

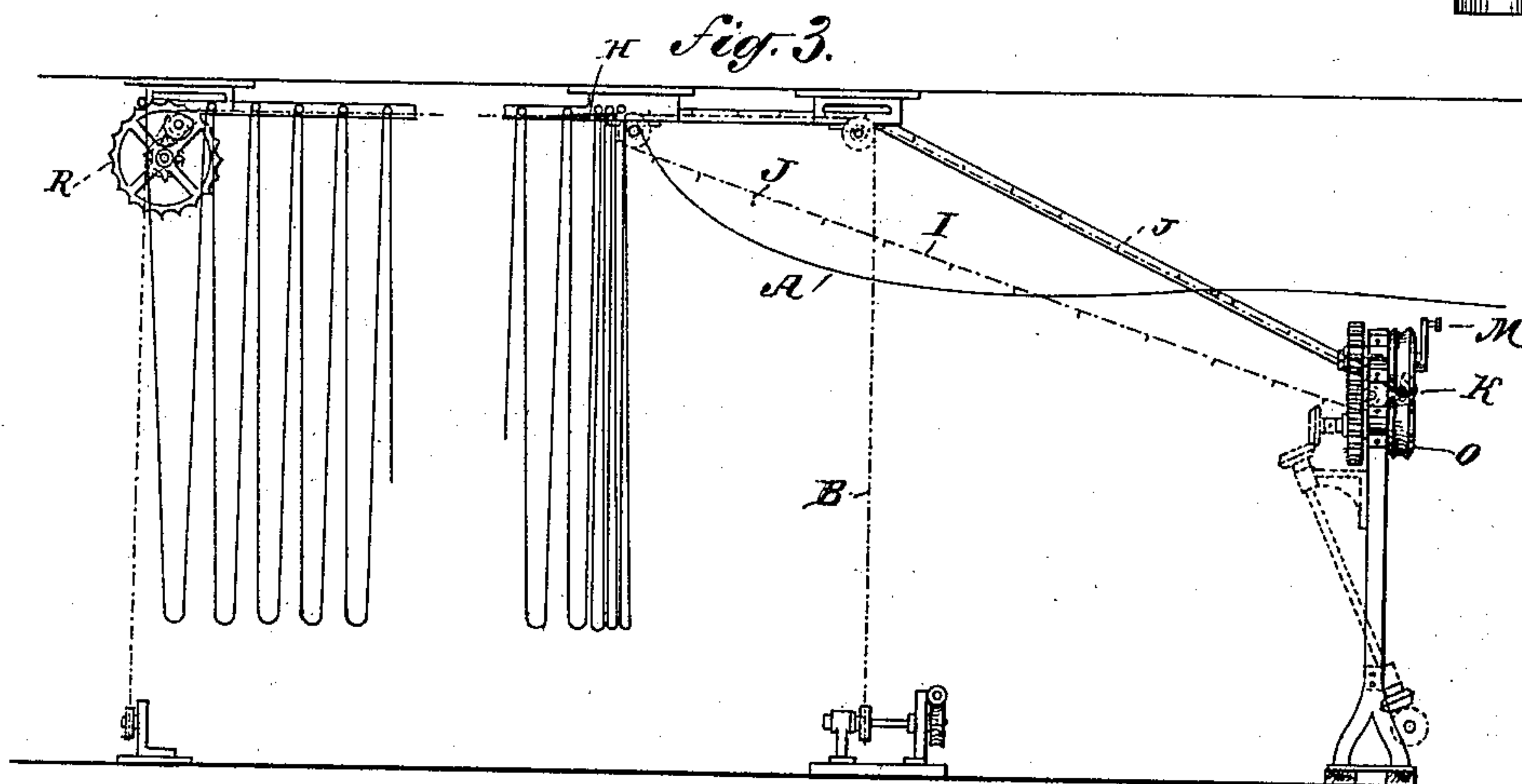
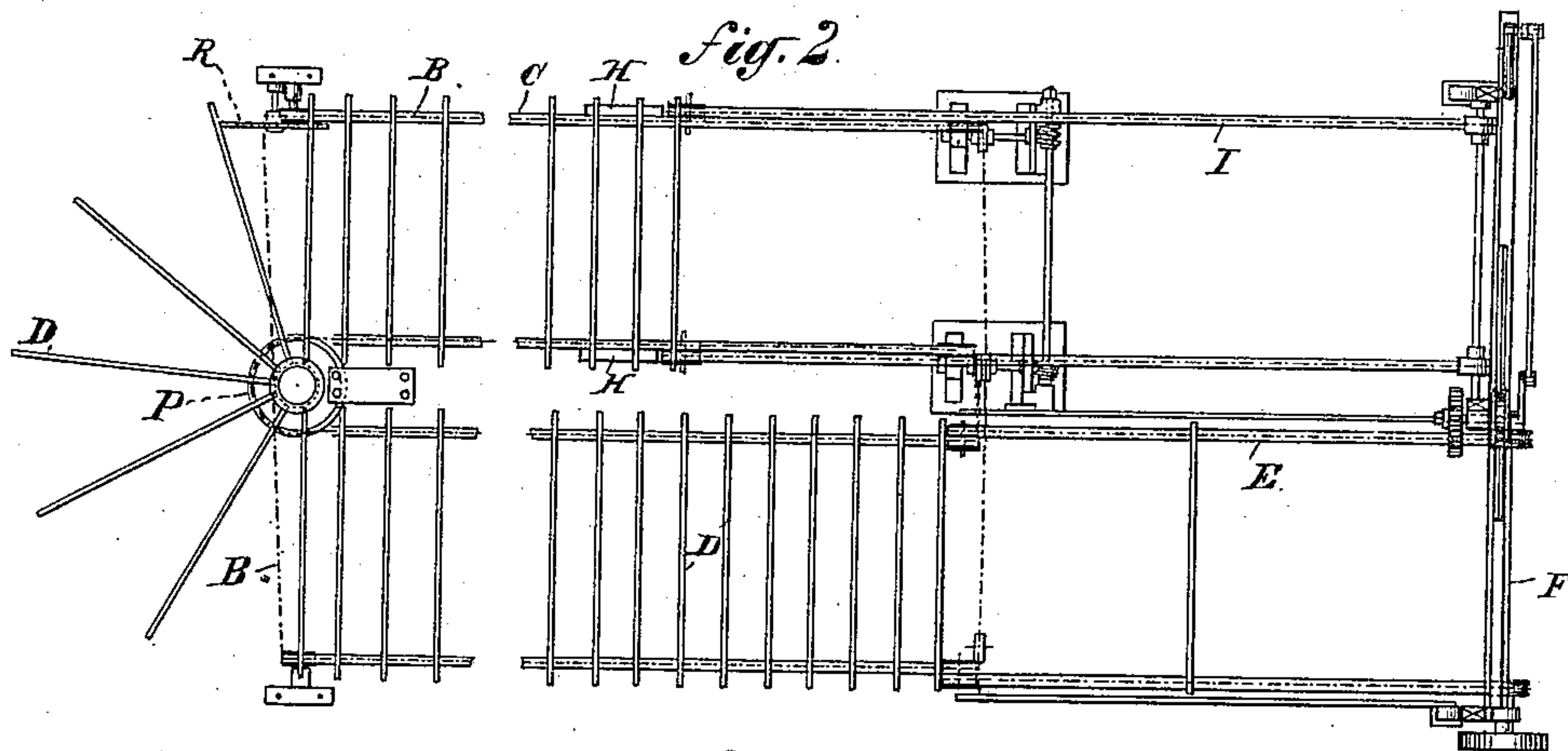
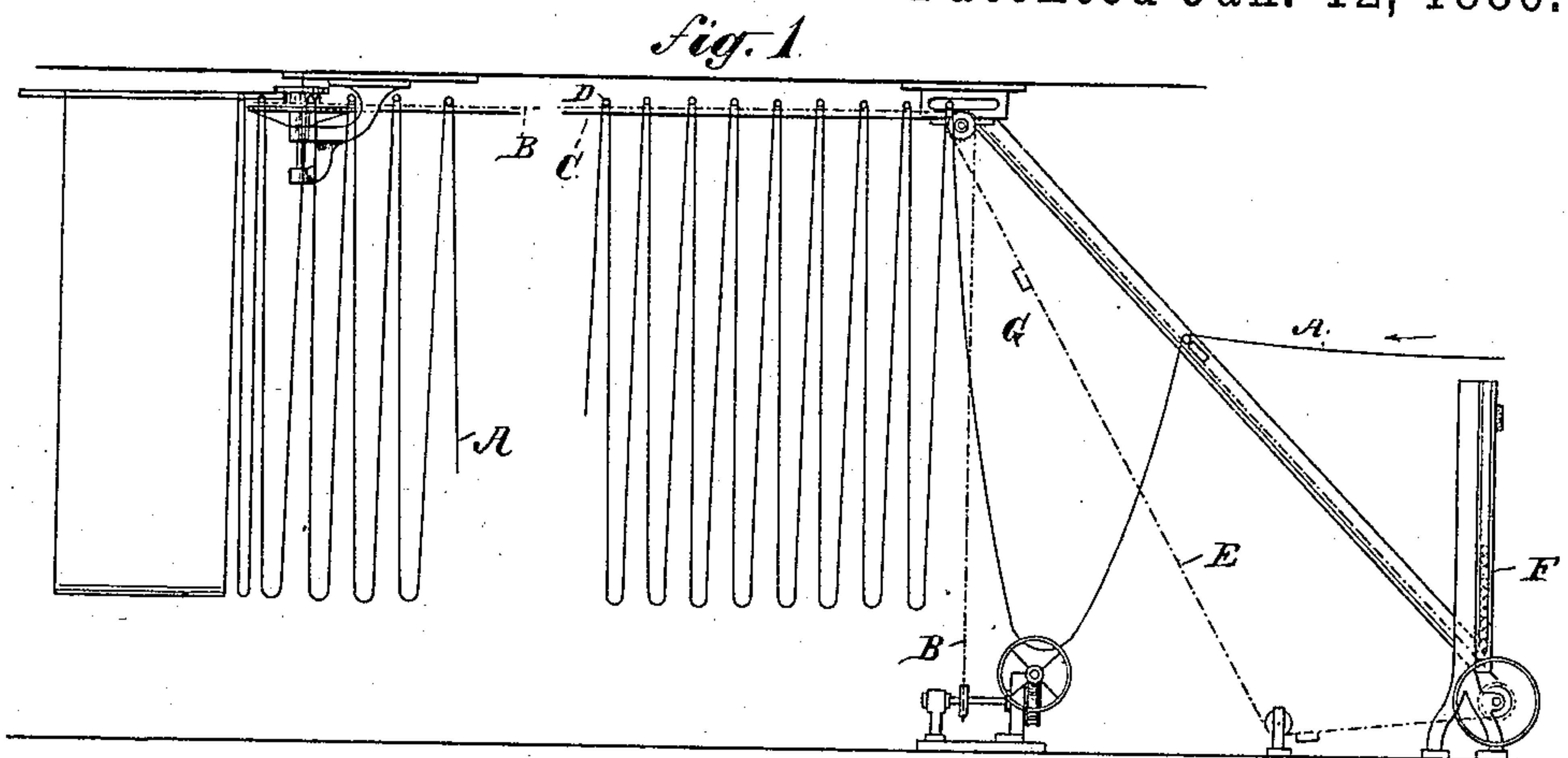
(No Model.)

H. WINTERWERBER.
PAPER DRIER.

3 Sheets—Sheet 1.

No. 334,150.

Patented Jan. 12, 1886.



Witnesses:
R. F. Gaylord
J. M. Pong

Inventor
Heinrich Winterwerber

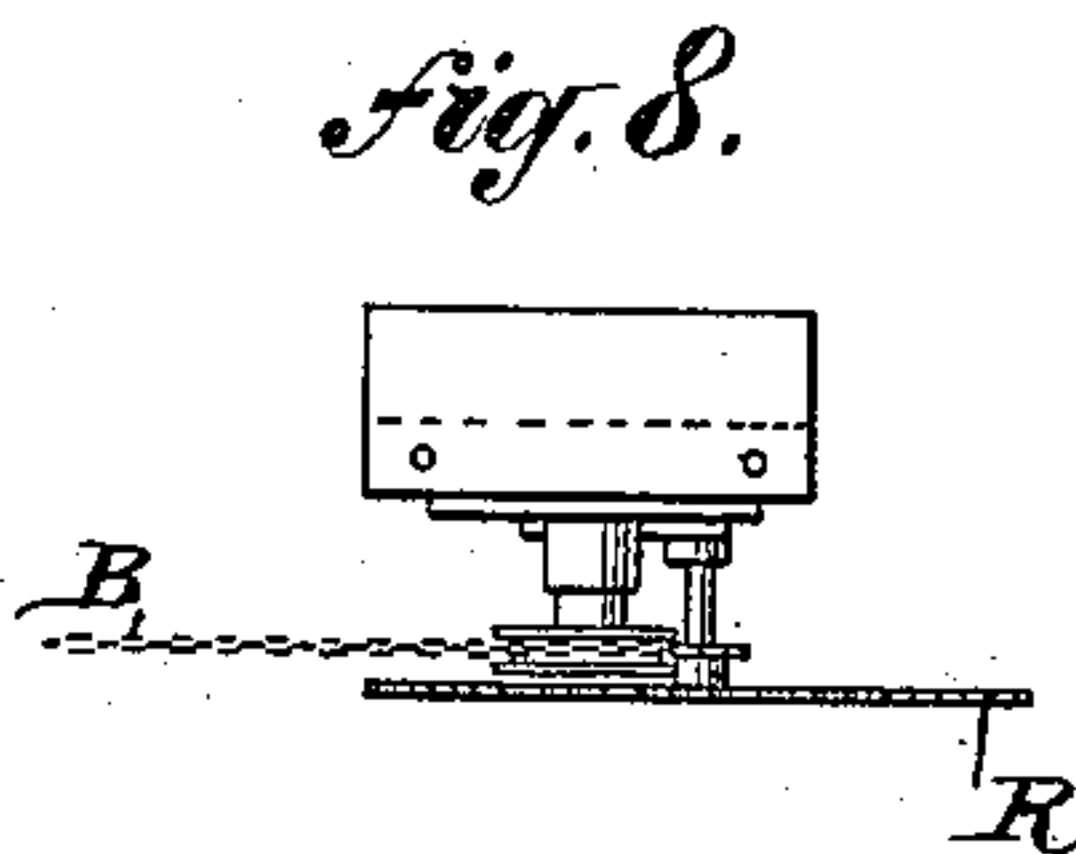
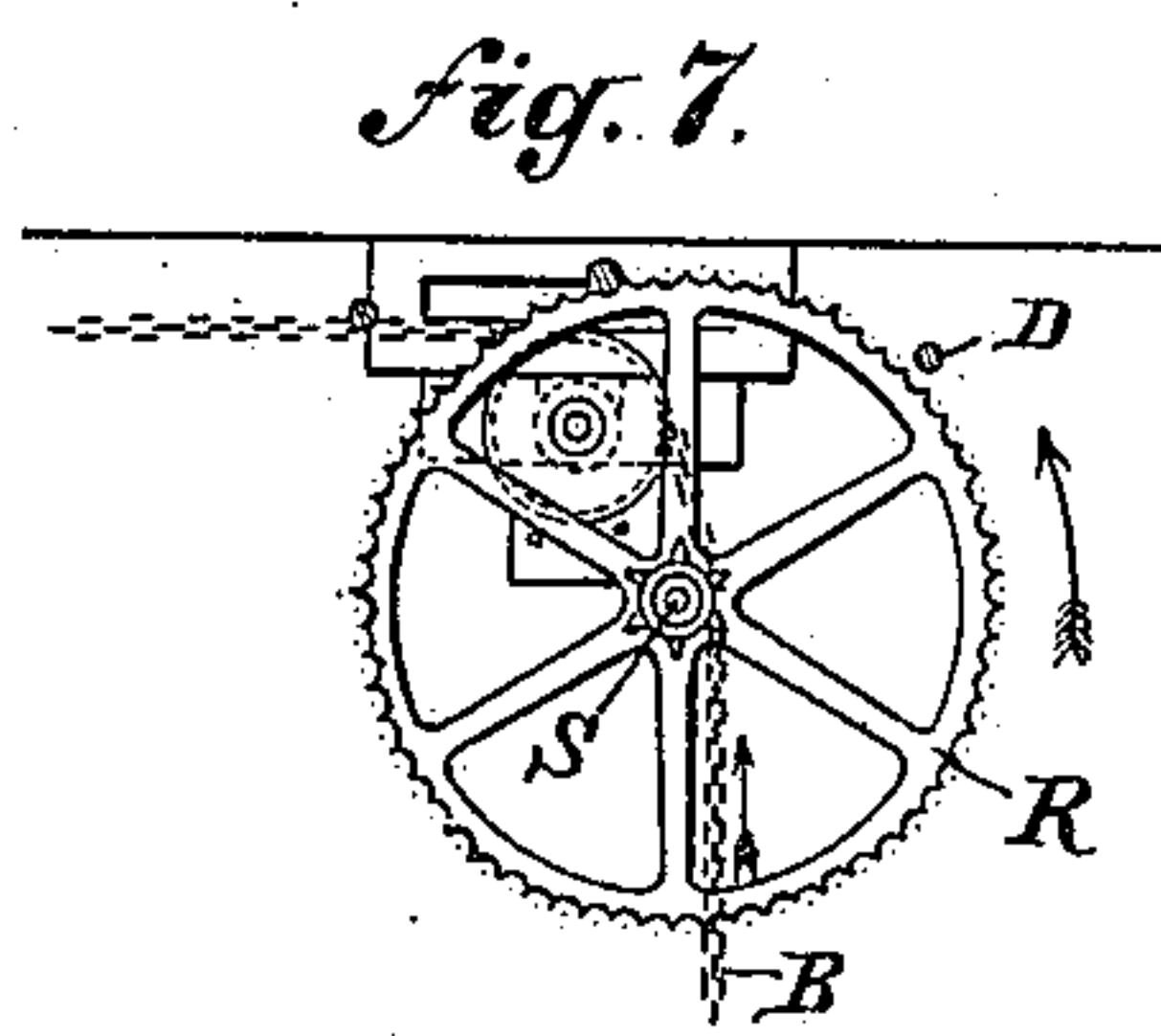
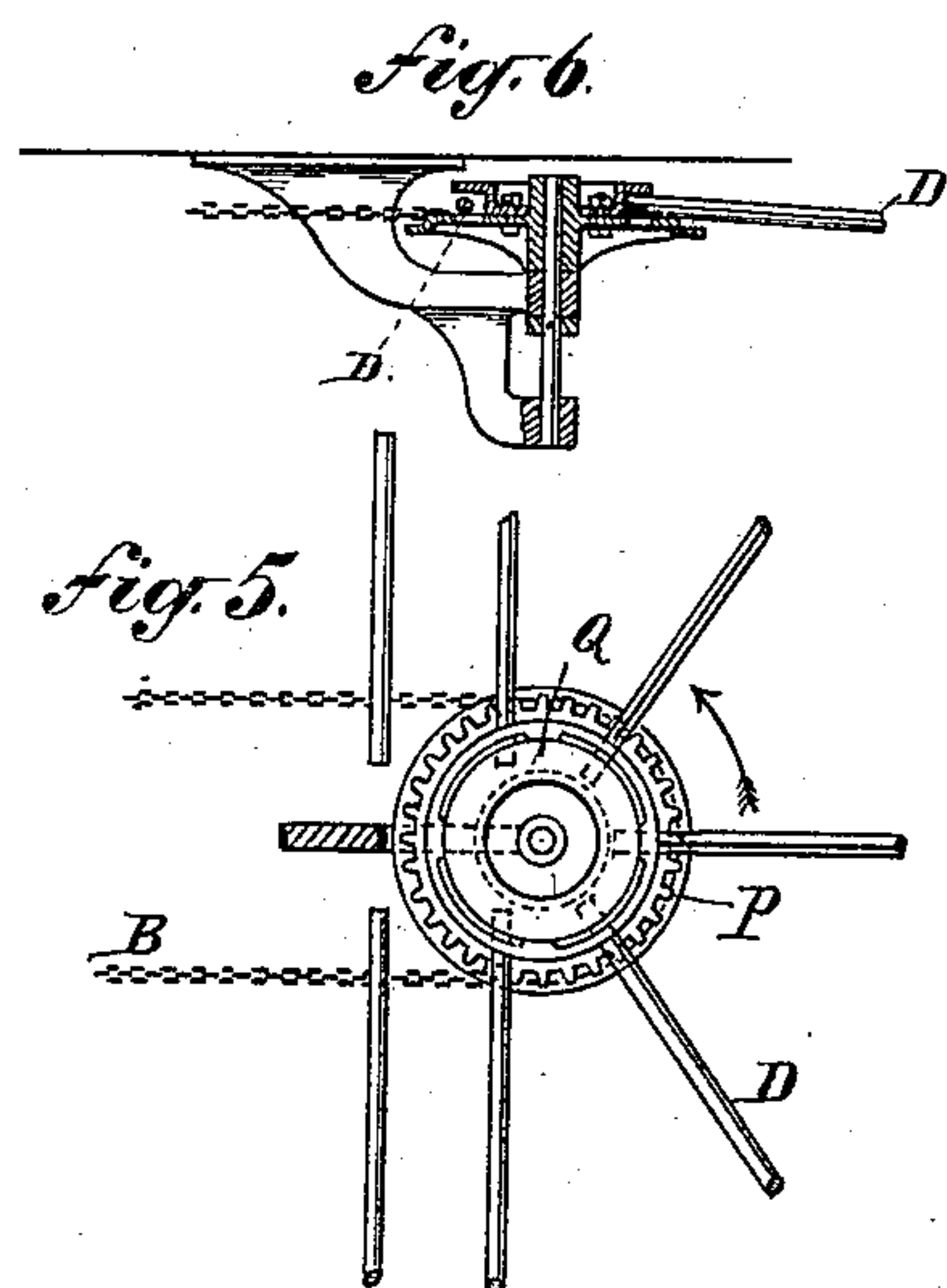
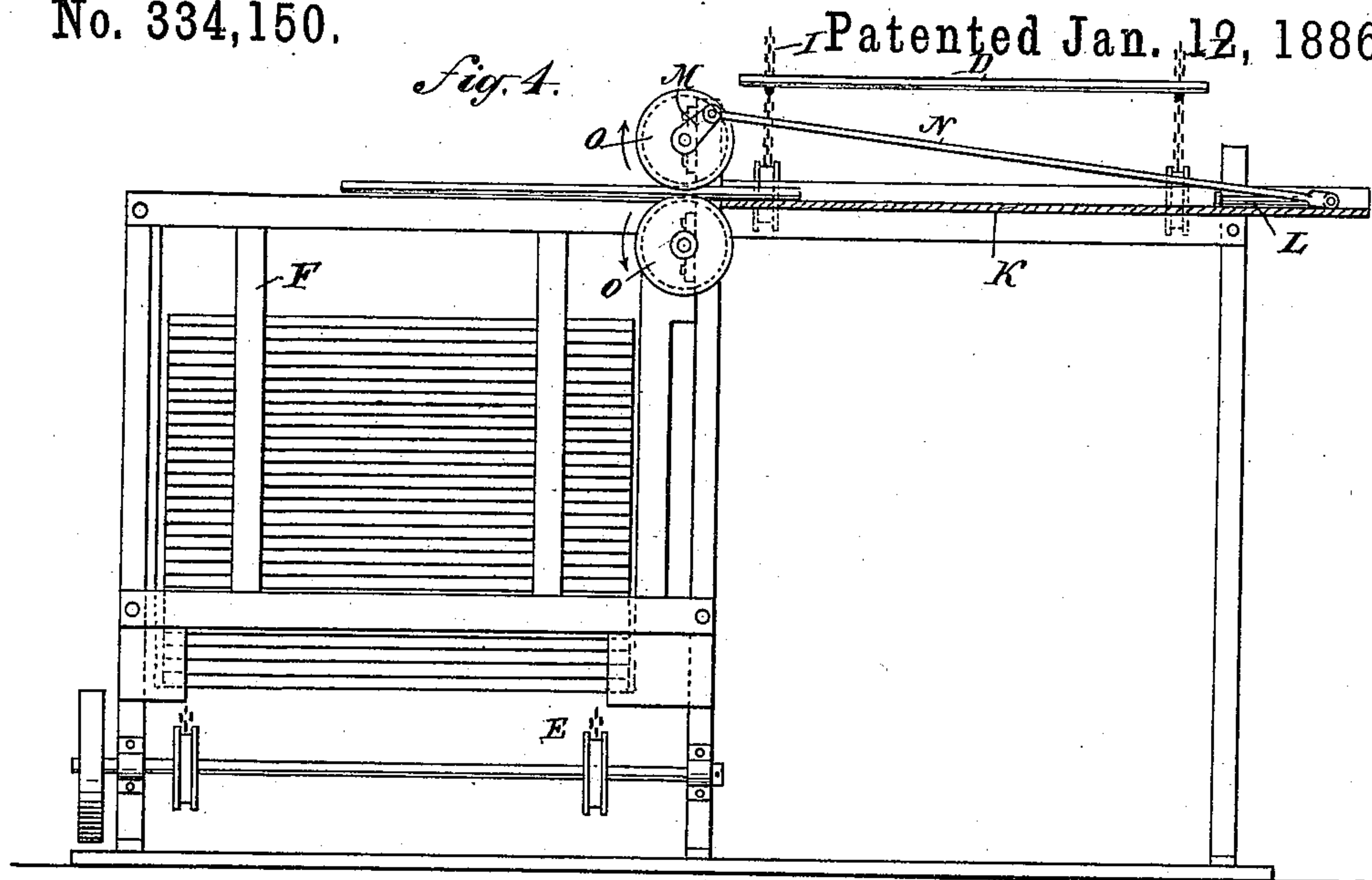
(No Model.)

3 Sheets—Sheet 2.

H. WINTERWERBER.
PAPER DRIER.

No. 334,150.

Patented Jan. 12, 1886.



Witnesses:

R. F. Gaylord.
J. M. Bond.

Inventor

Heinrich Winterwerber

(No Model.)

H. WINTERWERBER.
PAPER DRIER.

3 Sheets—Sheet 3.

No. 334,150.

Patented Jan. 12, 1886.

Fig. 10.

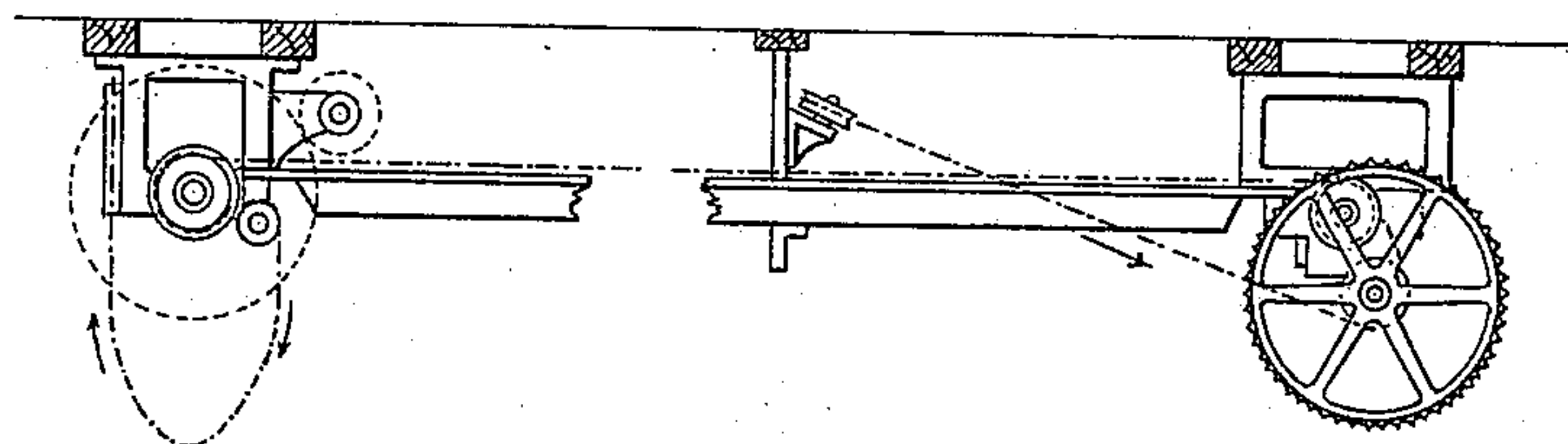


Fig. 9.

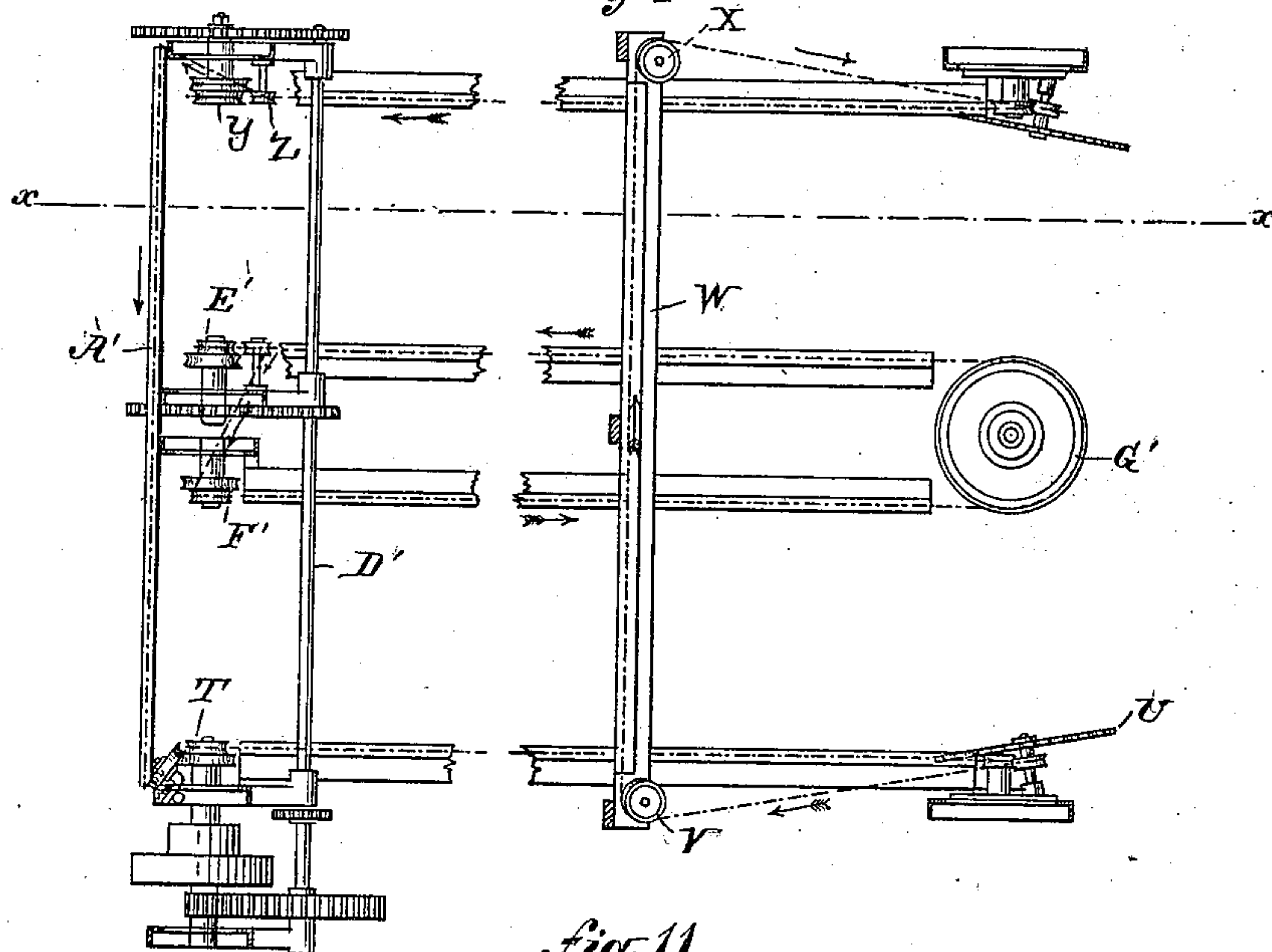
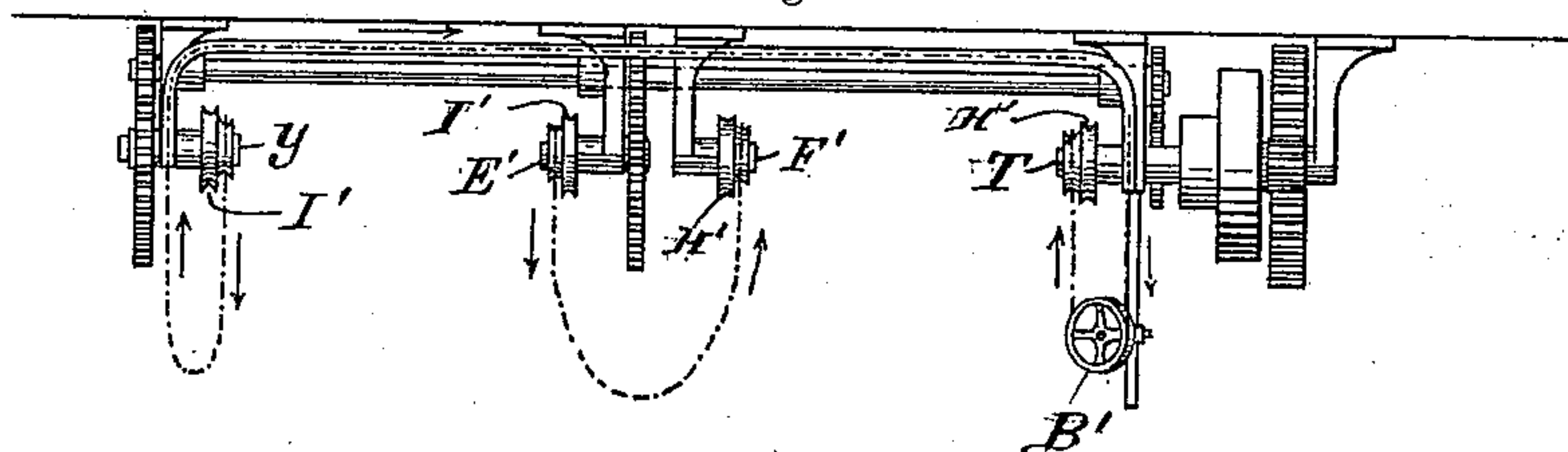


Fig. 11.



Witnesses:

R. F. Gaylord
J. M. Pong

Inventor

Heinrich Winterwerber

UNITED STATES PATENT OFFICE.

HEINRICH WINTERWERBER, OF OFFENBACH-ON-THE-MAIN, GERMANY.

PAPER-DRIER.

SPECIFICATION forming part of Letters Patent No. 334,150, dated January 12, 1886.

Application filed February 24, 1885. Serial No. 156,685. (No model.) Patented in Germany October 19, 1880, No. 15,668, and May 6, 1882, No. 22,275.

To all whom it may concern:

Be it known that I, HEINRICH WINTERWERBER, of Offenbach-on-the-Main, Germany, have invented certain new and useful Improvements in Drying-Machines, of which the following is a full, clear, and exact description, and will enable those skilled in the art to which these improvements relate to make and use the same, reference being had to the accompanying drawings.

This invention belongs to that class of drying-machines in which the paper or other material to be dried is carried in folds upon loose sticks resting upon a conveyer consisting of two parallel bands or chains, the apparatus being arranged to receive the paper while in its damp state, and to cause it to dry by carrying it slowly to the winding-machine or other means for collecting it, the paper during its passage hanging in long folds or loops from the sticks on the endless-band conveyer. In connection with this conveyer an apparatus is necessary at the receiving end of the conveyer for placing the sticks from which the paper hangs under the paper and upon the conveyer, and in such manner that the loops in the paper will be uniformly and properly formed. So, too, a device is required at the delivery end of the conveyer that will receive the sticks when the paper leaves the conveyer and return them to the apparatus that places them under the paper; and the first feature of invention consists in improved devices for thus handling the said sticks.

It is often found necessary to employ a conveyer of greater length than is convenient to the room or space in which the drying process is carried on, if the conveyer were all in one length or span, and in such case it is usual to arrange the conveyer so that it doubles on itself, or is in two or more spans, thus in the case of two spans, or where the conveyer turns back once, bringing the delivery end thereof opposite the receiving end, this latter arrangement also making it convenient for the stick-receiving machine to be close to the stick-placing machine. In machines where the conveyer thus deviates from a straight course it becomes requisite to provide means other than or in conjunction with the conveyer for carrying the sticks around the corner or angle where the conveyer turns, for in turning this corner

or angle it is obvious that the inner ends of the sticks must be moved more slowly than their outer ends, which the parallel bands or chains of the conveyer running at the same speed cannot do; and the second feature of invention consists of an improved device for thus carrying the sticks around the turn where the conveyer changes from its straight course.

In the drawings, Figure 1 is a side view of the receiving end of a machine embodying my improvements. Fig. 2 is a plan view of the same. Fig. 3 is a side view of the delivery end. Fig. 4 is an end view from the right. Figs. 5, 6, 7, and 8 are detail views of the turning mechanism. Figs. 9, 10, and 11 are views of a modified form.

In these views, A represents the paper or other fabric or material to be dried. B is the paper-conveyer, consisting of two chains running parallel to each other at the same speed and near to or on suitable tracks or guides, C.

D indicates the sticks, which lie upon the conveyer, and from which the paper hangs in loops, as shown. This conveyer is supported on suitable pulleys on hangers or like devices at a proper height from the floor to prevent the paper touching the floor, and to permit the forming of as long loops in the paper as is practicable.

E is an endless belt extending from the receiving end of the conveyer down to the open bottom of the stick-holder F. This band is provided with lugs or hooks G, of such length as to catch the bottom stick in the holder and carry it up to the conveyer B, the paper being caught up on the stick as shown, and the belt E traveling enough faster than the conveyer to bring the loops of paper as near each other as is practicable without their damp surfaces rubbing together. When the delivery end of the conveyer is reached, the sticks (with the now dry paper upon them) run upon the inclines H, which rise up a little from the conveyer and guide-rail, and thus cause the sticks to be collected closely together, as shown. This is to insure there always being sufficient paper at the delivery end of the machine to prevent the winding-rolls, upon which the paper runs from this delivery end, from taking the paper faster than the conveyer can deliver it. So, too, when it becomes necessary to stop the winding-rolls, or when for other reason it

is desired to stop the delivery end of the paper for a short time, this may be done without stopping the conveyer, as the sticks and folds of paper will go on collecting on these inclines until they are full. As the paper is drawn from the conveyer, the sticks are pulled over the end of the inclines and drop upon the endless belt I, which, moving faster than the conveyer, and being provided with lugs or hooks J, takes the sticks quickly from under the paper and carries them to the receiver K. At one end of this receiver is a starter, L, which is driven by the crank M and connecting-rod N. As the sticks are deposited in the receiver, this starter pushes them in between the yielding grip-rolls O, and these rolls shove them into the holder F at the delivery end of the conveyer, from which they are again taken and placed upon the conveyer, as before. Should this stick-holder become filled, its top being left open, the sticks pass out of it and into any suitable receptacle placed to receive them.

P represents the wheel around which the inner chain of the conveyer runs where the conveyer changes its direction. This wheel is provided with a flange or disk, Q, projecting over the chain and arranged just above but not touching the ends of the sticks as they lie upon both chains of the conveyer. At the point where the sticks should begin to turn around to the parallel span of the conveyer the outer chain is conducted downward and comes up to the outside of the next span, so that the outer ends of the sticks are at this point left free and drop slightly, as shown, being held by their inner ends only, which bear upon the inner chain and on the under face of the disk Q. In this position the sticks are swung around till nearly in a position at right angles with the second span of the conveyer, where their outer ends are lifted (thus freeing their inner ends from the flange-disk,) and placed upon the outer chain again by the notched wheel R, which is driven by the outer chain running over pinion S on the same shaft therewith, and is so arranged that its periphery moves with the same speed as the periphery of the inner chain-wheel, P. This causes the outer ends of the sticks to be again laid upon the outer chain of the conveyer in the same relative positions as before.

A wheel acting in all respects like wheel R, but in reverse, may be used to let the outer ends of the sticks down gradually, where they are released from the outer chain, and this I show in other figures.

In Fig. 9 I show the chains composing the conveyer arranged entirely above the floor, Fig. 10 being a cross-section in xx of Fig. 9, and Fig. 11 being an end view of the same from the left.

Here the outside chain starts from one of its driving-pulleys, T, runs to the turning-point, where it operates a notched wheel, U, for letting the outer ends of the sticks down easily, as already described; then turns back

over pulley V and guide W, and over to a corresponding notched wheel, X, for taking up the outer ends of the sticks; then to another driving-pulley, Y, upon which it is held by a friction-wheel, Z; then, making a loop, it passes over guide A', and, forming another loop around slip-pulley B', it returns to the first driving-pulley, T. The two driving-pulleys T and Y are connected by the shaft D', and the slack or loops in this outside chain are to insure it being taut where it is carrying the sticks and paper, and yet slack between the two driving-points and around as many angles as possible to prevent binding. The inside chain is driven from shaft D' by pulley E', which also has a friction-wheel like the other driving-pulleys, from which it loops over to pulley F', from there it runs to the chain-wheel G', and then back to its driving-pulley. The pulleys H' are those upon which run the belts for taking the sticks to the conveyer, and the pulleys I' are those that carry the upper ends of the stick-delivering belts. By this arrangement the whole conveyer part of the drying apparatus may be suspended from the ceiling of the room, thus making a more compact apparatus for a small space.

What is claimed as new is—

1. In the herein-described drying-machine, the combination of the conveyer for carrying the paper hung in loops from sticks thereon, the stick-receiving belt with its stick-holder, and the stick-delivering belt with its receiver and stick-starter, and the grip-rolls for shoving the sticks into the holder at the receiving end of the conveyer, substantially as set forth.
2. The combination, in a drying-machine in which loose sticks are used to suspend the material being dried, a belt for delivering the sticks into a receiver, rolls for withdrawing the sticks from the receiver and transferring them to a holder, and a starting device for pushing the sticks between the rolls, and a belt for taking the sticks from the holder and placing them in position for use, substantially as described.

3. In a drying-machine consisting of a conveyer for the material to be dried, composed of two parallel endless bands or chains, a turning mechanism for taking the sticks around a curve or angle where the conveyer deviates from a straight course, consisting of a wheel for carrying the inner chain, which is provided with a flange or disk arranged above and for the inner ends of the sticks to bear upon, substantially as and for the purpose set forth.

4. In combination with the two chains or bands of the conveyer, the wheel P, provided with the flange or disk Q, and the notched wheel R, for lifting the outer ends of the sticks and placing them upon the outer chain, substantially as set forth.

HEINR. WINTERWERBER.

Witnesses:

ROBERT JACKSON,
HENRY EICHLING.