

(No Model.)

2 Sheets—Sheet 1.

F. E. HALL.

PROCESS OF MANUFACTURING GOSSAMER WATER PROOF CLOTH.

No. 299,638.

Patented June 3, 1884.

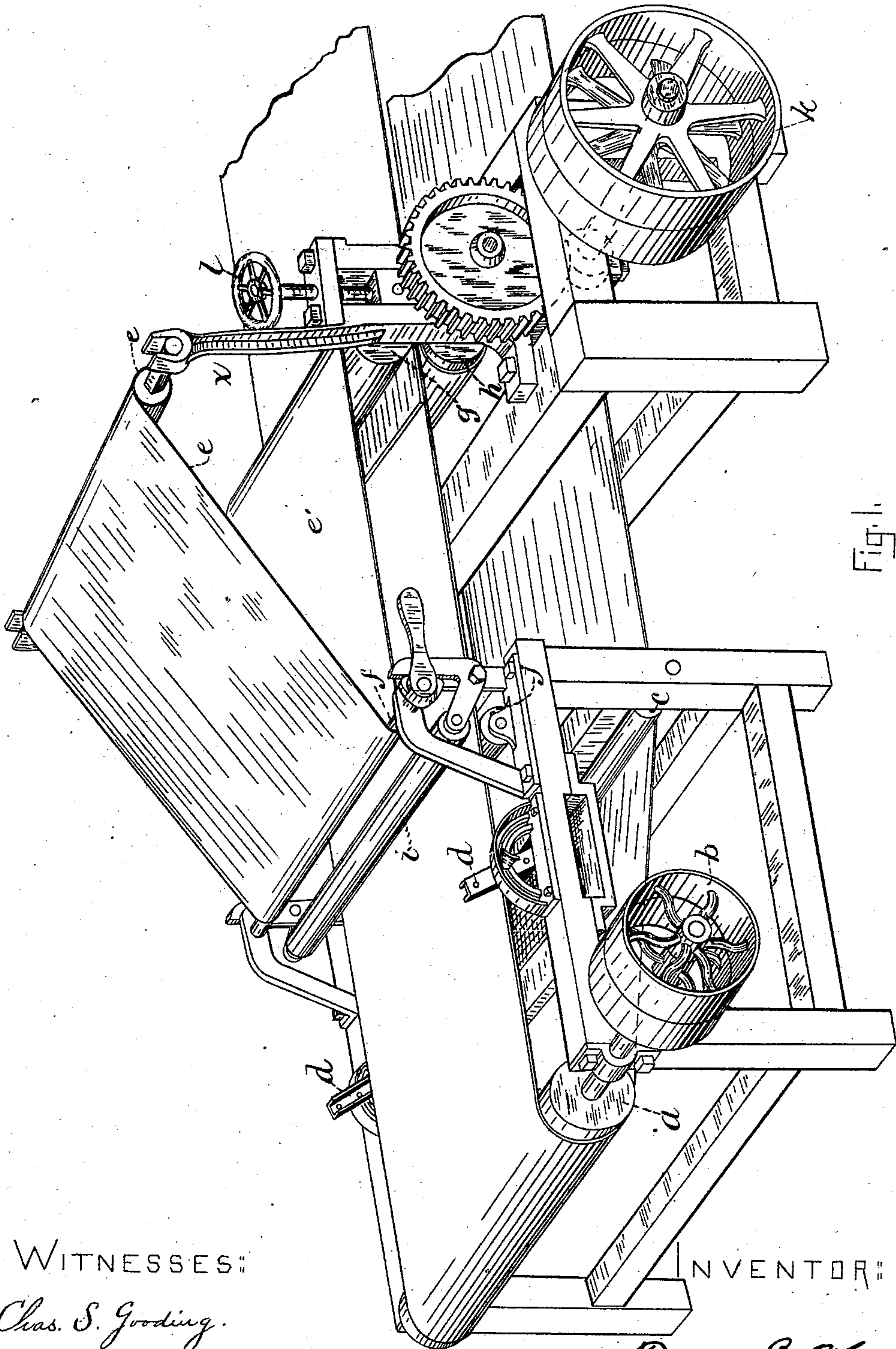


Fig. 1.

WITNESSES:

Chas. S. Gooding.
Chas. S. Gooding.

INVENTOR:

Frank E. Hall.

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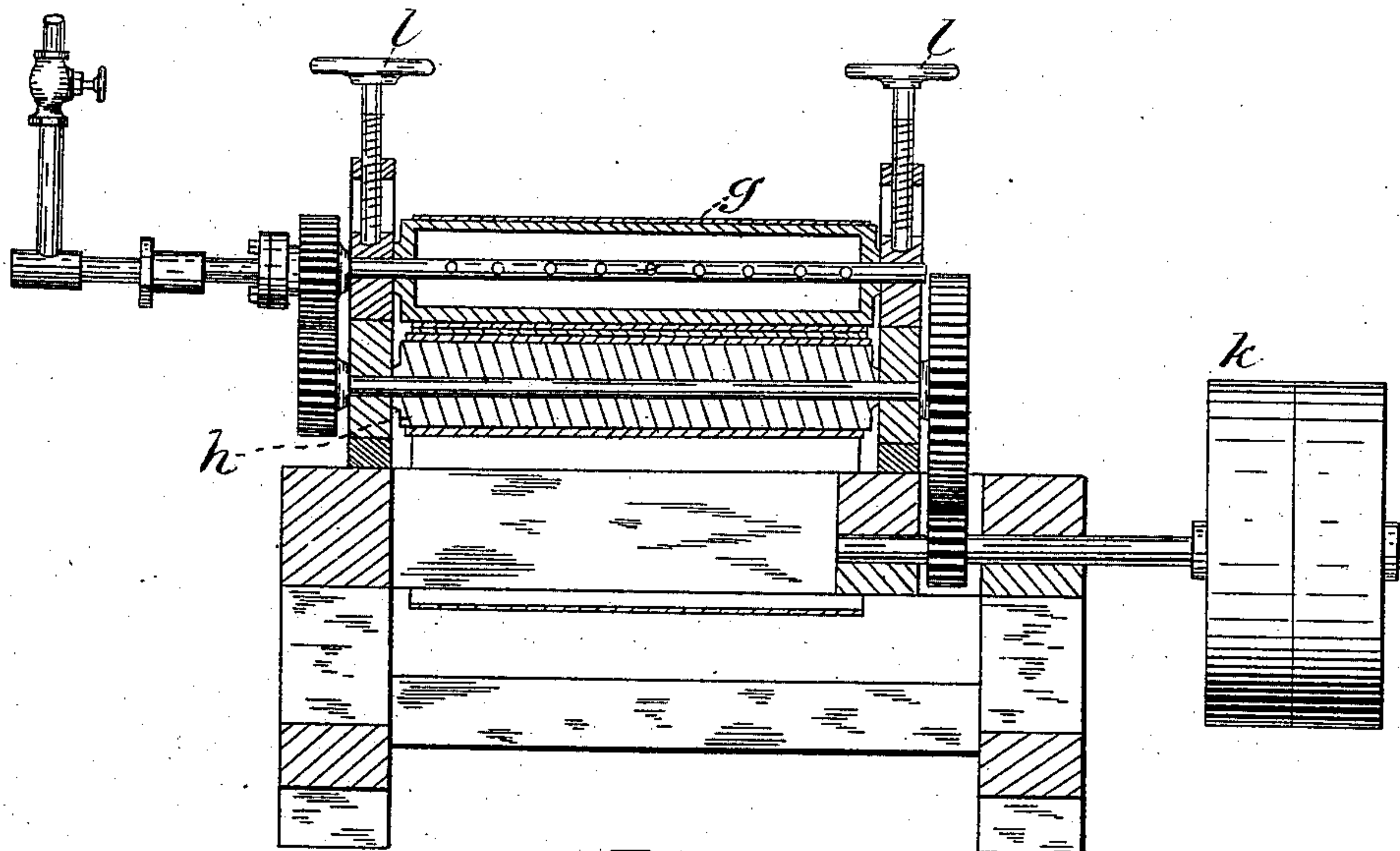


Fig. 2.

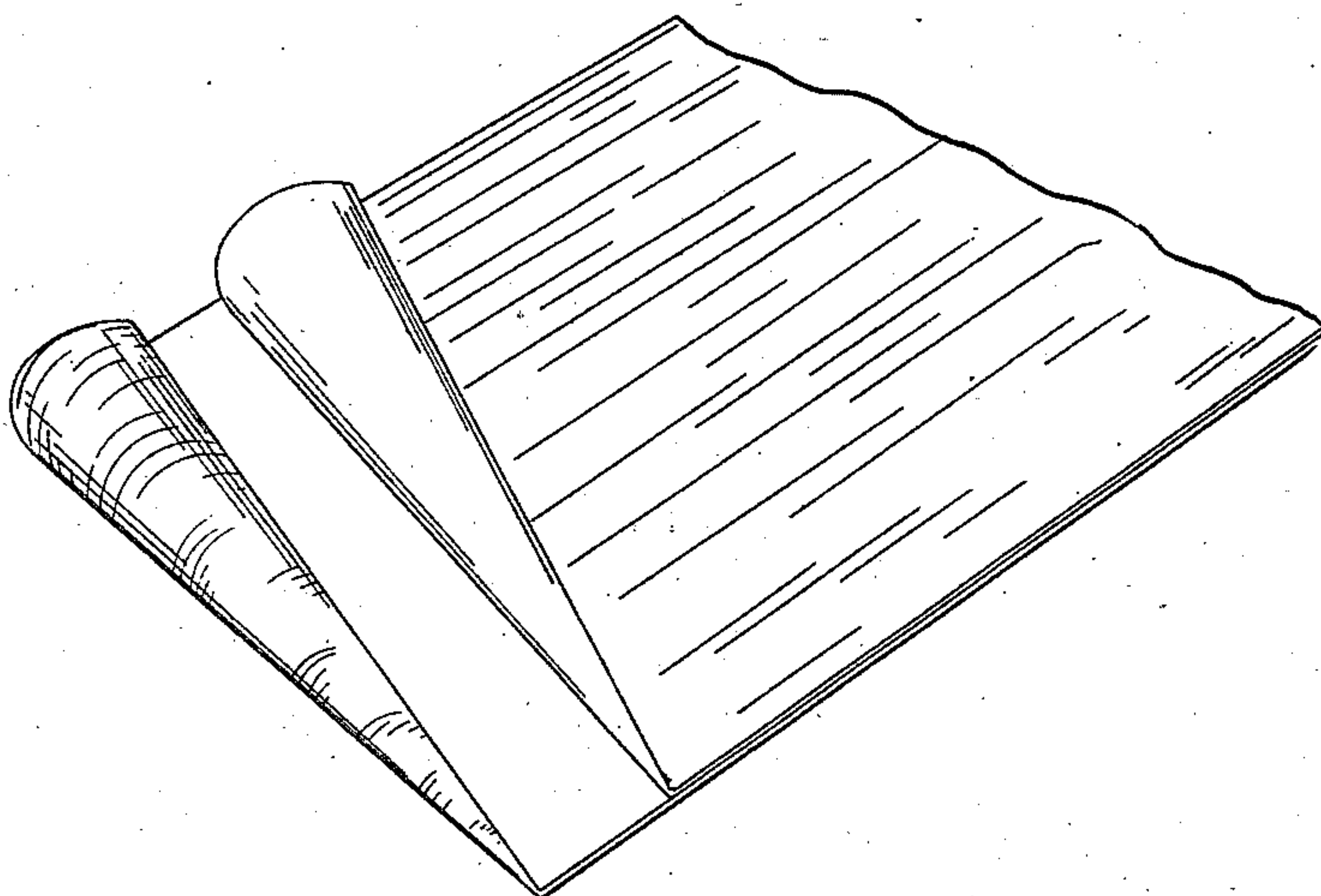


Fig. 3.

WITNESSES:

Chas. S. Gooding,
Chas. H. Deane

INVENTOR:

Frank E. Hall.

UNITED STATES PATENT OFFICE.

FRANK E. HALL, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO THE HALL RUBBER MILLS, OF PORTLAND, MAINE.

PROCESS OF MANUFACTURING GOSSAMER WATER-PROOF CLOTH.

SPECIFICATION forming part of Letters Patent No. 299,638, dated June 3, 1884.

Application filed March 24, 1884. (No model.)

To all whom it may concern:

Be it known that I, FRANK E. HALL, of Boston, in the county of Suffolk and State of Massachusetts, have invented a certain new and useful Improvement in Processes of Manufacturing Gossamer Water-Proof Cloth, of which the following is a specification, reference being made to the accompanying drawings, in which—

Figure 1 represents a perspective view of a machine on which a portion of my improved process is performed; Fig. 2, a section of the same on the line $x x$; and Fig. 3, a piece of water-proof cloth made by my process, its two parts being partially separated.

My improved water-proof cloth is made of an outer piece of cassimere or other suitable fabric and an inner piece or lining of cotton or woolen cloth, the two being united with india-rubber or other adhesive and water-proof substance, substantially like in these respects the "Mackintosh" and other well-known water-proof cloths, but differing from them in that my cloth is much lighter and better adapted for its purpose than any now in use, and is also more expeditiously and cheaply made.

In the machine shown in the drawings, a represents a roll, and a similar roll is placed at the opposite end of the machine, but not shown in the drawings. Around these two rolls is placed, in the form of an endless belt, a piece of cotton cloth, to form the lining of my water-proof cloth, so that by revolving the rolls by means of a belt placed on the pulley b the band of cloth is caused to revolve continuously, or so long as may be desired, the band passing under the roll c , and being held down so as to properly receive a coating of india-rubber by a strip of wood, metal, or glass placed in the slides $d d$. India-rubber in a proper state of solution is then poured upon the cloth at the point where it is thus held, the rubber forming a pool at this place, and as the band of cloth continues to roll the rubber is gradually, evenly, and thinly spread over its whole surface. The strip of wood, metal, or glass is then removed. This part of the process is well known in the manufacture of rubber-surfaced gossamer goods, but has never been used

in the manufacture of double-textured goods, as it has not been considered practical to do it, and it is not without the improvements invented by me and herein described. A piece of cassimere of the same width of the lining has been previously covered on one side out of this machine in a similar manner with a thin covering of india-rubber, which is allowed to dry on or become nearly dry. The cassimere is then rolled on a roller and placed in the machine.

e represents the roll, with the cassimere prepared as above described rolled thereon, so that when it is unrolled the rubber-coated side shall be underneath, e' being the rubber-coated side. From the roll d the cassimere proceeds under the roll f and over the steam-roll g . This roll g is supplied with steam, for the purpose of heating it, so that the rubber on the cassimere will be partially melted and become more adhesive, so as not to require the pressure which is needed in the old style of doubling-machines. Immediately under this roll, and over the rubber covered or cushioned roll h , the piece of lining above described, and which has been coated with liquid rubber, is revolved, and in its passage meets the cassimere, which, as it turns over the steam-roll g , having its rubber-coated side outward, meets the band of lining with its rubber coating up, and the two adhere to each other and pass between the rolls g and h , by which they are closely pressed together, but not so as to break the film of rubber, as is the case with the machine using two iron rolls now in use, known as the "doubling" machine or calender. In this manner the whole band of lining is covered with the cassimere, so that the two fabrics are closely united by means of an interior coating of rubber. When that has been done, the machine is stopped, the band of cloth cut where it has been joined together to form the band, and then taken off, and the water-proof cloth is then ready for curing, which is done by spreading it on tables, where it is cured by the sun, as is done with gossamer goods, instead of the acid, vapor, or steam cure, which necessitates putting on a heavier coating of rubber, to make them water-tight. The rolls f

and *h* are actuated by a band over the pulley *k*, which, by means of suitable gears, (shown in Fig. 2,) revolves the rolls *g* and *h* toward each other, so that the cassimere rolling over *g* and the lining over *h* shall proceed in the same direction. The pressure of the rolls *g* and *h* is regulated by the screw *l*. One of these rolls is of iron and one of rubber, or an iron roll covered with rubber, so as not to make the cloth come out stiff or to permit it to break the film of rubber.

I am aware that it is not new to make a water-proof cloth of two fabrics united by an adhesive and water-proof substance pressed into the two fabrics by passing them between rolls, that being the old and well-known Mackintosh process; but it is new to coat one or both of two fabrics to be used in the manufacture of double-textured goods with an adhesive and water-proof substance by passing the fabric in the form of an endless belt through such substance, so that the same will adhere to it and be evenly spread over it; and it is also new to unite to this piece of cloth another piece previously coated with rubber, passing it over a heated roll to make the rubber covering more adhesive, and uniting the same with the first-mentioned piece of cloth, which for that purpose is revolved in a machine in the form of an endless belt; and it is also new to cure double-textured goods by the sun, and it would not be possible to do it by any process heretofore known. These goods could be cured by the steam-cure; but it would make them porous, unless they were coated much heavier than is necessary, and so make the goods heavy.

What I claim, and desire to secure by Letters Patent, is—

1. The improved process of making double-textured water-proof cloth by uniting a fabric designed as the outer part of the cloth with that intended for the lining by first covering one or both with an adhesive and water-proof substance, and then uniting the two fabrics while one is in the form of an endless belt, substantially as above described.

2. The improved process of making water-proof cloth of two fabrics by coating one of said fabrics with an adhesive and water-proof substance, the said fabric for that purpose being made in the form of an endless belt, to which the other fabric is caused to adhere, the two for that purpose passing between rolls, one of which is heated, and the other is a rubber covered or cushioned roll, and afterward cutting the belt so as to form a strip, substantially as above described.

3. The improved process of making a double-textured water-proof fabric by uniting two pieces of cloth with an adhesive substance, one of said pieces being made in the form of an endless belt, while the other is rolled thereon, and afterward cutting the belt so as to form a strip, and curing the double-textured fabric thus formed in the sun, substantially as described.

FRANK E. HALL.

Witnesses:

ANSON M. LYMAN,
CHAS. H. DREW.