in which the same is to be performed are fully described and ascertained in and by the following statement thereof, reference being had to the drawings hereunto annexed and to the figures and letters marked thereon—that is to say:

The invention relates, first, to improvements in the constructing of the combs used in machinery for combing wool and other suitable fibrous materials and the improvements consist in constructing such combs with teeth set at a coarser gage at the end where they first commence to work the wool or other suitable fibrous material and of a finer gage at the other end where the teeth are caused to penetrate the wool or other suitable fibrous material (under process) closer up to the head of the comb containing the wool or other suitable fibrous material as will be hereafter described.

My invention also relates to improvements in rotatory working combs which work with combs which move in a circular or endless course and also to delivering the wool or other suitable fibrous material from the working combs back again to the carrying combs while working. And my invention also relates to improvements in apparatus for filling combs with wool or other suitable fibrous material. And in order that the invention may be most fully understood and readily carried into effect I will proceed to describe the drawings hereunto annexed reference being had to the figures and letters marked thereon.

Description of the drawings.—The nature of the various views of the machinery which are shown in the drawings being written thereon the same will not be required to be repeated here. The first part of the invention relates as above stated to a mode of constructing the working combs in order to make them more suitable for combing particularly in such cases as have the combs so placed that each of the working combs

acts upon the outer ends of the wool or other suitable fibrous material at one end of the combs at the same time that the other end of the same comb is working up closer to the head of the comb which is holding the wool or other suitable fibrous material and this part of the invention consists in setting the teeth at one end of each of the working combs to a coarser gage than at the other end of each of the combs.

Figure 1 shows a front view of a comb constructed according to this part of my invention. Fig. 2 is an end view thereof and Fig. 3 is a plan of the coarser end of the comb the degree of coarseness and fineness of the setting of the teeth may be varied.

The drawing shows those which I am using and find fully to answer the drawing showing the combs of the real size for fine wool and the front and back rows of teeth are shown to have flattened stems which I prefer to be the case but other teeth may be used varying the setting from a coarser to a finer gage according to the nature of the wool or other suitable fibrous material under process. In using combs such as above described in machinery which causes the combs which carry the wool or other suitable fibrous material to move in a direction from the coarser toward the finer end of the working combs and in such manner that the working combs work in a direction across the surface of the wool or other suitable fibrous material the finer end of the combs working near to the head of the combs with which they are working and the coarser end of the combs working at a distance from the head of the comb with which they are working will cause the wool or other suitable fibrous material first to be combed out near the ends with the coarser gage of teeth and as the wool or other suitable fibrous material is carried onward the teeth will penetrate nearer and nearer to the head of the comb which is carrying the wool and the working teeth in so penetrating farther and farther into the wool will become of finer and finer gage until the combing is completed by the finest gage of the teeth combing up near to the head of the combs with which they are working.

I will now describe the machinery shown in the drawing in order that the parts of my invention may be understood.

a a is the framing of the machine, the nature and construction of which are clearly

shown in the various figures of the drawing, the comb of which is filled and carries the wool to the working combs moves in a circular course $b\ b$, being a ring which carries the comb teeth or the circle of combs may be made up of several combs $b\ b$, the heads of which are a segment of a circle. The circular comb $b\ b$ moves in a circular guide $c\ c$ affixed on the framing a . The outer surfaces of the ring of combs b is formed into a toothed rack in order that the comb b may be caused to move in a circular course by means of the cog wheel d , which takes into the teeth of the toothed racks formed on the heads of the combs b and motion is communicated to the cog wheel d in the following manner.

e , is a shaft or axis turning in bearings above the machine, this axis e , receives motion from a steam engine or other power by means of a strap acting on the drum f . On the axis or shaft e , is affixed the drum g , which by means of a strap working on the drum h , gives motion to the shaft or axis i on which the drum h , is affixed, such axis i turning in bearings within the circular framing c as is shown. On the axis or shaft i , is affixed the beveled toothed wheel j which takes into and drives the beveled toothed wheel k which is affixed to the axis l , which turns in bearings l' carried by the framing of the machine. On the axis l , is affixed a pinion m , which takes into and drives the cog wheel n affixed on the axis o , which turns in suitable bearings carried by the framing. On the axis o , is affixed the cog wheel d , which as before stated takes into the toothed racks of the combs b and causes those combs to move around in the circular guide c . The axis l at its upper end has one of the drawing rollers p affixed thereto the other drawing roller q , receiving motion by means of the drawing roller p . The axis of the drawing roller q , turns in suitable bearings. Each of the drawing rollers has an endless cloth t , v which I prefer to be of felt or woollen cloth. The endless cloth t moves on the drawing roller p and the roller or drum p' which turns upon an axis p^2 and the object of the endless cloth t is to lay hold of the wool or other suitable fibrous material as it comes through between the drawing rollers and conduct it toward the pressing or delivering rollers r , s , which press the continuous sliver as it passes between them and the sliver is guided to the rollers r , s , by means of the bell shaped funnel u , as is shown. The endless cloth v works with the drawing roller q , and the roller p^3 the object of it being to lay hold of the wool or other suitable fibrous material and carry the ends forward toward the drawing rollers the surface of the endless cloth v traveling faster than the combs b .

The pressing rollers $r\ s$ receive motion in

the following manner: On the axis of the roller r , is affixed a pulley r' , which receives a gut or other suitable band r^2 , which is guided by the guide pulleys r^3 , r^4 and receives motion by the pulley w which is affixed on to one of the drawing rollers x which are for drawing off the "backings" and the axis of this roller x receives motion from the axis l by means of two cog wheels l' x' which are respectively fixed on the axes l , x . The axes of the drawing rollers x , x , turn in bearings carried by the circular framing and within the circle of combs b , b , and are so placed as to draw off the "backings" of wool or other suitable fibrous material and after the other drawing rollers have drawn off the sliver of wool or other suitable fibrous material and the wool or other suitable fibrous material composing the "backings" as it is drawn off the backs of the combs b , may be wound on either of the endless cloths x^2 , x^2 , which work with the drawing rollers x and with the rollers x^3 and be broken therefrom when sufficiently accumulated.

I may remark that the using of a circular comb such as is produced by b , b , forms no part of my invention when separately considered and in place of a circular comb other endless combs may be used in carrying out part of my invention, but I believe not with such advantage. The wool or other suitable fibrous material in the combs b , b , after it has been combed and before it is drawn should be raised a little from the lower parts of the stems of the teeth in order to facilitate the process of drawing by the drawing rollers p , q , and x , x , for this purpose. I apply a blade with a leather surface (1) on the rod (2) this rod having a slot through which a fixed pin (3) passes and in the up and down motion of the rod (2) the pin controls the motion of the blade (1). The lower end of the rod (2) is placed on a crank pin affixed to the pulley (4) which receives motion by the band (5) by this arrangement a quick motion to the blade (1) will be obtained and the wool or other suitable fibrous material in the comb b , will be lifted in the combs b , b . The wool is removed from the combs $b\ b$ by means of a brush z the bearing of the axis of which is affixed to the circular framing of the machine and the brush z receives motion from the main shaft or axis by means of a gut or other band worked by the pulley z' affixed on the axis or shaft e , the gut or other band from the pulley z' working the pulley z^2 , affixed on the axis of the brush z , all which will readily be understood on examining the drawings.

I will now describe the apparatus for lashing the wool or other suitable fibrous material into and filling the combs b , which apparatus is also suitable for lashing wool or other suitable fibrous material into and

filling combs which may be caused to move past the apparatus by other means than when moving in a circle. This apparatus is shown as applied to the machine as well as separately in section by which the mode of arranging the parts will readily be traced and the manner of their working will be understood by the description hereafter given. On the main or driving shaft or axis is affixed the crank A which gives motion to the connecting rod B which is attached to a crank pin affixed to the crank A. The lower end of the connecting rod is attached to a pin affixed to the arm C⁵ of the toothed sector C, such toothed sector moving on an axis D, the bearings of which axis are affixed to one side of the projecting framing E, E, as is shown. The toothed sector gives motion to a beveled cog wheel F affixed to the axis G which is a framed or open axis allowing the sliver of wool to be combed as it is fed into the machine to pass through the opening in the axis this axis only making a portion of a revolution. The axis G moves in bearings E' E', on the projecting framings E E. On the axis G are affixed the two plates H H which are combined by the stay bar H' and these two plates H will be caused to move up and down describing an arc of a circle and by means of the apparatus hereafter described the wool fed into the machine will be lashed on to the combs and in being lashed will be drawn in a direction away from the combs *b* by a retrograde motion of the feeding rollers as hereafter explained.

On the axis G is the drum I which moves freely on that axis G and motion is communicated to the drum I by means of the endless strap or band J, which is driven by the drum J', affixed on the axis J² such axis moving in bearings at the upper part of the room in which the machinery is placed and motion is communicated to the axis J² by means of the screw J³ affixed on the main or driving axis or shaft *e* such screw taking into and driving the screw wheel J⁴ affixed on the axis J² by which means a slow motion will be given to the drum I and consequently to the parts driven thereby on the drum I is affixed the cog wheel K which takes into and drives the cog wheel L on the axis of one of the grooved rollers (6) which grooved rollers turn in bearings formed in the plates H. On the axis of one of the grooved rollers (6) is affixed the cog wheel (7) which takes into and drives the cog wheel (8) affixed on the axis of one of the feed rollers (9) the two feed rollers (9) being geared together by means of the cog wheels (10). The two feed rollers (9) turn in bearings formed in the plates H, H, (11) (11) are gage plates to prevent the wool or other suitable fibrous material spreading too much along the rollers (9). The sliver of roughly combed

out wool from a preparing machine as is well understood is laid on to the table E^x and it is drawn through the guide tube E² by the grooved rollers (6) it thence passes between the feed rollers (9).

The apparatus for feeding and lashing the wool or other suitable fibrous material into the comb *b* when rising after having lashed the wool or other suitable fibrous material into the combs *b*, gives motion to the rollers (9) and (6) in a direction to draw and feed the wool through between those rollers and the motion of the cog wheel K adds to the quantity of motion which would be communicated to those rollers (9) and (6) for it will readily be understood that if the cog wheel K were a fixture the quantity of motion of the rollers (9) and (6) first in one direction and then in the other would be equal and no wool or other suitable fibrous material would be continually fed through between the feed rollers but owing to the slow motion of the cog wheel K there will be a constant feeding of wool through between the feed rollers while the up and down motion of the plates H, and the consequent motion of the cog wheel L will cause the wool or other suitable fibrous material when it is lashed into the combs *b* to be drawn away from the combs *b*, by the back revolution of the feed rollers and it is this peculiar working of the feed rollers and the apparatus connected therewith which constitutes one part of my improvements.

I will now describe the means of applying working combs to an endless comb, *b*, working in a circular or endless course whereby the working combs shall at one of their ends approach near the curved combs *b*, with which they are working and be at a distance from the comb *b* at the other end whereby one end of a working comb will be working the outer ends of the wool or other suitable fibrous material and the other end of the same working comb will be working up to near the head of the comb *b*, with which it is working, the working combs being mounted on a revolving axis and each comb being so mounted as to have a movement from the comb with which it is working and toward the axis of motion at the time the working comb is in the wool or other suitable fibrous material (carried by the circular or endless comb) and combing it, and it should be observed that the working comb works with the circular combs, *b*, in such direction that the parts of the working combs pass downward opposite the teeth in the circular comb *b*, the teeth of the combs *b*, rising upward from the head of the combs *b*, so that the heads of the working combs in revolving pass toward the heads of the circular combs *b*, *b*. I do not however confine myself to the relation of the teeth of the working combs to the

combs *b*, as that may be varied so long as the rotatory combs have each a movement to their center of motion and work with endless combs.

5 *M*, is the axis which carries three or it might be one or more working combs; this axis *M*, turns in bearings at *M'* which are carried by the framing which is affixed to the circular framing of the machine as is shown. The axis *M* receives motion from 10 the axis or shaft *e* by means of a strap or band worked by the drum *M*² affixed on the axis *e* which drives the drum *M*³ affixed on the axis *M*. The axis *M* is hollow in order 15 to receive steam there being a steam pipe from a steam boiler applied thereto. To the axis *M*, are affixed hollow arms *M*⁵ which communicate with the hollow rings *M*⁶. These rings have openings through them for 20 receiving the necks of the hollow steam boxes *N* so that they move and yet have steam pass through from the rings *M*⁶ into them. The necks of the steam boxes *N* have each a projecting crank arm with a pin *N'*, 25 affixed thereto such pins being guided and governed in their movement by the fixed eccentric guides *O*, which are so arranged as to cause the working combs which are affixed to the steam boxes *N* to recede from the 30 comb *b*, before the head of the working comb comes to the head of the comb *b* but the ends of the working combs nearest the comb *b* will work the fibers near the teeth of the comb *b* when entering among the wool or 35 other suitable fibrous material, and owing to the combs *b* forming part of a circle there will be a considerable space between the other end of the working combs and the combs *b*.

40 It should be stated when the working combs used in this machine are according to the first part of the invention then the end of the comb where the teeth are set to the finest gage is to come nearest the 45 comb *b* and the coarsest end of the comb will be the most distant from the comb *b* when working. And one part of my invention consists of combining a curved or endless comb with working combs which are 50 mounted on an axis the head of each comb having the capability of being moved toward the axis of motion in their rotation and at the time of combing so that the working combs may at one end work up near to 55 the circular comb with which they are working and although I prefer the arrangement above described for obtaining such movement of the heads of the combs toward the center of motion during the revolution I do 60 not confine myself thereto.

I would remark that although I believe it better to use rotary working combs each having a movement toward the center of motion in their rotation and when in the 65 wool or other suitable fibrous material yet

rotatory working combs describing a complete circle in their rotation may be advantageously combined with circular or endless or other carrying combs when the teeth of such working combs have their teeth set 70 at a coarser gage where they first work, the wool or suitable fibrous material and of a finer gage where they approach close up to the teeth of the carrying comb, and part of my invention consists of combining 75 rotatory combs which perform in a circle in their rotation on their axis of motion with curved or endless or other carrying combs when so arranged that the rotatory combs work up near the heads of the carrying comb *b* with which they work an angular 80 space being left between the carrying comb and the working combs whereby the teeth of the working comb will at the end where the teeth are of the finest gage be 85 working nearly up to the head of the carrying comb and at the other end where the teeth are of the coarsest gage will be working near the outer ends of the wool or other suitable fibrous material placed in the end- 90 less or curved or other carrying combs.

P is a brush for clearing the teeth of the working combs there being a crank handle on the axis of the brush (which has several tufts of hair though only is shown) for turning 95 the brush from time to time or in place of cleaning the working combs by a brush *P*; another arrangement may be resorted to and which is shown at Figs. E and F.

a^x is a toothed wheel affixed on the axis *M* 100 of the working combs the toothed wheel *a*^x takes into and drives the cog wheel *b*^x affixed on the axis *c*^x which axis makes three revolutions for one revolution of the axis *M* upon the axis *c*^x are affixed two arms *d*^x 105 which act upon the ends of the sliding plates hereafter described.

N are the steam boxes to which the working combs are affixed and between and against the rows of teeth of these combs are 110 applied the sliding plates *e*^x which may have brushes affixed thereto as shown in the drawing, these plates being guided in their movement by staples *f*^x affixed to the heads of the combs and it will be seen that at every 115 revolution of the axis *M* the sliding plates *e*^x are acted on by the arms *d*^x, which causes the wool or other suitable fibrous material to be forced toward the points of the working combs and into a position to be taken 120 by the teeth of the circular or other comb *b* the sliding plates *e*^x are again moved toward the heads of the working combs (after the wool or other suitable fibrous material has been removed therefrom) by fixed inclined planes *g*^x this allows the working 125 combs to comb out the wool or other suitable fibrous material contained in the circular or endless comb *b*, the wool or other suitable fibrous material taken up by the combs 130

in this operation being removed therefrom by the sliding plates as above described.

It is important that the combs *b* should be kept heated I therefore make the circular frame on which they move hollow at *a'* in order to receive steam or hot water. If steam be used then there is to be a steam pipe from a steam boiler to the hollow space *a'* and an escape pipe for the condensed steam and if hot water be used then there is to be a pipe leading from a boiler to the space *a'* and another pipe leading from the space *a'* to the boiler so that a constant flow of hot water may take place through the hollow space *a'*.

Having thus described the nature of my invention and the manner in which the same is to be performed I would wish it to be understood that I do not confine myself to the details here shown and described so long as the peculiar character of either part of my invention be retained. And I would have it understood that

What I claim is—

1. The arranging the teeth of the "working" combs at variable and decreasing distances apart from one end of the comb to the other as set forth (whether the said comb consists of a straight row of teeth or several circular rows or cylinders) in combination with arranging the said teeth in such manner that as they increase in distance asunder they shall increase in distance from the teeth of the carrying combs or in other

words arranging the teeth of the working combs at increasing distances apart from each other and form the carrying combs as hereinbefore set forth.

2. Also giving to each of the rotary working combs (when revolving and working with the teeth of the endless carrying combs) a movement toward the common axis of the set of rotatory working combs; the same being for the purpose specified.

3. Also the manner of discharging wool from the teeth of the working combs, viz., by means of the sliding plates *e^x e^x* &c. applied to the said teeth and operated as set forth.

4. Also I do not claim the employment of one or more sets of feed rollers for supplying the carrying combs with the fibrous material but that which I do claim consists in the above described manner of arranging and operating those feed rollers with respect to the carrying combs (or teeth thereof) so as to cause them to lash, lay or apply the wool upon the said teeth as specified the said feed rollers and carrying teeth being arranged with respect to each other as seen in the drawing entitled "Section of the apparatus for filling the comb *b* with the wool or hair" and being operated or depressed and elevated as hereinbefore described.

G. E. DONISTHORPE.

Witnesses:

W. HY. RITCHIE,
S. CARPMAN.