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PATENTED AUG. 29, 1905.

T. T. HOLLINGER.

APPARATUS FOR TRANSFERRING THE GRAIN OF WOOD TO FLEXIBLE MATERIAL.

APPLICATION FILED DEC. 21, 1900.

2 SHEETS—SHEET 1.

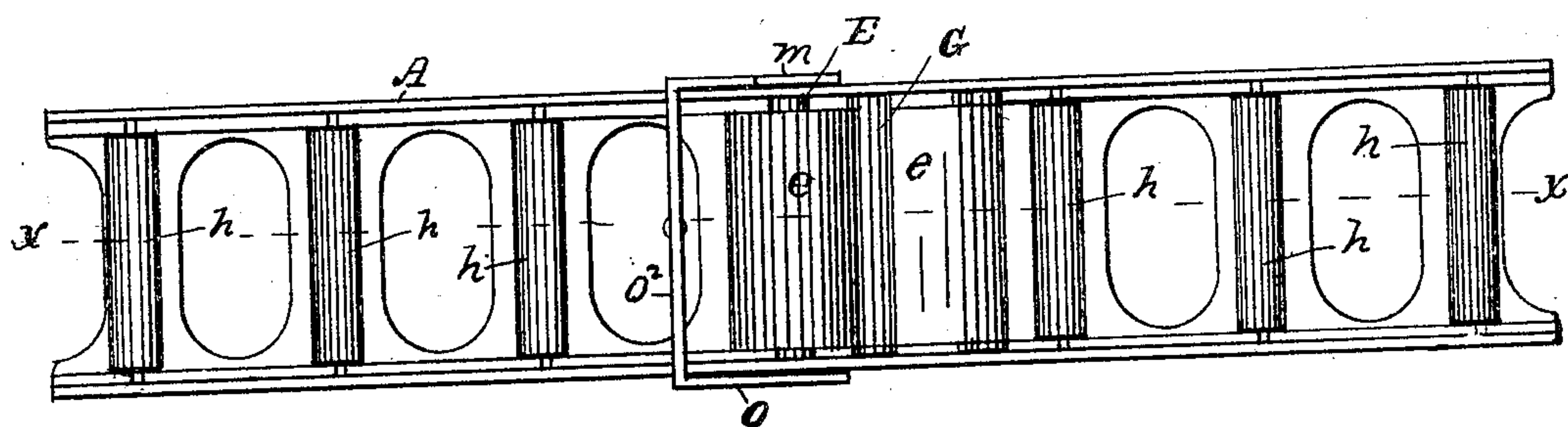
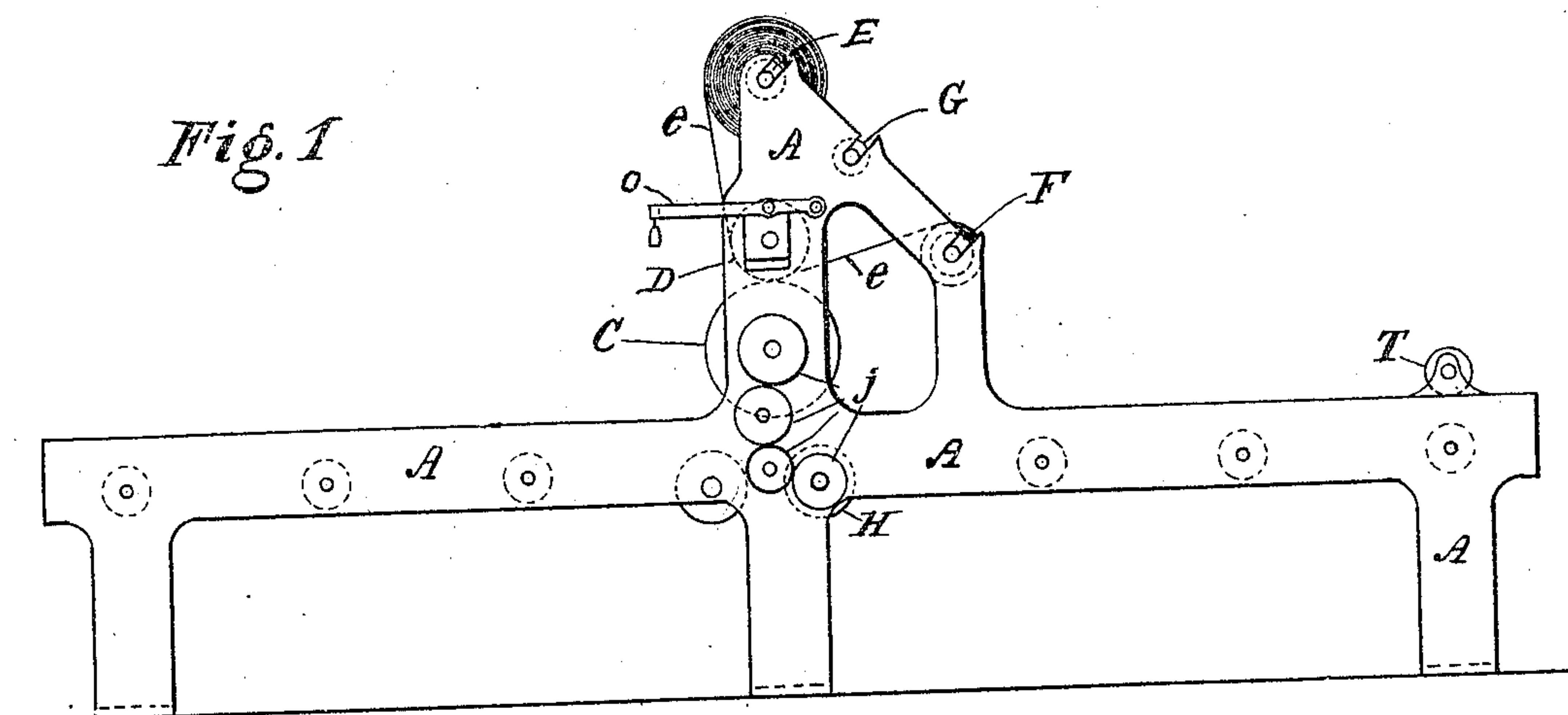


Fig. 2

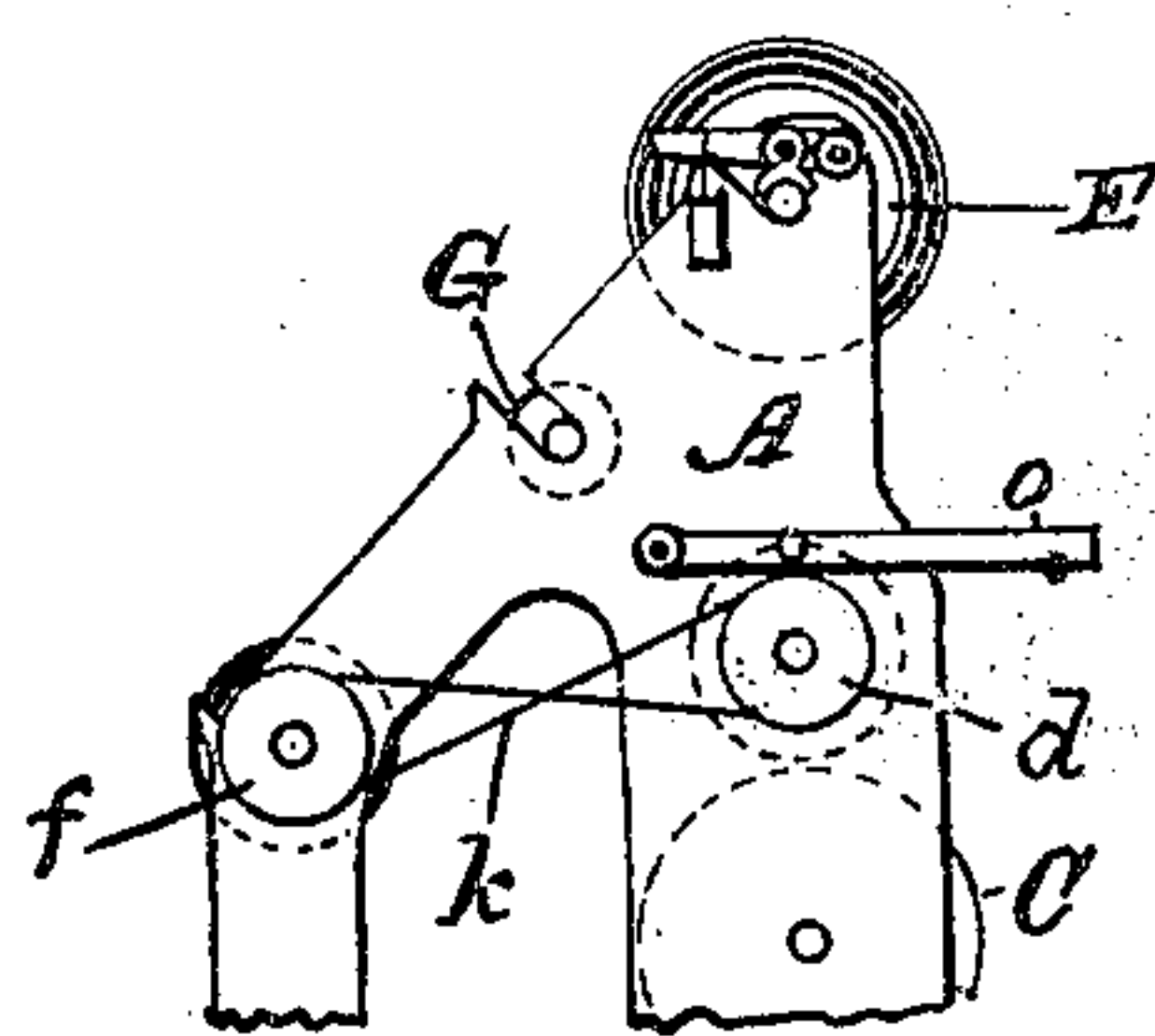
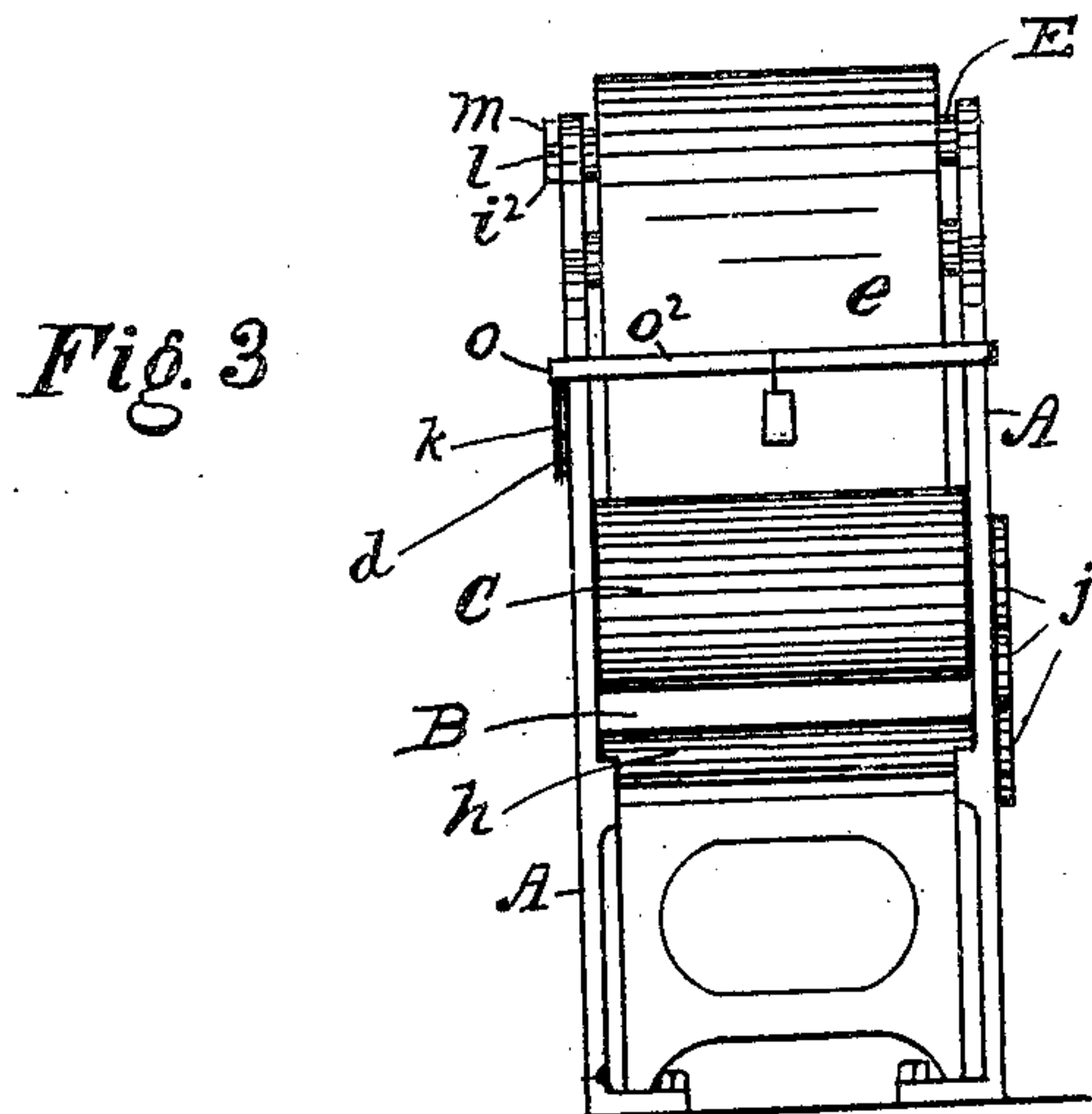


Fig. 7

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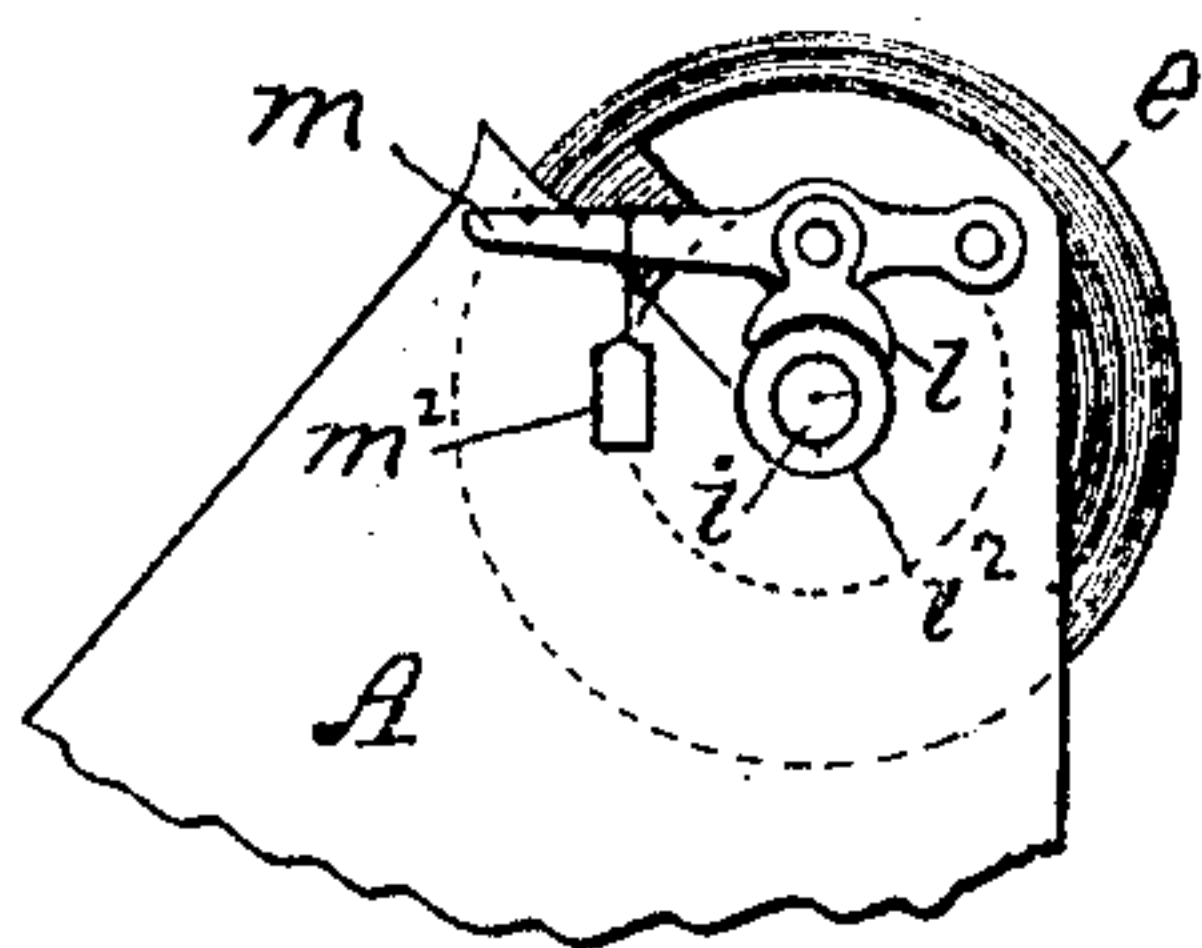
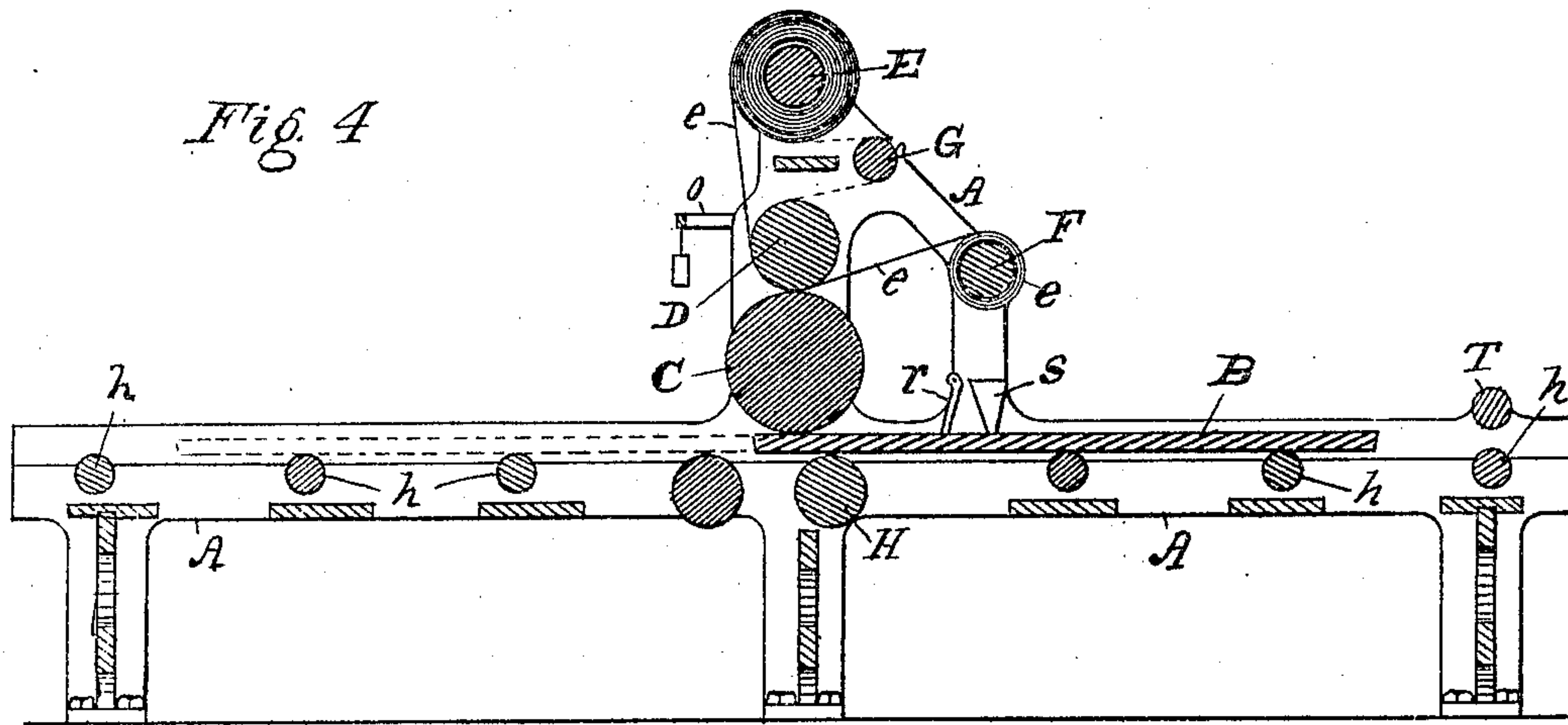


Fig. 5

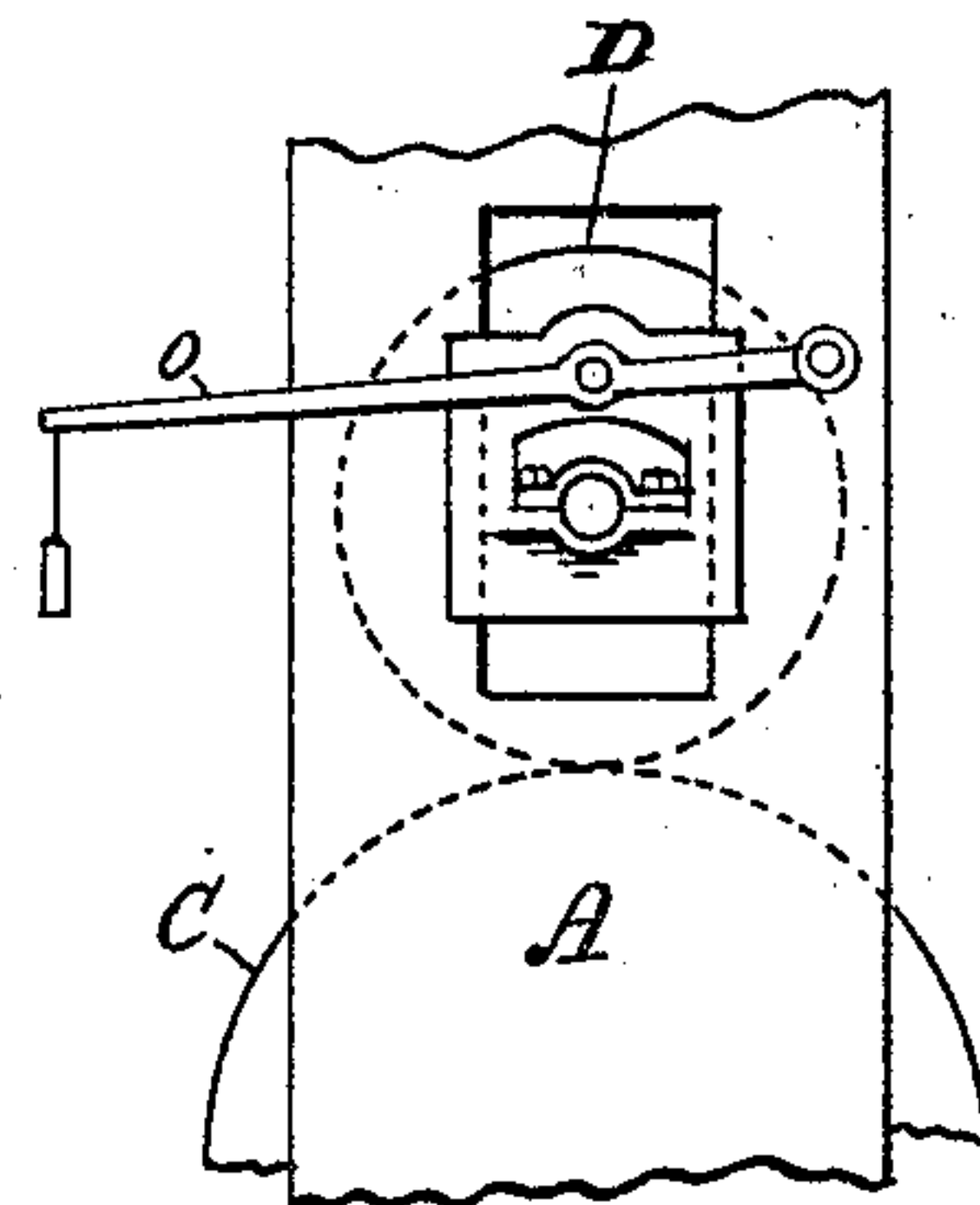
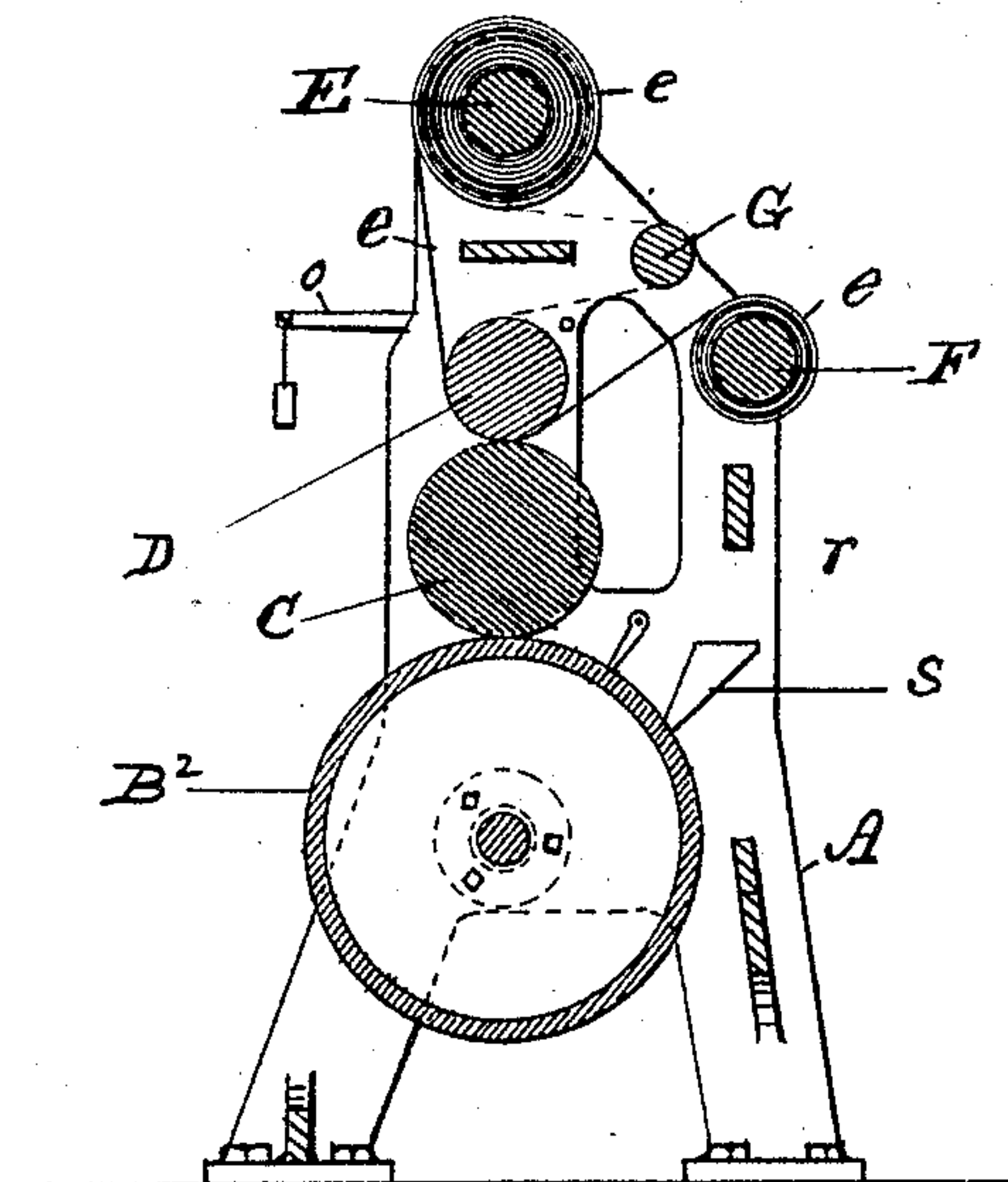


Fig. 6

Fig. 8



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UNITED STATES PATENT OFFICE.

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APPARATUS FOR TRANSFERRING THE GRAIN OF WOOD TO FLEXIBLE MATERIAL.

No. 798,182.

Specification of Letters Patent.

Patented Aug. 29, 1905.

Application filed December 21, 1900. Serial No. 40,616.

To all whom it may concern:

Be it known that I, THOMAS T. HOLLINGER, a citizen of the United States, residing at Detroit, in the county of Wayne and State of Michigan, have invented certain new and useful Improvements in Apparatus for Transferring the Grain of Wood to Flexible Material; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to apparatus for transferring the grain of wood to paper, cloth, leather, linoleum, or any flexible fibrous material suitably prepared to receive such transfer. Paper or a combination of paper and cloth forming a cloth-backed paper or a suitably-prepared cloth alone may be used, and various kinds of manufactured fibrous materials are suitable for the purpose; but my present invention relates to the apparatus and not to the material produced.

In general terms my apparatus consists of means for causing a suitably-chosen smooth surface of natural wood to be coated with a suitably-colored paint or liquid coloring and to then traverse in contact with a roller or equivalent composed of or coated with a non-absorbent surface which takes up the color from the wood and transfers it to the prepared fibrous material, which is caused to traverse in contact with the said roller thus charged with the color taken up from the wood surface.

Referring to the drawings, Figure 1 represents in side elevation an apparatus so constructed as to involve my invention. Fig. 2 is a plan view of the apparatus. Fig. 3 is an end view thereof. Fig. 4 is a view in central vertical sectional elevation of the apparatus shown in Figs. 1, 2, and 3, the plane of section being indicated by the broken line xx in Fig. 2. Fig. 5 is a detail view of the tension-brake. Fig. 6 is a detail view showing the arrangement for varying the pressure of the impression-roll, Figs. 5 and 6 being drawn on a larger scale than the other figures for the sake of greater clearness. Fig. 7 is a side elevation of a portion of Fig. 1 viewed from the opposite side, and Fig. 8 is a view in vertical section of a modified form of the apparatus.

A represents the frame of the apparatus.

B represents a suitably-prepared surface of natural wood, which may, as preferred, be

flat or cylindrical and to which is imparted movement in the manner hereinafter to be described.

C represents a roller or cylinder supported in the frame A, so as to make suitably firm contact with the surface B, and which roller is composed of or coated with an elastic substance, non-absorbent, of the coloring material to be transferred. This roller when the prepared and coated surface B is caused to traverse in contact therewith takes up the color therefrom and transfers it to the prepared fibrous material, and hence is designated as the "transfer-roller."

D represents a roller or cylinder traveling in contact with the fibrous material at the point where the latter touches the transfer-roller and is so supported in the frame A that it may be made to press with the desired degree of pressure against the web of fibrous material as the latter passes between it and the transfer-roller, for which reason the roller D is designated as the "impression-roller."

E represents a roller upon which the web of suitably-prepared fibrous material e is wound and from which it feeds to the transfer-roller and passing between the latter and the impression-roller is received upon a roller F. According to the character of the material to which the color is to be transferred the web e may pass directly from the feed-roller E to the transfer-roller, as shown in full lines in Fig. 4, or it may be passed intermediately around a roller G and thence to the transfer-roller, as indicated in dotted lines in Fig. 4. This is preferable where the material is thin or liable to twist or "cockle;" but with thick or firm material it may pass direct from the feed-roll to the transfer-roll, as shown.

To insure the proper feeding of the web of material from the roller E to the transfer-roller, it is desirable to cause a certain amount of tension upon the web, and this I prefer to accomplish by means of a brake mechanism applied to the roller E or its axis, although in cases where the web passes over the roller G the tension might be applied to that roller or its axis. Any suitable device for exerting a friction upon the roller E or its axis will afford a sufficient tension; but the device which I prefer is shown in the drawings, and particularly in Fig. 5, in which i represents the shaft or axis of the roll E. i^2 represents a small drum upon the axis of the shaft i .

represents a small shoe adapted to rest upon the drum i^2 and pivotally secured to a short lever m , pivoted on the frame and carrying a suitable weight m^2 , by the adjustment of which along the lever m any desired tension upon the material feeding from the roller E may be obtained. When it is desired to remove the roller E and substitute a fresh one carrying a new roll of material, the lever m can be turned back upon its pivot so as to be out of the way and returned to its place after the new roll has been inserted. Although the shoe l is shown as bearing upon the drum i^2 , it is obvious that it might equally well bear directly upon the shaft i of the roller E, only in that case the weight m^2 would have to be larger to effect the same degree of tension. By changing the position of the weight m^2 upon the lever m the tension may be varied from time to time as the diminishing size of the roll of material may render desirable.

It is desirable, although not strictly necessary, that the transfer-roller C should be capable of some slight vertical adjustment in order that its pressure upon the surface of the wood may be varied to suit the grain and character of the surface of the wood from which the transfer is made. For this purpose I prefer to support the roller C in bearings supported on springs and to provide above the bearings adjusting-screws by means of which the bearings may be adjusted against the tension of the springs so as to give the exact degree of pressure required. The impression-roll also is supported in bearings capable of sufficient vertical play to enable the roll to be made to bear with any desired degree of pressure upon the transfer-roll and also to enable the impression-roller to be lifted up sufficiently to remove the web of material from contact with the transfer-roller whenever desired—for instance, upon stopping the machine. For this purpose I prefer to attach to the bearings at each end of the impression-roller a lever o , pivoted upon the frame and joined at their outer ends by a connecting-bar o^2 , upon which in case the weight of the levers and connecting-bar is not sufficient to give the necessary pressure of the impression-roll against the transfer-roll a suitable weight may be hung, as seen in Fig. 3. When it is desired to lift up the impression-roller and bring the web of material out of contact with the transfer-roller, the lifting of the lever o will raise the impression-roller sufficiently to effect the desired object, and the levers o may be secured in their elevated position by any suitable means—such, for instance, as a suspended hook, which may be made to engage the cross-bar o^2 .

The surface of prepared wood from which the transfer is to be made, which I designate as the "pattern-board," is caused to traverse in contact with the transfer-roller, either by

means of a roller H, which supports the pattern-board in contact with the transfer-roller and may, if preferred, be intergeared therewith, as shown by the gears j in Figs. 1 and 3, in case the pattern-board is flat, or by mechanism hereinafter described in case said surface is cylindrical. When the flat surface is employed, rollers h , journaled in the frame A, support the pattern-board from whose surface the transfer is to be made and enable it to be drawn between the rollers C and H without permitting any slip or lag in its movement, which would cause defects in the transfer and render the same practically worthless.

The rotation of the receiving-roller F is effected by means of a belt k , passing over pulleys f and d upon the axes of the rollers F and D, respectively, and the tension of this belt is made such as to permit a slight slip when the increasing diameter of the roll of material upon the roller F renders it necessary, as it would be exceedingly difficult to use gearing for this purpose in view of the widely-varying character of the material treated at different times. Although intergearing of the rollers C and D may be employed, if preferred, it has not been found necessary, as the friction between them is sufficient to rotate the impression-roller and the receiving-roller driven therefrom even when using the most diverse character of materials.

The wood surface from which the transfer is to be made is prepared of carefully-selected wood presenting the desired characteristics of grain and texture, and the separate portions composing the same are carefully joined so as to present the desired appearance of surface without cracks, and the grain may run either lengthwise or crosswise of the prepared surface, as may be preferred. Ordinarily the flat surface of wood is employed when the grain is to run lengthwise and the cylindrical surface when the grain is to run crosswise, as shown at B² in Fig. 8, but the grain may run circumferentially around the cylinder, if preferred, when the cylindrical surface is employed.

To obtain the best results, the coating of paint or color upon the wood surface should be uniform and thin, and to effect this the surface of the wood is coated with a somewhat thicker coating than is required for the transfer, and a scraper r , having a flexible edge, is adjusted to ride upon the surface of the wood just in front of the transfer-roller. This scraper removes any excess of the coloring medium and leaves a very fine and uniform coloring on the wood surface which gives a clear and perfect transfer. The paint or other color may be applied to the wood surface in any preferred manner; but I prefer to apply it by means of a so-called "fountain" s , similar to an ink-fountain, which is supported upon the frame A a little in advance of the scraper r .

While the apparatus is designed to be run by power which may be applied to the axis of either of the rollers C or H, it may be successfully operated by hand. In operating the machine the end of the web of material on the roller E is led under the impression-roller and secured to the roller F. The selected wood surface is then placed upon the rollers *h* *h* and its end passed under the fountain *s*, which is filled with the paint or other color to be used, and the wood is pushed along, passing under the scraper *r* until its end engages between the rollers C and H, by which it is drawn through and passes out upon the rollers *h* at the other end of the machine, as shown in dotted lines in Fig. 4. At the moment when that portion of the transfer-roller which the wood first touched and which consequently has upon its surface the pattern or color taken up from the wood reaches the point beneath the impression-roller the latter is by means of the levers *o* lowered and allowed to rest upon the web of the material in contact with the transfer-roller, whereupon the rotation of the impression-roller feeds the material through at the speed at which the transfer-roller travels, and the color upon the surface of the latter roller is transferred to the material, leaving the transfer-roller substantially free from the color. Before the pattern-board with which the operation was started has entirely passed under the fountain *s* a second one is placed upon the rollers *h*, the ends of the two pieces being so jointed as to make perfect contact without showing any visible crack, and is in the same manner pushed forward in contact with the first board until it engages the rollers C and H. In this manner successive pattern-boards are passed through the machine and there is obtained upon the web of material to which the grain is transferred an endless pattern which, however, instead of containing a repetition at given intervals of the same pattern or grain may contain an endless variety of grain which will not be alike in any two portions of a roll containing hundreds of yards' length of the material.

Although I have not found it necessary, since the successive pieces of the prepared wood surface may be passed through the machine in the manner above described, just as successive boards are passed through a planing-machine, yet the work is somewhat facilitated by arranging a roller T at that portion where the wood surface enters, which roller is rotated by suitable intergearing, as with the rollers H and C, and serves to mechanically move forward the successive pieces of pattern-board, thus requiring slightly less attention on the part of the operator.

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

1. In apparatus for transferring the grain of wood to flexible material the combination

of a printing-surface of wood, means for coating the same with color, a transfer-roll having an elastic non-absorbent surface, means for causing said coated wood surface to traverse in contact with the transfer-roll, a feeding-roll for holding the material to be coated, means for taking up the material as coated, an impression-roller adapted to press upon the transfer-roll, and means for feeding the material between the impression-roller and the transfer-roll, substantially as described. 70 75

2. In apparatus for transferring the grain of wood to flexible material the combination of a printing-surface of wood, means for coating the same with color, a transfer-roll having an elastic non-absorbent surface, means for causing said coated wood surface to traverse in contact with the transfer-roll, a feeding-roll for holding the material to be coated, a brake acting on said feeding-roll to cause a tension upon said material, means for taking up the material as coated, an impression-roller adapted to press upon the transfer-roll, and means for feeding the material between the impression-roller and the transfer-roll, substantially as described. 80 85 90

3. In apparatus for transferring the grain of wood to flexible material the combination of a printing-surface of wood, means for coating the same with color, a transfer-roll having an elastic non-absorbent surface, means for causing said coated wood surface to traverse in contact with the transfer-roll, a feeding-roll for holding the material to be coated, a shoe bearing on said feeding-roll and a weighted lever acting on said shoe for effecting a variable tension upon said material while feeding, means for taking up the material as coated, an impression-roller adapted to press upon the transfer-roll, and means for feeding the material between the impression-roller and the transfer-roll, substantially as described. 95 100 105

4. In apparatus for transferring the grain of wood to flexible material the combination of a printing-surface of wood, means for coating the same with color, a transfer-roll having an elastic non-absorbent surface, means for causing said coated wood surface to traverse in contact with the transfer-roll, a feeding-roll for holding the material to be coated, means for taking up the material as coated, an impression-roller adapted to press upon the transfer-roll, a roll intermediate of said feeding-roll and impression-roller, and means for feeding the material from the feeding-roll around the intermediate roll and thence between the impression-roller and the transfer-roll to the receiving means, substantially as described. 110 115 120 125

5. In apparatus for transferring the grain of wood to flexible material the combination of a printing-surface of wood, means for coating the same with color, a transfer-roll having an elastic non-absorbent surface, means 130

for causing said coated wood surface to traverse in contact with the transfer-roll, an impression-roller mounted in movable bearings and normally appressed to the transfer-roll, means for feeding the material from the feeding-roll between the impression-roller and the transfer-roll and thence to the receiving means, and means for moving the impression-roller away from the transfer-roll, substantially as described.

6. In apparatuses for transferring the grain of wood to flexible material the combination of a printing-surface of wood, means for coating the same with color, a transfer-roll having an elastic non-absorbent surface, means for causing said coated wood surface to trav-

erse in contact with the transfer-roll, an impression-roller mounted in movable bearings and normally appressed to the transfer-roll, means for feeding the material from the feeding-roll between the impression-roller and the transfer-roll and thence to the receiving-roll, and levers engaging the bearings of the impression-roller for moving the same from the transfer-roll, substantially as described.

In testimony whereof I hereto affix my signature in presence of two witnesses.

THOMAS T. HOLLINGER.

Witnesses:

OTTO F. BARTHEL,
JOSEPH A. NOELKE.