

No. 753,200.

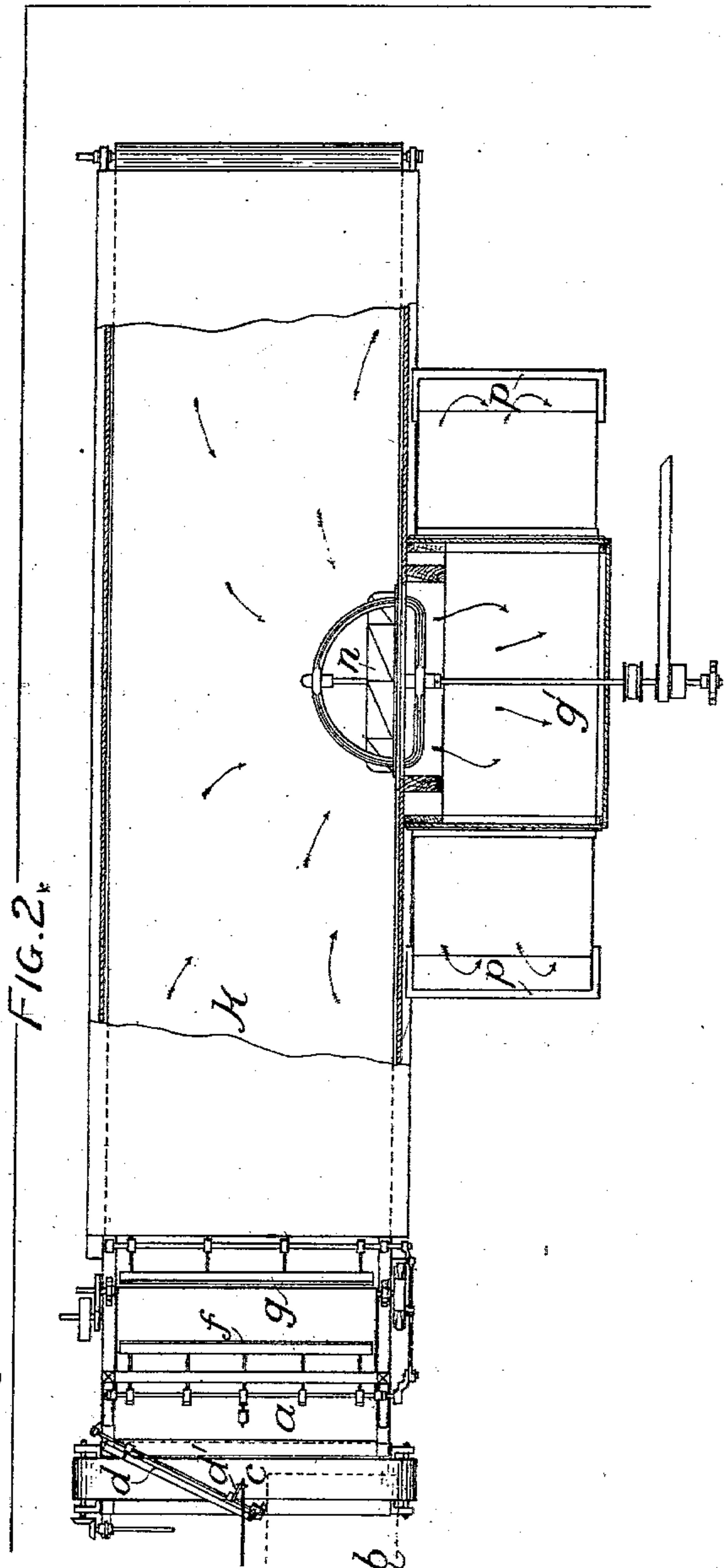
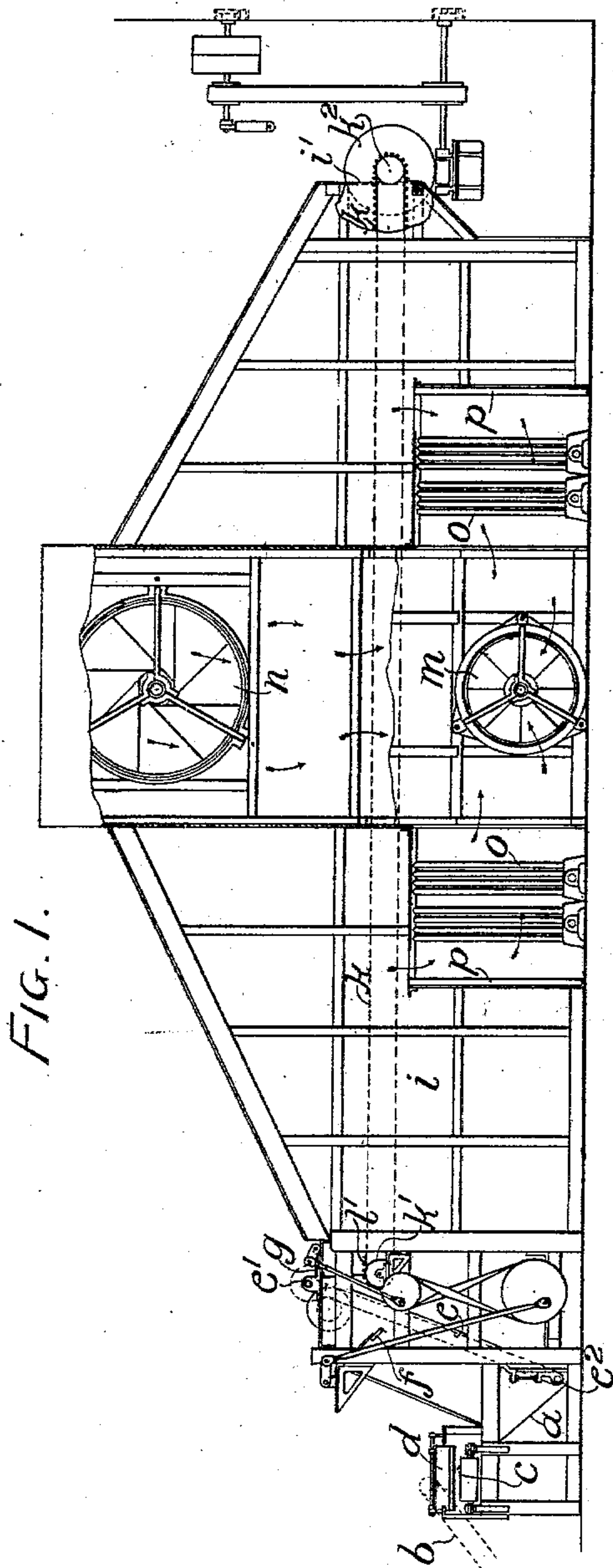
PATENTED FEB. 23, 1904.

J. KEITH & W. W. WARDLE.
APPARATUS FOR DRYING WOOL, &c.

APPLICATION FILED AUG. 22, 1903.

NO MODEL.

4 SHEETS—SHEET 1.



Witnesses
Wm. H. Chandler
Fred C. Jones

Inventors
J. Keith and
W. W. Wardle
by *[Signature]*
Attys.

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4 SHEETS—SHEET 2.

FIG. 3.

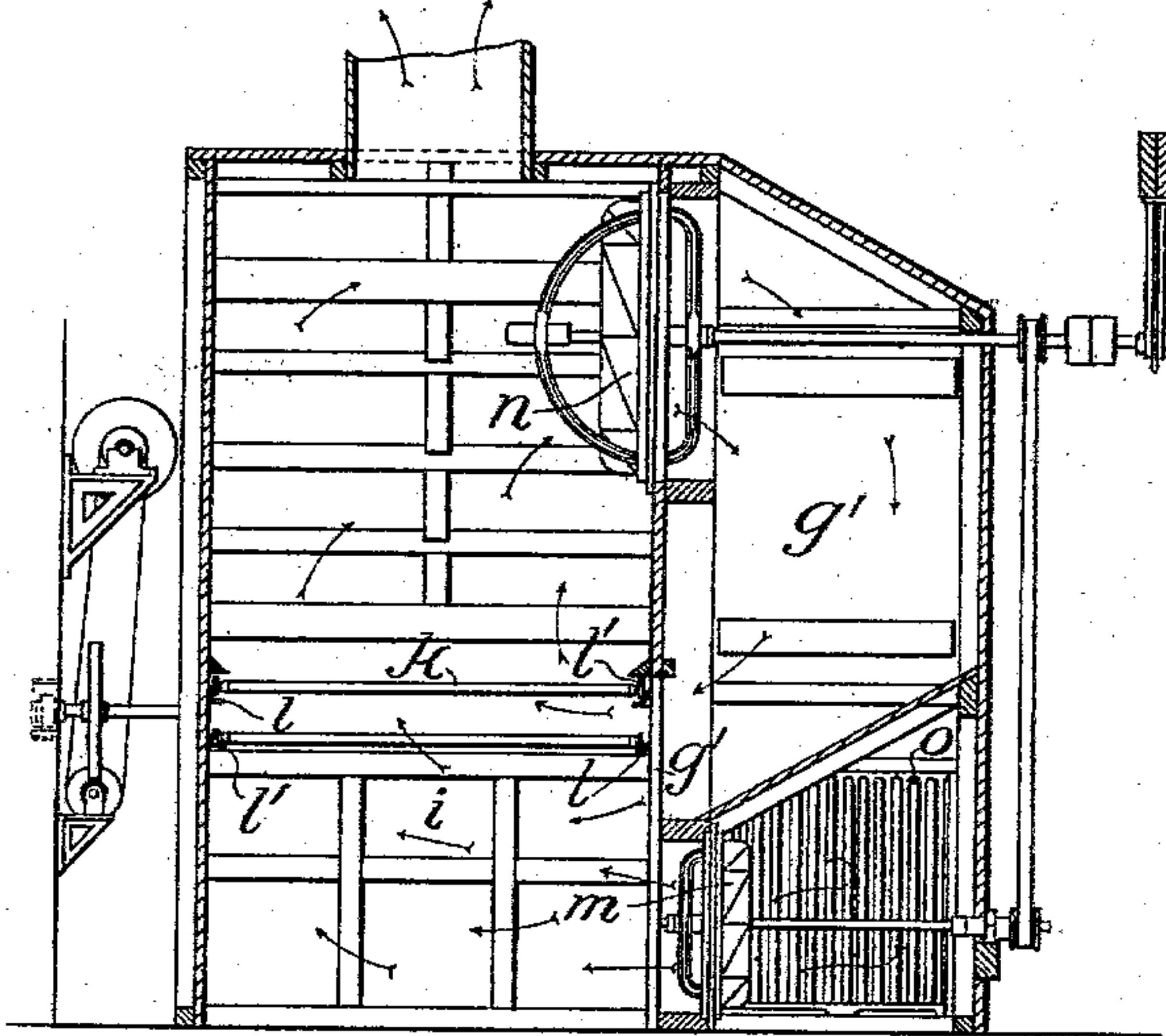
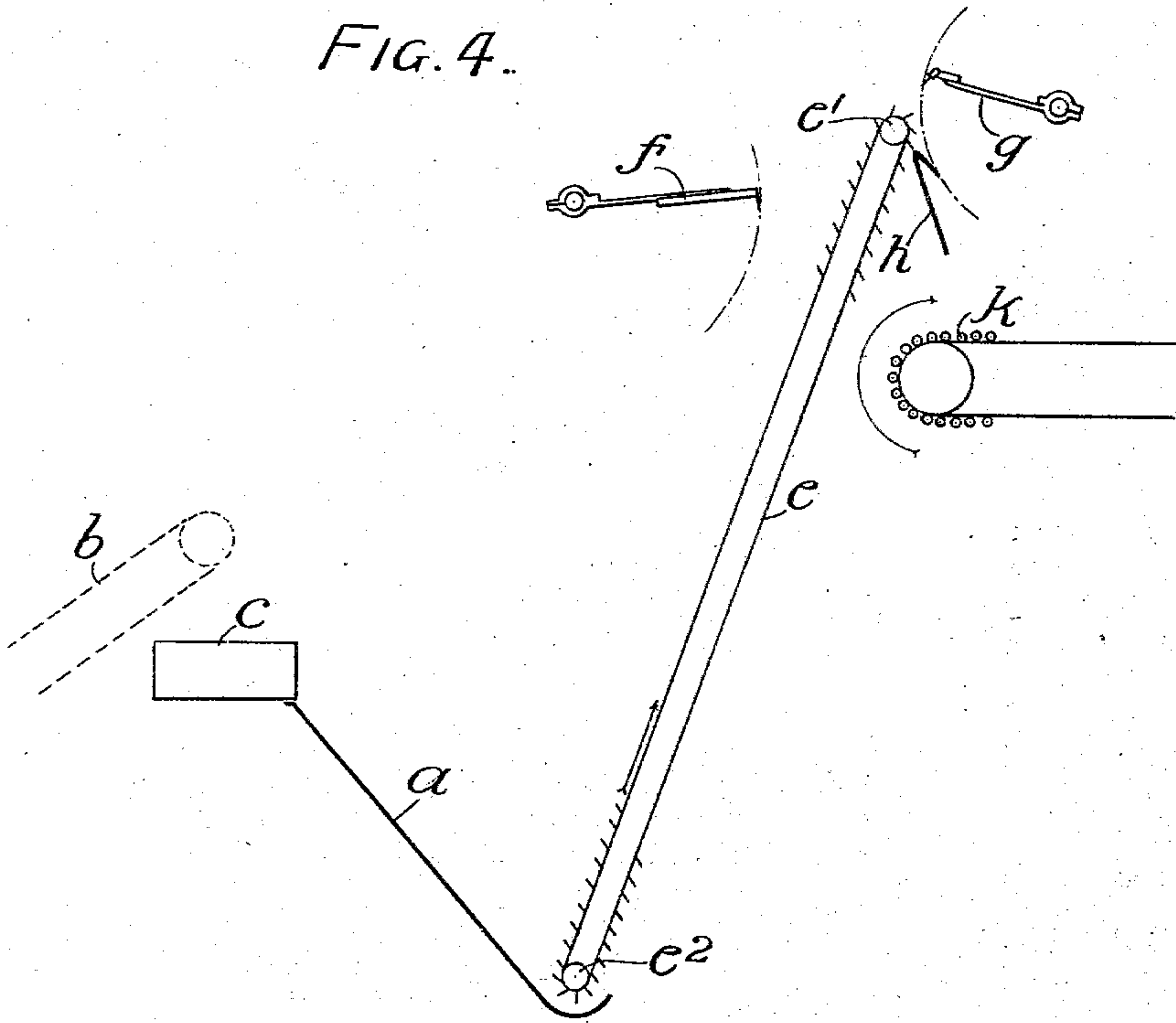


FIG. 4.



Witnesses
Samuel H. Chandler
Fred C. Jones

In witness
J. Keith and
W. W. Wardle
by *[Signature]* atty

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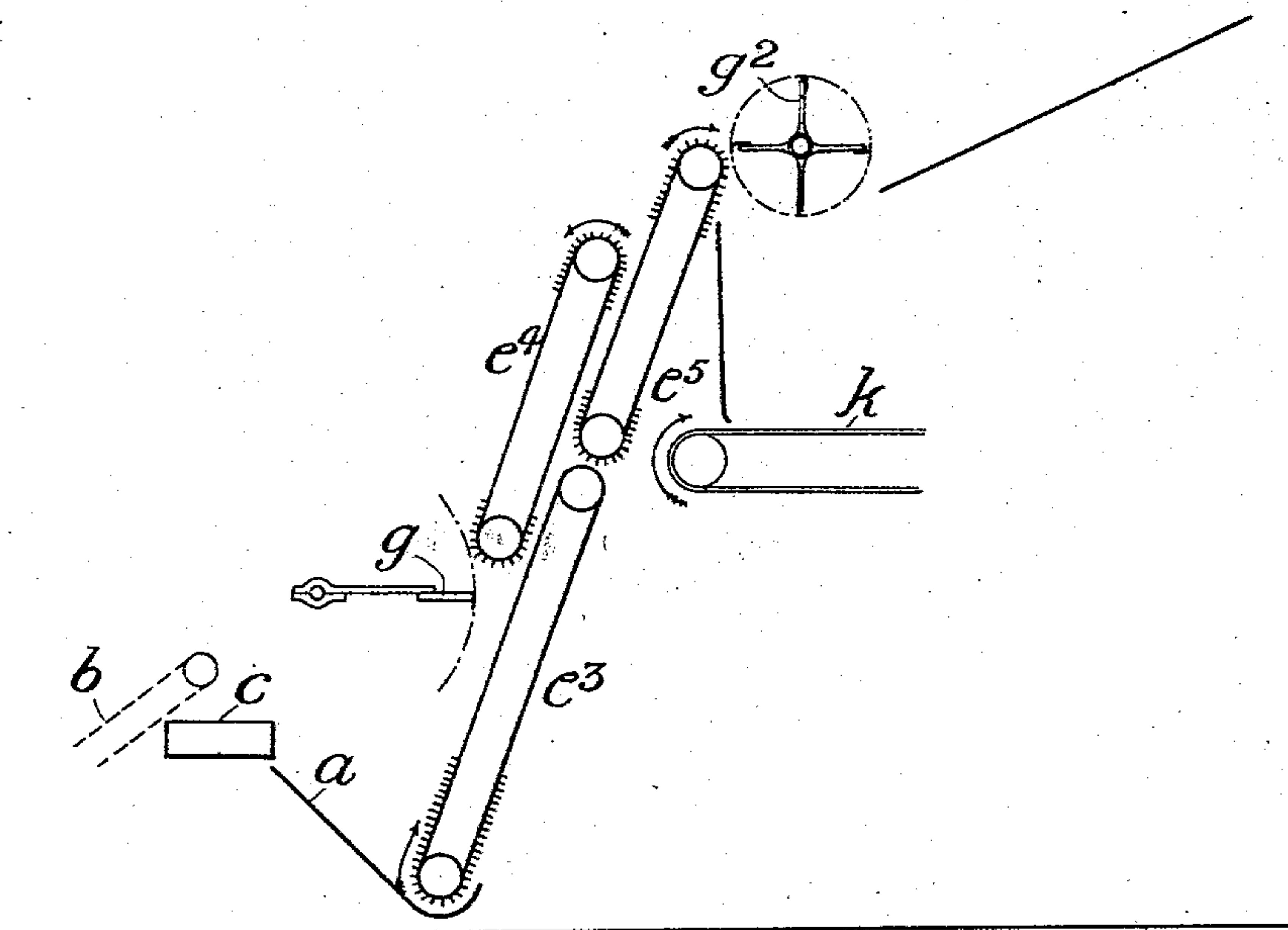
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NO MODEL.

4 SHEETS—SHEET 3.

FIG. 5.



In witness
whereof I have
signed my name
Fred C. Jones

In witness
whereof I have
signed my name
J. Keith and
W. W. Wardle
by *[Signature]*
attys.

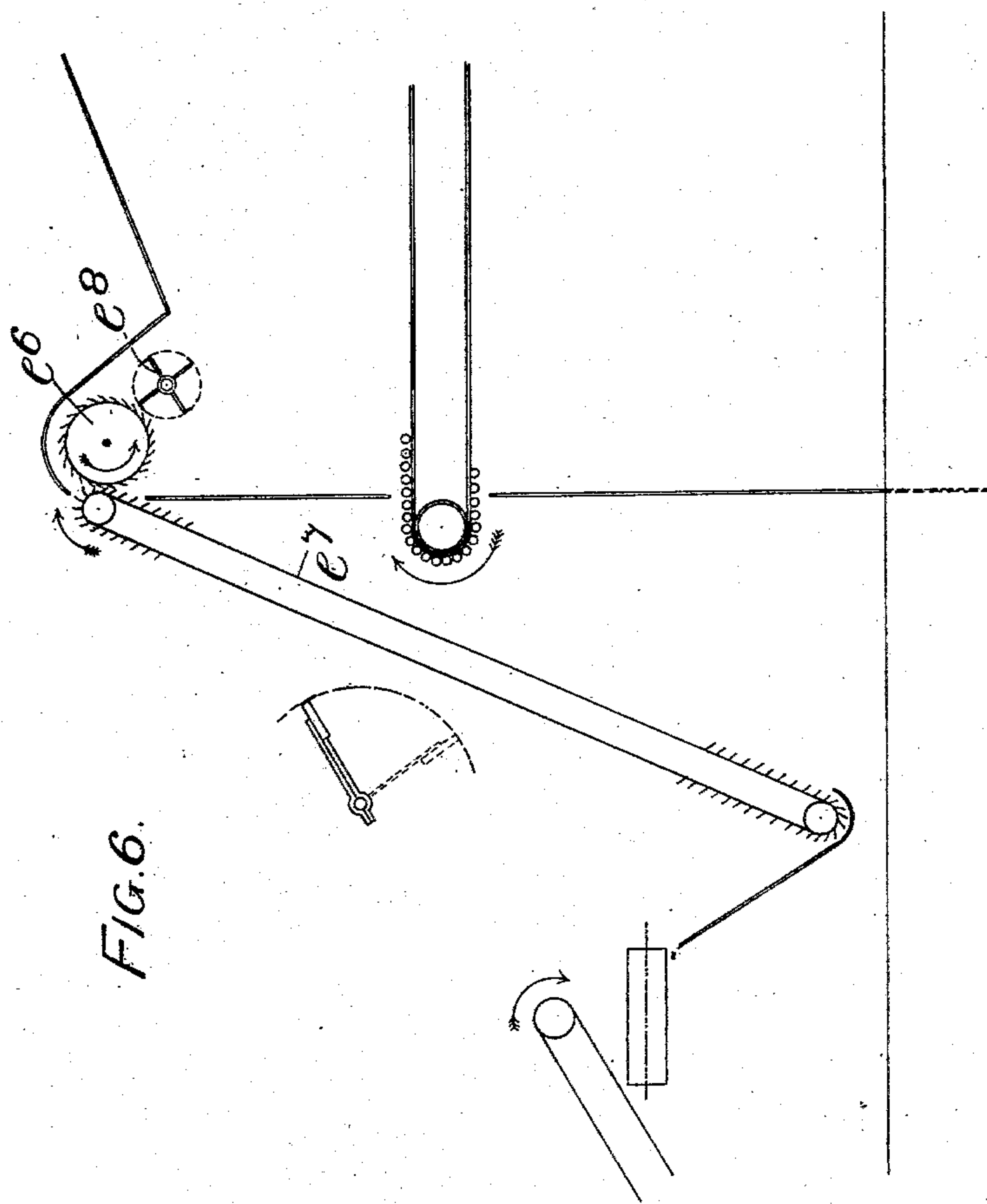
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NO MODEL.

4 SHEETS—SHEET 4.



Inventors
Harry W. Chandler
Fred C. Jones

Inventors
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By *[Signature]*
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UNITED STATES PATENT OFFICE.

JAMES KEITH AND WILLIAM WINSHIP WARDLE, OF LONDON, ENGLAND,
ASSIGNORS TO JAMES KEITH & BLACKMAN COMPANY, LIMITED, OF
LONDON, ENGLAND.

APPARATUS FOR DRYING WOOL, &c.

SPECIFICATION forming part of Letters Patent No. 753,200, dated February 23, 1904.

Application filed August 22, 1903. Serial No. 170,407. (No model.)

To all whom it may concern:

Be it known that we, JAMES KEITH, residing at 27 Farringdon avenue, and WILLIAM WINSHIP WARDLE, residing at 32 Somerfield road, Finsbury Park, London, England, subjects of the King of the United Kingdom of Great Britain and Ireland, have invented certain new and useful Apparatus for Drying and Conditioning Wool or Like Fibrous Material, of which the following is a specification.

This invention has for its object to provide apparatus for effectually drying and conditioning loose wool or like fibrous material, more especially as it is delivered from a washing or dyeing machine.

The apparatus, which is intended for continuous treatment of the wool, differs from that hitherto in use in that it provides for spreading and opening out the wool in its passage to the drying-machine, being thus adapted to present the material to the drying-currents of air in a condition in which it is more readily and uniformly acted on, owing to its being opened up and evenly distributed. Wool is delivered from the usual narrow washing or dyeing machine in such unequal masses that if directly carried into a drying-chamber the smaller pieces would be overdried before the larger masses would be acted upon to the same extent; but under our invention we provide for spreading the material over a larger area by making the drying apparatus much wider than the washing-machine and for opening up the wool by devices for partially drawing or carding it in process of transference from the washer to the drier.

In the accompanying drawings, which illustrate the invention, Figure 1 is a sectional side elevation, Fig. 2 is a plan, partly in section, and Fig. 3 is a cross-section, of the improved wool-drying apparatus. Figs. 4, 5, and 6 are diagrammatic views showing in side elevation three forms of devices employed for spreading and drawing out the wool prior to delivery into the drying-chamber.

The improved apparatus comprises a hopper of a width greater than that of the washing, dyeing, or like machine from which the wool

is delivered and into which hopper it is distributed by the delivery apparatus or otherwise. Extending down into the hopper is a creeper consisting of an inclined spiked traveling band or bands which lift the wool out of the hopper and which, in conjunction with combs or equivalent devices, serve to spread and draw out and partially card the wool while raising it and delivering it overhead onto a traveling band, which is arranged to carry the spread wool into a drying-chamber, whence after being acted on by heated air circulated by fans it is delivered at the farther end properly dried or conditioned.

The wool or other material is delivered from the washing or dyeing machine or from other source of continuous supply into a hopper *a*, of the full width of the drying apparatus, the delivery when from a narrow washing-machine being preferably effected by a traveling band *b*, which drops it on a transverse traveling web *c* and from which it is discharged into the hopper *a*, partly by falling over the said web and in part by the action of a push-plate *d*, suspended over the transverse web *c* at an angle to its line of travel, the said plate having a swinging movement imparted to it by levers *d'* such that it evenly distributes the material into the hopper. From the hopper the material is raised to a higher level by means of a spiked creeper which, as shown by Figs. 1 and 4, is composed of an endless traveling band *e*, of laths, carried round rollers *e'* and *e''* and having on the laths projecting spikes which engage with the wool in the hopper *a*, the band being placed at a slight inclination from the vertical, so that it raises the wool an approximately vertical stream or layer. The quantity of material carried up by the creeper is regulated by means of a swinging and adjustable knock-off comb *f*, whose spiked edge as the comb swings engages with and throws down surplus wool into the hopper *a*. As the wool passes over the upper roller *e'* of the creeper *e* it is engaged with the spikes of a second swinging knock-off comb *g* and thrown down on the farther side into the drying-chamber *i*, the spikes of the knock-off comb

g being cleared of loose wool by a stationary stripping-comb plate k . Suitable gear, such as the belts and pulleys, is provided, as shown, at the side of the apparatus for operating the moving parts in unison.

The drying-chamber i , which is adjacent to the creeper and which is composed of an oblong wooden or other casing of any desired length, has fitted within it a long endless traveling band k , composed, preferably, of round wooden laths secured at each end to parallel chains or like supports carried round end pulleys or rollers k' k'' , the band being supported against sagging by means of side rails l , upon which run small pulleys l' on the chains or edges of the band k .

The wool is delivered from the creeper e onto this band k , which carries material continuously through the chamber while subjected to the action of a blast of heated air, the wool being delivered through a slit or opening v' at the opposite end fully dried or conditioned.

For effecting the drying operation a fan or blower m draws air through a radiator o and delivers it in a heated state under the traveling band k , suitable baffles p being located in the base of the chamber to disperse the air as it enters. In the side of the chamber above the band k a fan or fans n , of larger capacity, is or are fitted to draw off the air and redirect it through a passage q' , and so under the band k , and generally to maintain circulation of the heated air, the excess of air which has absorbed the moisture ultimately escaping through a regulated outlet above to the atmosphere.

The wool carried along on the traveling band of open laths being spread out over an extended surface is rapidly dried by the circulating air until its delivery through the opening v' , a portion of the air escaping under the band at this end of the chamber and facilitating the discharge and serving to clear the laths of any loose fiber.

The temperature of the heater, the volume of air drawn or forced through it, and the speed of the traveling band may each or all be regulated to insure ample drying of the material without overheating.

In the modification of the creeper for spreading and opening up the wool shown at Fig. 5 a series of endless bands e^3 e^4 e^5 , carrying spikes or formed of carding-cloth, are employed and arranged to carry up the wool from the hopper a and partially draw or card it prior to delivery onto the traveling band k . One of these creeper-bands, e^4 , is placed parallel to the others, e^3 and e^5 , a convenient arrangement being to have the two bands e^3 e^5 in line, of which the upper one, e^5 , runs at a higher speed than the lower one, e^3 , while the third band, e^4 , in front and parallel to the others, runs at an intermediate speed. The wool is lifted from the hopper a by the lowest band, e^3 , and passes between the parallel bands

e^3 e^4 e^5 , by which it is gently opened up and drawn out and is finally delivered over the top of the upper band, e^5 , over a chute into the drying-chamber.

A knock-off or feed-regulating comb g is fitted in proximity to the lowest band, e^3 , to throw down into the hopper a surplus wool carried up, and a rotating doffing cylinder or comb g^2 is fitted near the upper end of the top band, e^5 , to facilitate the delivery of the wool into the drying-chamber.

In a further modification of the creeper (shown in Fig. 6) a spiked drum e^6 is mounted above the traveling band e^7 , which drum runs a little faster than the said band, a revolving clearer or comb e^8 being arranged underneath the drum e^6 and in turn running faster than said drum.

The improved apparatus is applicable not only for drying wool or like fibrous material after being washed or dyed, but also for drying wool as it is removed from hides in what is known as "fell-mongering."

Having now described our invention, what we claim, and desire to secure by Letters Patent of the United States, is—

1. For continuous treatment of wool and like fibrous material apparatus comprising the combination with a washing-machine, dyeing or like machine, and a drying-machine of greater breadth than said washing-machine, of means for spreading and opening out the material and automatically transferring it from said washing-machine to said drying-machine, as described.

2. For continuous treatment of wool and like fibrous material apparatus comprising the combination with a washing-machine, a hopper of greater width than said washing-machine and a drying-machine of the same width as said hopper, of devices for automatically distributing the material from said washing-machine equally throughout said hopper and devices for automatically opening out said material and delivering it in uniform masses to the drying-machine as described.

3. For continuous treatment of wool and like fibrous material apparatus comprising the combination with a washing-machine, a hopper of greater width than said washing-machine and a drying-machine of the same width as said hopper, of devices for distributing the material from the washing-machine uniformly throughout said hopper, devices for opening out and carding the material, means for delivering said material to a drying-machine and means for regulating the quantity of material so delivered, as described.

4. The combination with a hopper for receiving wool from a washing or dyeing machine, said hopper being of greater width than the washing-machine, of a spiked band for raising the wool from said hopper, combs for regulating the quantity of material raised by said spiked band and a drying-chamber in-

cluding an endless traveling band onto which the wool is continuously fed to be dried and continuously delivered at the end of the drying-chamber as described.

5 5. For continuous treatment of wool from a washing or dyeing machine, apparatus comprising in combination a hopper, a traveling band and a transverse traveling web delivering the material to said hopper, and a push-plate
10 for removing the material from said web, means for raising the wool from said hopper, means for throwing down surplus wool into the hopper, means for throwing off the wool from said receiving means onto the traveling
15 band of a drying-machine, said traveling band delivering the conditioned wool continuously as described.

6. For continuous treatment of wool from a washing or dyeing machine, apparatus comprising in combination a traveling band receiving the wool from the washing-machine, a transverse traveling web beneath said band and receiving the material therefrom, a hopper of the same width as the drying-machine,
25 a push-plate located over said traveling web, and means for operating said push-plate to distribute the material into a hopper, a creeper comprising an endless band of laths having projecting spikes and means for moving said
30 band to raise the material from said hopper, a knock-off comb and means for swinging said comb for throwing down surplus wool into said hopper and a knock-off comb for throwing off the raised wool, an endless band passing
35 through a drying-chamber and receiving the wool and devices for causing said band to travel continuously through the drying-chamber to deliver the conditioned wool as described.

40 7. For continuous treatment of wool the combination with a washing-machine of a drying-machine of greater width, a hopper of the same width as the drying-machine, a traveling band, a traveling web and a push-plate coöp-

erating to distribute the material from the washing-machine uniformly into said hopper, 45 a spiked band for raising the material from said hopper, means for regulating the quantity of material delivered by said spiked band, an endless band passing through the drying-machine, means for throwing down the material 50 onto said band, means for moving said band through the drying-chamber, means for heating said drying-chamber, and means for circulating air-currents through said chamber as and for the purpose set forth. 55

8. For continuous treatment of wool the combination with a washing-machine and a drying-machine of a hopper of the full width of said drying-machine, a traveling band delivering the material from the washing-machine, a transverse endless traveling web beneath said band and above said hopper, receiving the material, a push-plate at an angle to the line of travel of said web, levers for swinging said push-plate and assisting to distribute 65 the material uniformly into said hopper, an endless traveling band of laths having projecting spikes for raising the material from said hopper, means for throwing down surplus material back into said hopper and means for 70 throwing forward the wool to be treated into the drying-chamber, an endless band passing through said drying-chamber, means for supporting said band, and means for imparting to said band a continuous movement through the 75 drying-chamber, means for heating said chamber and means for circulating air through said chamber as and for the purpose set forth.

In testimony whereof we have signed our names to this specification in the presence of 80 two subscribing witnesses.

JAMES KEITH.

WILLIAM WINSHIP WARDLE.

Witnesses:

WALLACE CRANSTON FAIRWEATHER,
JNO. ARMSTRONG, Jr.