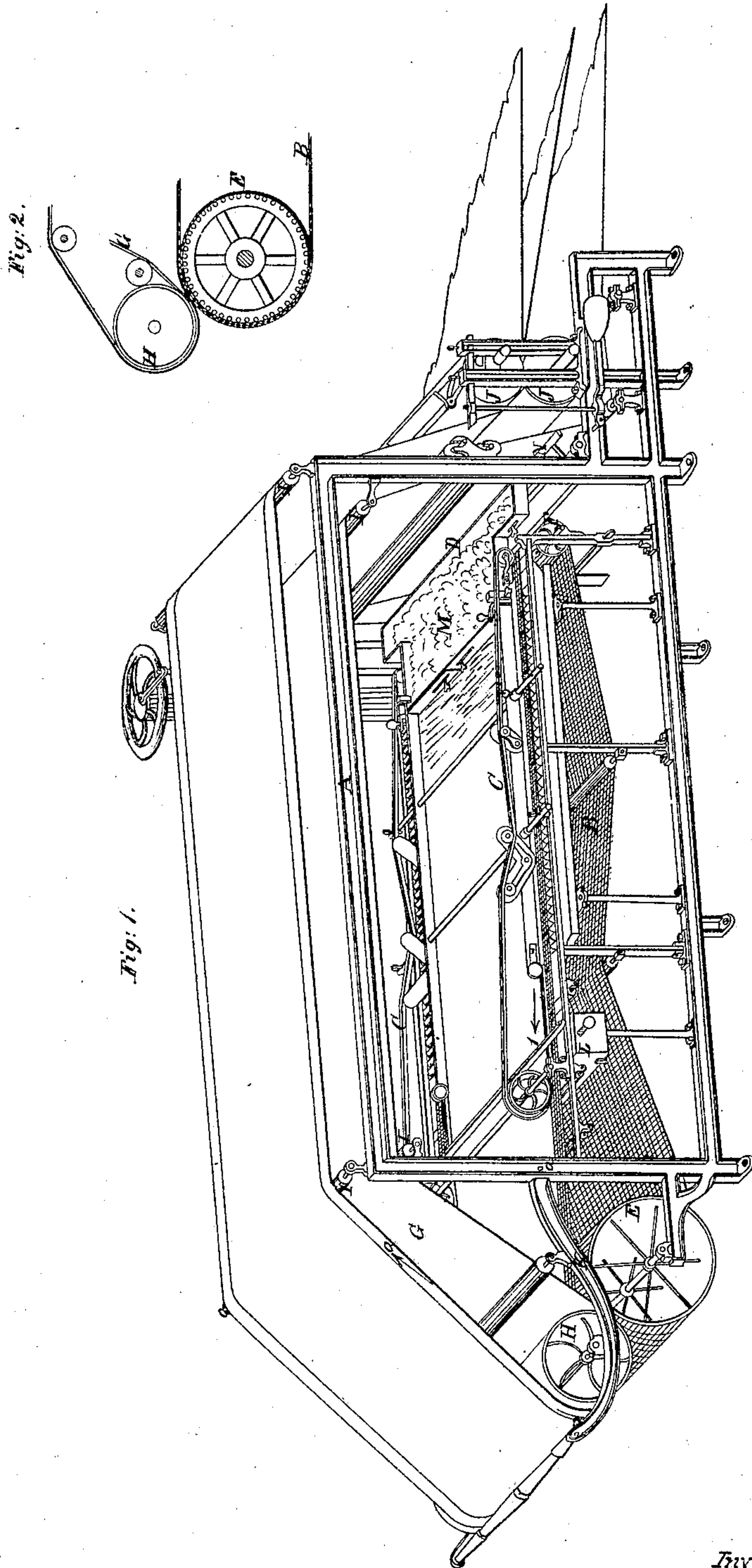


J. Harper.
Paper Mach.
N^o 34,633. Patented Mar. 11, 1862.



Witnesses:

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UNITED STATES PATENT OFFICE.

JAMES HARPER, OF EAST HAVEN, CONNECTICUT.

IMPROVEMENT IN MACHINERY FOR MAKING PAPER.

Specification forming part of Letters Patent No. 34,633, dated March 11, 1862.

To all whom it may concern:

Be it known that I, JAMES HARPER, of East Haven, in the county of New Haven and State of Connecticut, have invented certain new and useful Improvements in Paper-Making Machines; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, and to the letters of reference marked thereon, in which—

Figure 1 is a perspective view of a machine embodying my invention. Fig. 2 is a vertical section of a portion of it, showing the end of the wire-cloth from which the paper is couched and the roller which carries it, and also the same end of the couching-felt and the roller over which it passes.

This invention relates to certain improvements in what is known as the "Fourdrinier machine," and these improvements are intended to obviate a difficulty in couching from a wire-cloth by direct contact of an endless felt. They consist in, first, the combination with the Fourdrinier wire-cloth and with an endless felt so arranged as to couch the paper therefrom by direct contact with the said wire-cloth, of a perforated cylinder to carry the said wire-cloth, the parts being so arranged with reference to each other that the wire-cloth and couching-felt are both supported directly at their point of contact by the cylinders over which each is carried, or, in other words, the paper is couched at a point where the wire-cloth bears directly upon the perforated cylinder above mentioned; second, the combination, with a couching-felt and Fourdrinier apron when these two are so combined that the paper is couched by the direct contact of these two parts, of a beater arranged in the manner described with reference to the other parts for cleaning the felt, as hereinafter set forth.

A represents the frame of a Fourdrinier paper-making machine; B, the endless wire-cloth apron.

F is the front, and E the back roller, of the apron B.

The above parts, except the roller E, may be of nearly the usual construction, and therefore do not require a minute description.

C are the deckle-straps, and D the trough from which the pulp flows on the apron B.

G represents an endless blanket of felt for

receiving the paper from the wire-cloth. This blanket passes around a roller H, which is placed over the roller E, of the endless wire-cloth apron B, and so arranged with reference to it as to bring the felt and the wire-cloth in contact where each bears directly upon its own carrying-cylinder, so that each is thereby directly supported by its said cylinder against the pressure it receives from the other. The blanket G passes over suitable guide-rollers I at the upper part of the frame A and between pressure-rollers J J near the point where it delivers the paper to the felt, which receives it therefrom and passes it to the drying-rollers. The roller H of the blanket G is placed in the frame K, which is connected by joints *a* to the frame A, the joints *a* admitting of the weight of the roller H and its frame K resting on the roller E of the apron B. A small roller will be observed immediately at the right hand of the roller H and bearing upon the blanket G. The object of this roller is to give steadiness to the blanket and also to increase the surface of contact between the blanket and the wire apron B. For this purpose it should be placed somewhat lower than it is represented in the drawings. It will be observed, further, that the couching-felt G and the wire apron B are so arranged in connection with the receiving-felt, which takes the paper from the coucher G, and with each other that the couching-felt extends back over the apron B and is met by the receiving-felt, to which the paper is transferred to be passed onto the driers at that end of the apron B at which the pulp is introduced, and that immediately at the right hand of the pulp-box a beater N is so arranged in connection with the felt as to clean it, with aid of jets of water applied at that point, as it is being returned back to the point at which the paper is couched. This arrangement of the beater in connection with the other parts is important, as it is indispensable to success that the couching-felt should constantly be cleaned while in use.

The operation of the machine is as follows: The endless wire apron B moves in the direction indicated by the arrow 1, and the blanket G moves in the direction of the arrow 2. The pulp M flows on the apron B from the trough D, and may be subjected to the usual

Suction in passing over vacuum-boxes L. The draft through these boxes need not, however, be very strong, and, perhaps, under favorable circumstances, may with my improvements be dispensed with. The pulp or paper is taken from the wire-cloth apron B by the blanket G, as it passes over the roller E, and the paper is carried by the said blanket over the top of the frame A and passed between the rollers J J, the paper being taken at this point by an apron which conducts it to the ordinary heating-cylinders. The roller E has a wire-cloth or perforated periphery to allow the superabundant water to escape at the point where the paper is couched, and by this means the paper is taken from the apron B in a drier state than would otherwise be the case, the very light pressure requisite for couching the paper by this arrangement allowing the perforated cylinder to be used. The ordinary plan is to have the paper pass between pressure-rollers at the point of discharge from the apron, and this involves the necessity of having rollers with solid peripheries and covered with felt in order to prevent the paper from being forced through the meshes of the apron and adhering to it, and even with this precaution the apron is injured by the pressure and is much sooner worn out than when used with my improvements. By my improvements this difficulty is obviated, as only sufficient pressure is necessary to enable the blanket to take up the paper from the apron. The paper, in passing between the rollers J J, may be subjected to any requisite degree of pressure, as the blanket G cannot of course be injured thereby.

I am aware that an endless blanket or couching-felt has been made to take the paper from a forming-cylinder by direct contact, and the couching of paper by direct contact is not *per se* or in itself therefore new. This combination of the cylinder with the couching-felt by no means realizes the purposes of my

invention, and is therefore entirely different in its results and consequent merits.

I am aware that in the English patent of Leger Didot, May 22, 1817, an effort has been made to combine the couching-felt and the Fourdrinier apron in such a manner as to couch by direct contact of the two, but in which the essential improvements claimed by me were not introduced or embodied.

It will be obvious to paper-makers that the cleaning of the couching-felt is an important consideration, and unless it can be so arranged and combined with beaters as to prevent its becoming foul the machine must soon be stopped to clean it. I have so constructed and arranged my machine that, while I combine the couching-felt with the wire-cloth in such a manner as to couch by direct contact, I also combine with the felt a beater for cleaning it; or, in other words, I combine the Fourdrinier apron, the endless felt couching from it by direct contact, and the beater for cleaning the said felt in one and the same machine and combination.

Having thus fully described my invention and set forth its characteristic features of novelty and utility, I claim—

1. The combination, with the Fourdrinier wire-cloth apron B, and the couching-felt G, so arranged as to couch the paper from the wire-cloth by direct contact, of the perforated cylinder E, when these parts are so arranged that the cylinders E and H support the wire-cloth B and and the couching-felt G, respectively, directly opposite their point of contact with each other, substantially as set forth.

2. The combination, with each other when arranged as above described, of the Fourdrinier wire-cloth B, couching-felt G, and beater N, substantially as set forth.

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Witnesses:

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