

(No Model.)

2 Sheets—Sheet 1.

R. KITSON.

MACHINE FOR OPENING AND CLEANING COTTON, &c.

No. 373,075.

Patented Nov. 15, 1887.

Fig. 2

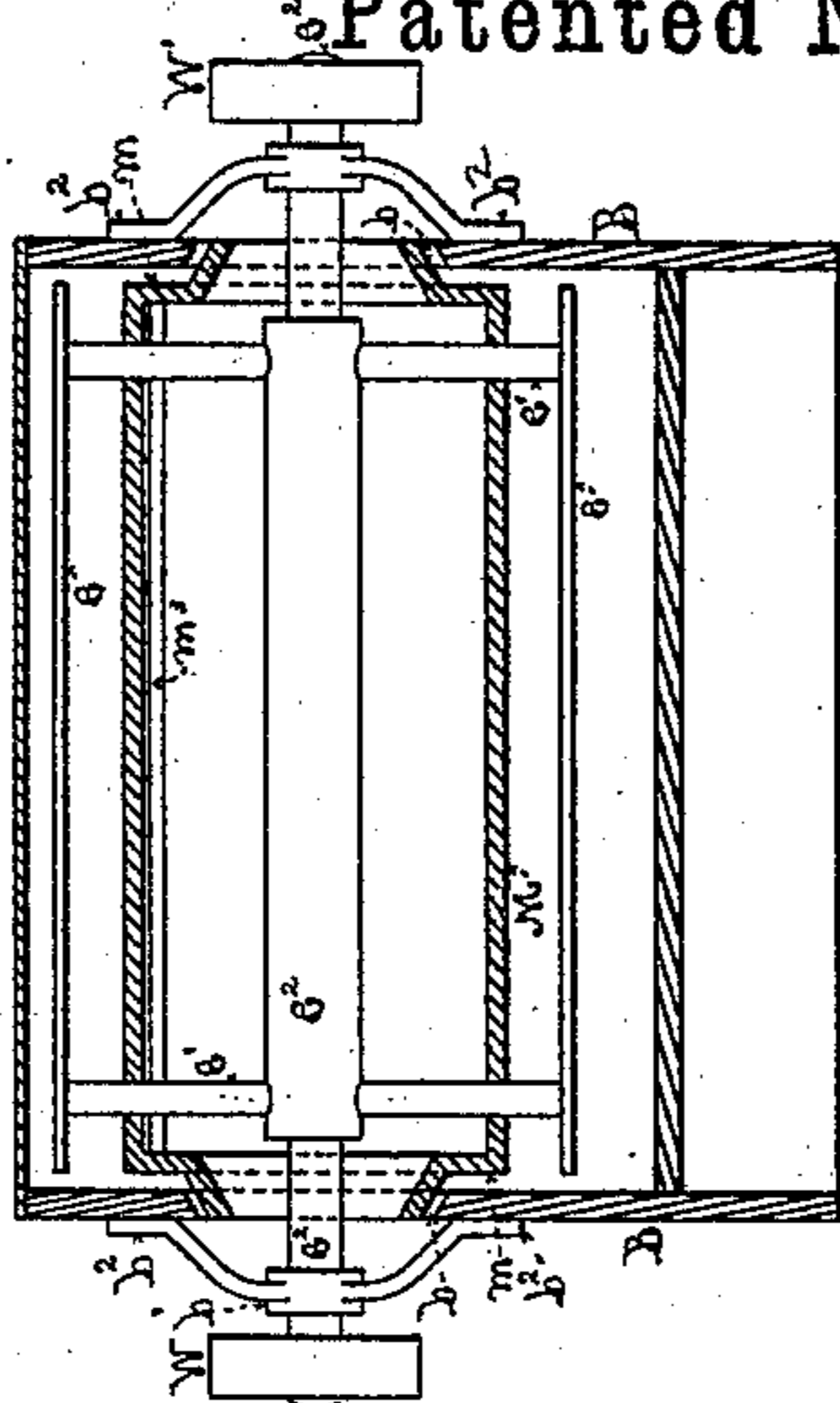
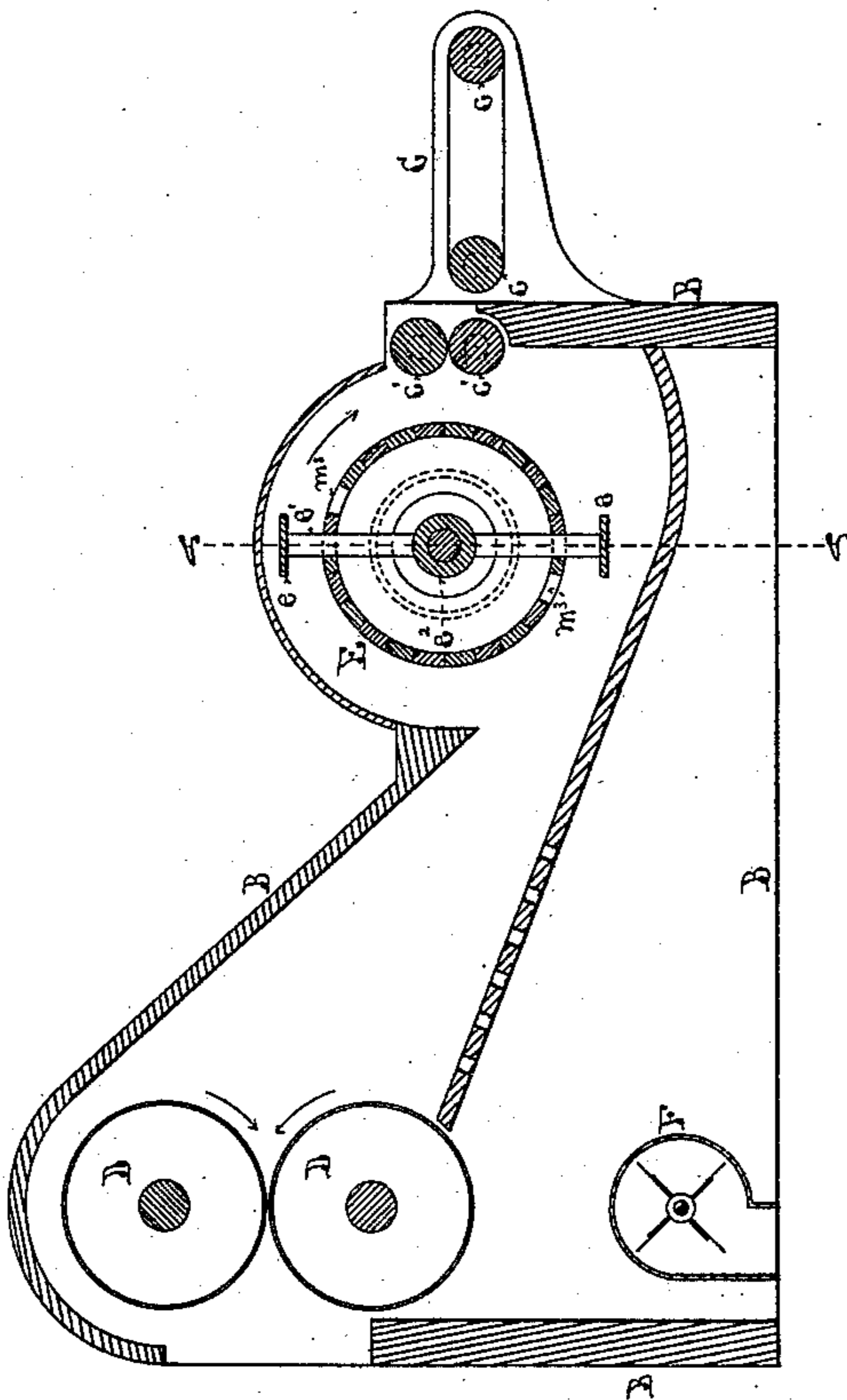


Fig. 1



Witnesses

Wm. D. Brown
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Richard Kitson

(No Model.)

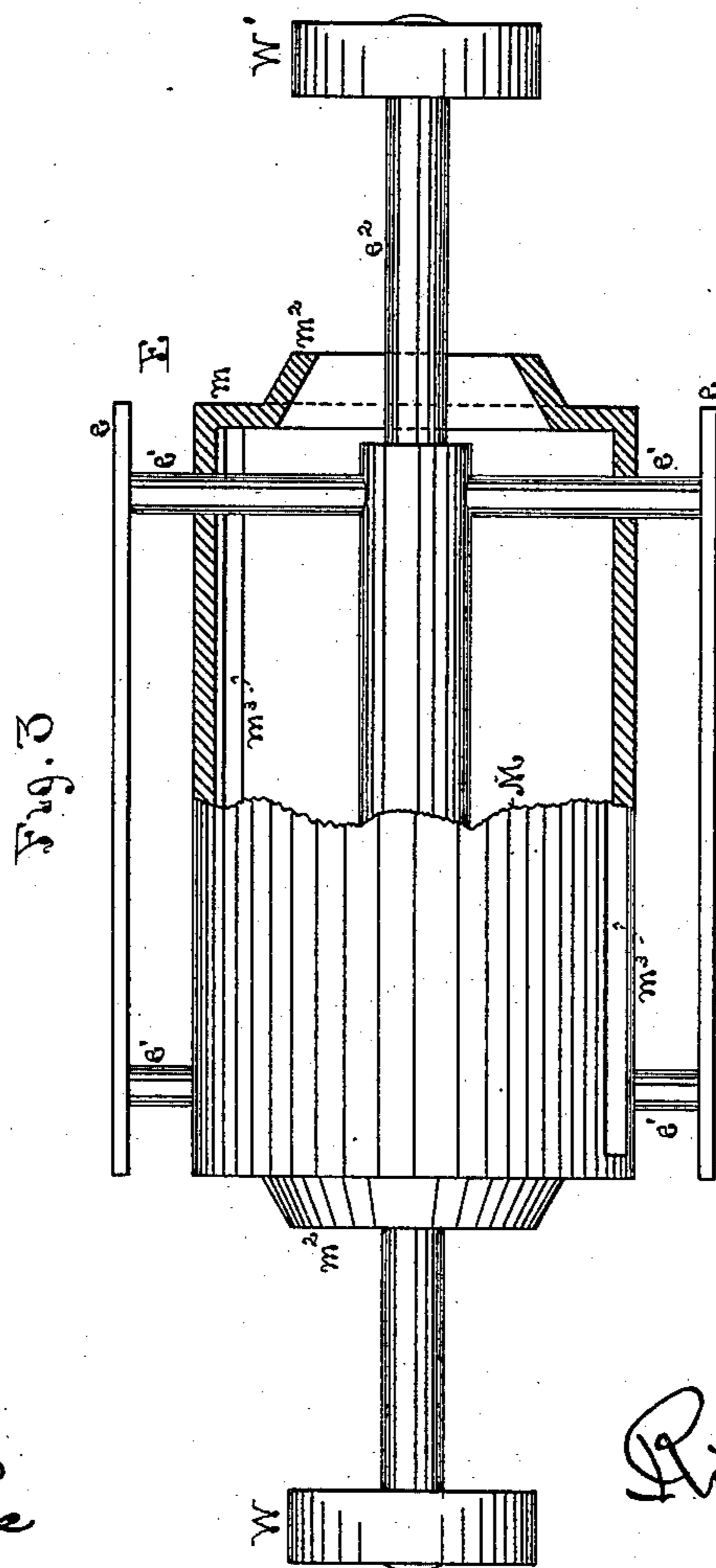
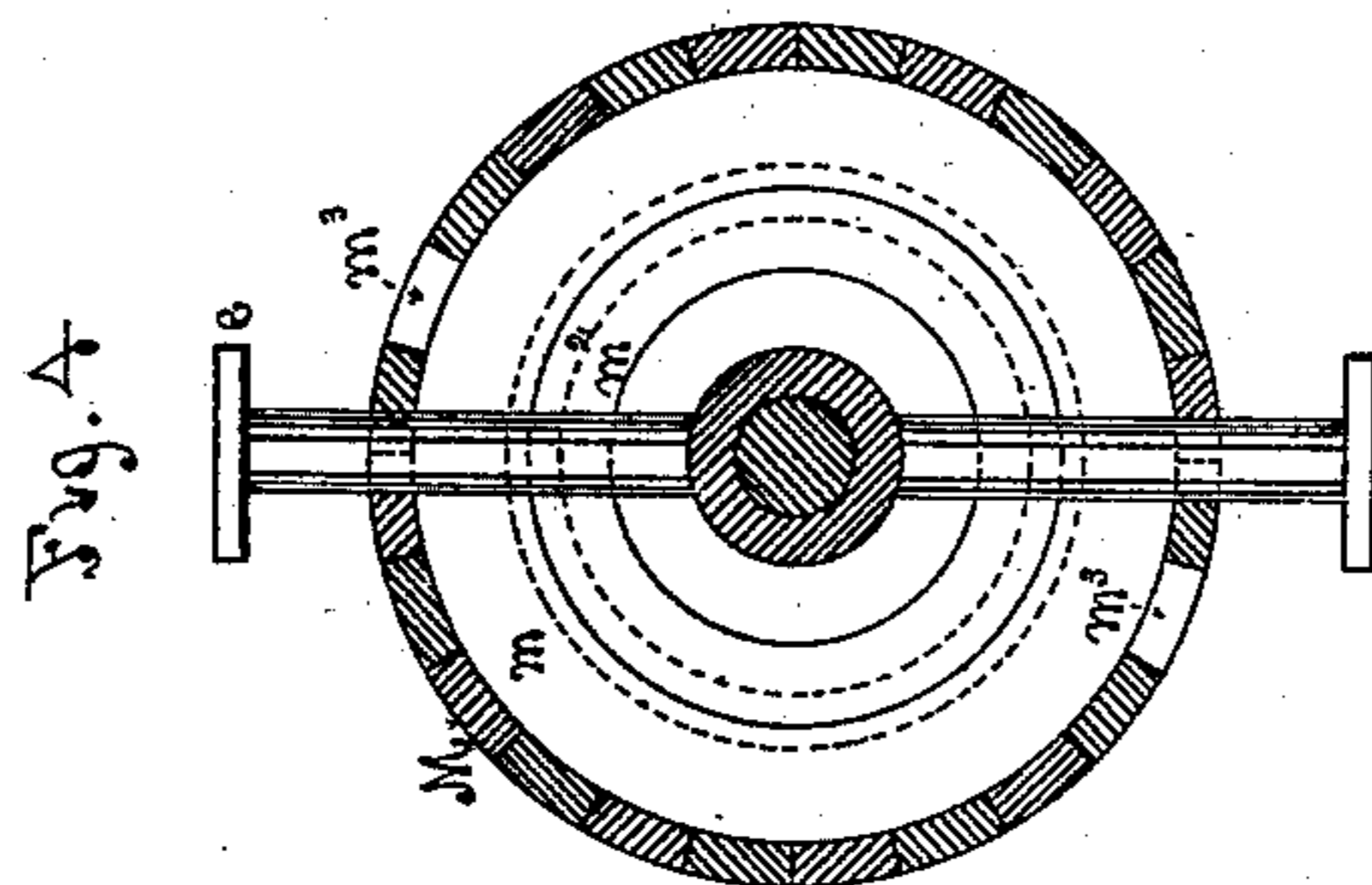
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MACHINE FOR OPENING AND CLEANING COTTON, &c.

No. 373,075.

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Witnesses

Wm. S. Brown
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UNITED STATES PATENT OFFICE.

RICHARD KITSON, OF LOWELL, MASSACHUSETTS, ASSIGNOR TO THE
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MACHINE FOR OPENING AND CLEANING COTTON, &c.

SPECIFICATION forming part of Letters Patent No. 373,075, dated November 15, 1887.

Application filed March 24, 1884. Serial No. 125,288. (No model.)

To all whom it may concern:

Be it known that I, RICHARD KITSON, of the city of Lowell, in the county of Middlesex, and State of Massachusetts, have invented certain new and useful Improvements in Machines for Opening and Cleaning Cotton and other Fibrous Substances, of which the following is a specification.

My invention relates to machines for opening and cleaning cotton and other fibrous substances; and it consists in certain improvements in the beaters of such machines and other parts connected therewith for the purpose of securing an improved operation of such machines, substantially as hereinafter described and claimed.

In the drawings, Figure 1 is a longitudinal section through a machine for opening cotton provided with my improvements. Fig. 2 is a transverse section through line A A of Fig. 1. Fig. 3 is an enlarged side view of the beater detached from the machine, partly in section. Fig. 4 is a transverse section of the same.

B is the casing of the machine, which is provided with the usual feed-apron, C, running around rollers *c c* and carrying the cotton to the feed-rolls *c' c'*, whence it is struck by the beater as it is fed to the machine.

D D are the condensing-screens for forming the cotton into a lap, and F is the exhaust-fan, connected with them in the ordinary and well-known manner and substantially as in the machine referred to in the Patent No. 52,008, granted January 9, 1866, to E. Lord.

E is the beater of the machine, constructed with blades *e e* and arms *e' e'*, attached to the shaft *e²* in the ordinary manner. To the arms of the beater I attach a drum, M, as shown, formed of the length of the beater-blades, with ends *m m*, which support tubular projections *m² m²*, which are formed tapering on their outer peripheries, such surface being that of the frustum of a cone with its smaller diameter outward. The end of each of the tubes *m²* is concentric with the beater-shaft, thus forming around the latter, at each end of the beater, an open annular space, as shown.

The drum M is in the form of a tube, of smaller diameter than the distance between the beater-blades through the center of its shaft, so as to allow the air passing through it

to escape against the inner faces of these blades and around their rear as well as their front sides.

In each side of the drum M, and just in front of each beater-blade, is made a long slot, *m³*, to allow the air to escape from the drum, as hereinafter described, upon the lower face and rear and front edges of the beater-blade, which strikes the cotton from the feed-rolls.

W W' are the pulleys on the ends of the beater-shaft by which it receives motion from a counter-shaft and communicates it to other parts of the machine, in the well-known manner.

The casing B of the machine has two round holes, *b*, made in its sides, where it is to receive the beater, of proper size and taper, as shown, to correspond with the tubular projections *m²* on the drum M and allow them to project through the casing, substantially as shown in Fig. 2.

The shaft *e²* of the beater is sustained in boxes *b'*, which are attached to the casing by arms *b²*, the outer ends of which are bolted to the casing outside of the holes *b*, and the boxes *b'* are thus adjusted in the position necessary to bring the holes *b* concentric with the beater-shaft. The conical form of the projections *m²* on their external surface and the corresponding tapering form of the holes *b* cause the beater and tubular projections *m²* to create a draft inward in the small space necessarily left around the exterior of the projections to allow the beater to revolve freely, and thus these tapering surfaces prevent cotton from being thrown outward and clogging up the spaces either between the surface of the projections *m²* or the ends *m* of the drum and the casing of the machine.

When the beater is rotated rapidly, its blades *e*, which strike the cotton from the nip of the feed-rolls, travel through the air as horizontal bars, surrounded on all sides by air-currents set in motion by the beater-blades themselves, and this construction of the beater with blades *e* and their supporting-arms *e' e'* is preferable in avoiding atmospheric friction in running the beater at high rates of speed, such as are commonly employed. The centrifugal force generated by the rotation of the beater throws outward the air ahead of the

beater-blades and creates a partial vortex in the space within their path and between them and their shaft. This causes the fiber to follow the blades and cling to their rear and inner faces, producing stringing and matting together of such fibers. The air, escaping through the openings or slots of the tubular drum M, is delivered therefrom with some force, and by the rapid forward progression of the beater-blade, while the air is traversing across the space between drum M and the blade under the influence of centrifugal force, it is caused to impinge against the inner face and rear side of the blade, and also to fill the space between the outer surface of the drum and the path of the beater-blades, thereby preventing a vortex being formed and the fiber clinging to the latter, as described. In these respects the drum and its slots co-operate with the beater-blades while it is in operation differently from any similar parts heretofore known in beaters, owing to their peculiar construction and arrangement, as above stated.

By regulating the breadth of the openings or slots m^3 in the drum I insure the delivery of the air to the beater-blades in such a manner and quantity that it shall be delivered against all parts of the blade lengthwise in a substantially even amount, thus providing an even lap, while not in so great quantity as to blow the fiber out through the grids before reaching the lap-screens by the centrifugal action of the beater. The position of the air-passages m^3 with relation to the blades of the beater will vary somewhat in proportion to the speed at which it is intended to run the latter in order to produce the most efficient results; but it can be readily ascertained by experiment in each case, and their best form and proportions should be determined in like manner and in view of the difference in the kinds of fiber to be operated on by the beater.

By the construction of the drum M with its open ends around the beater-shaft, and providing corresponding openings in the casing of the machine for the admission of air to it, I am enabled to provide for the introduction of a large amount of air around the shaft of the beater, while keeping the bearings of the beater-shaft of the same size as before, and thus not increasing their friction upon the bearings. In these respects my invention differs from a beater having a hollow perforated shaft for the admission of air within the beater-blades, since it is evident that an increase in the air-delivering capacity of the shaft must be obtained by increasing the size of its bearings.

I do not consider the tubular projections m^2 as an absolutely essential part of this invention, although I prefer to employ them as de-

scribed, as they might be removed from the ends of the drum M and the air admitted directly through the holes b in the casing into the ends of the drum. The latter might also be used with an opening in only one end instead of both.

What I claim as new and of my invention is—

1. The combination of the beater constructed with shaft e^2 , arms e' , and one or more blades, e , in the form of a bar or bars mounted on the ends of said arms, and the tube or drum M, of smaller radius than the length of arms e' , secured to the beater outside of its shaft, and open at the end or ends for the admission of air, and provided with one or more air-delivery passages, m^3 , located between the shaft and the path of the beater-blade, adapted to deliver currents of air within the path of the beater blade or blades and allow the same to impinge upon the lower and rear faces of the latter, substantially as described.

2. The combination of the machine-casing B around the beater, the feed-rolls $e' e'$, the beater constructed with shaft e^2 , arms e' , and one or more blades, e , in the form of a bar or bars mounted on the ends of said arms, and the tube or drum M, of smaller radius than the length of the arms e' , secured to the beater outside of its shaft, open at the end or ends through the casing for the admission of air, and provided with one or more air-delivery passages, m^3 , located between the shaft and the path of the beater blade or blades, adapted to deliver currents of air within the path of the revolving beater blade or blades and allow the same to impinge upon the lower and rear faces of the latter, substantially as described.

3. The combination of the machine-casing B around the beater, the feed-rolls $e' e'$, the screen-cylinders D D, the beater constructed with shaft e^2 , arms e' , and one or more blades, e , in the form of a bar or bars mounted on the ends of said arms, and the tube or drum M, of smaller radius than the length of arms e' , secured to the beater outside of its shaft, open at the end or ends through the casing for the admission of air, and provided with one or more air-delivery passages, m^3 , located between the shaft and the path of the beater blade or blades, adapted to deliver currents of air within the path of the revolving beater blade or blades and allow the same to impinge upon the lower and rear faces of the latter, substantially as described.

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Witnesses:

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