

(No Model.)

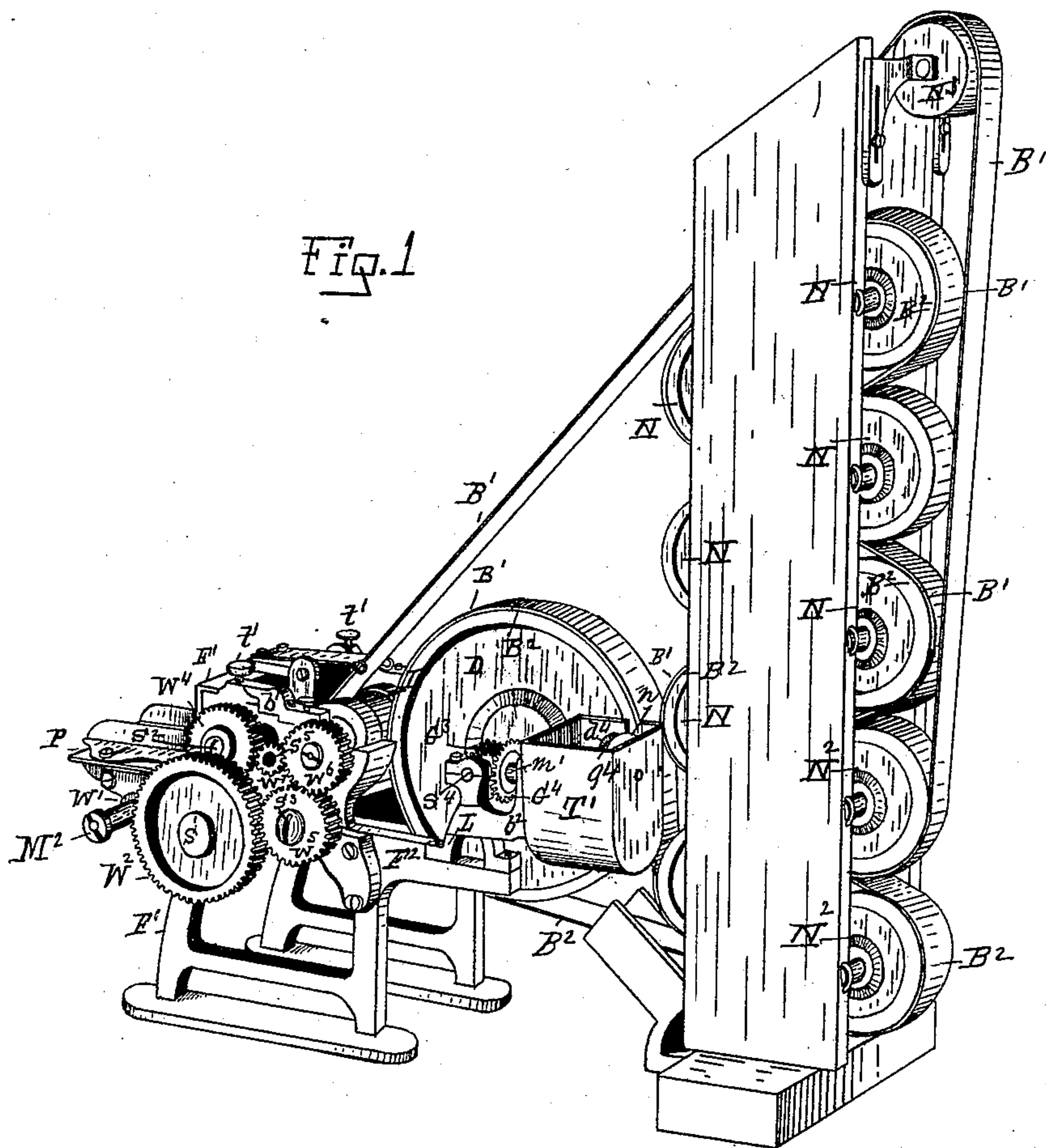
4 Sheets—Sheet 1.

G. E. NORRIS & W. E. HAGAN.

MACHINE FOR MAKING MATCHES.

No. 337,074.

Patented Mar. 2, 1886.



WITNESSES

Geo. A. Darby.

Charles S. Brintnall

INVENTORS

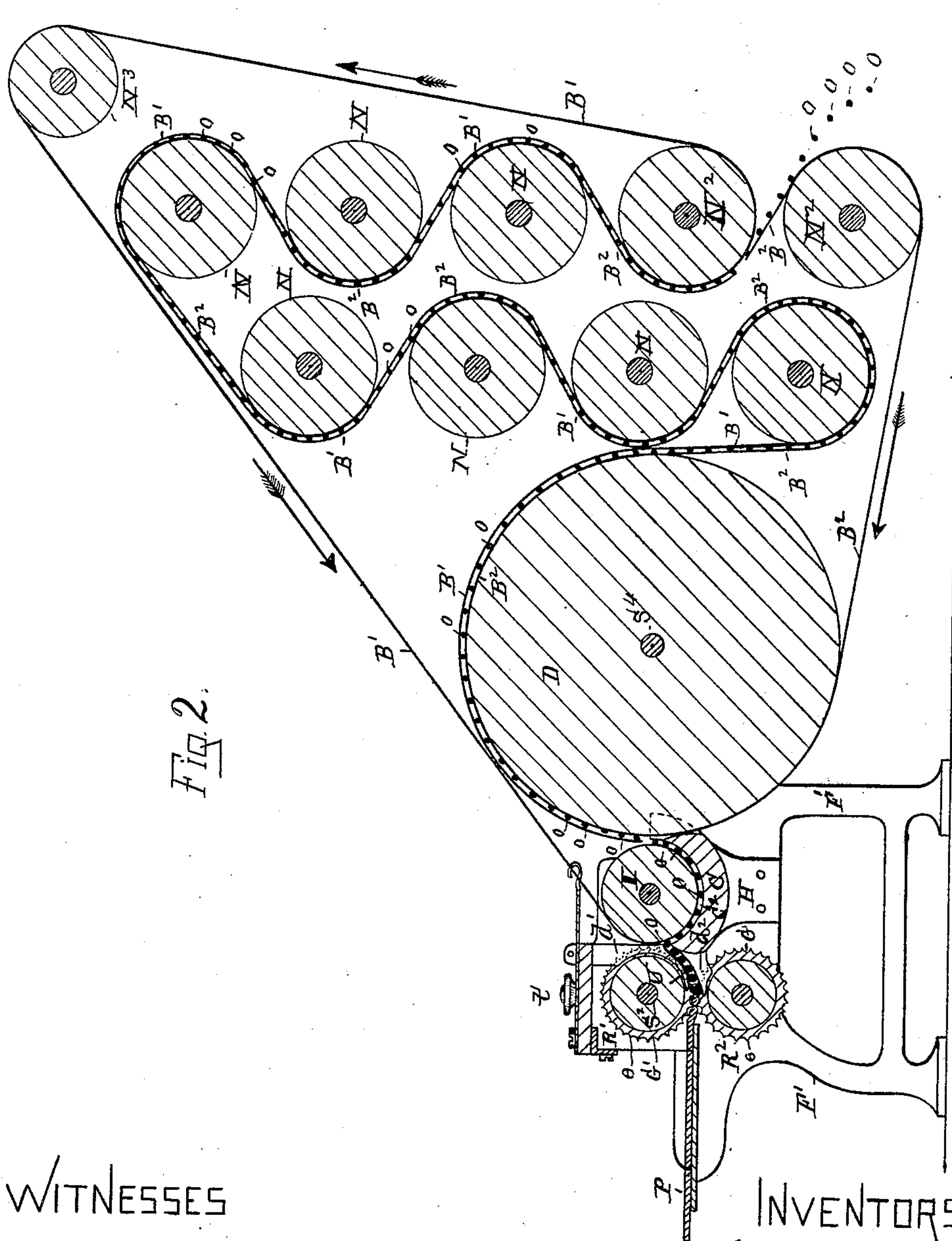
George E. Norris

William E. Hagan

4 Sheets—Sheet 2.

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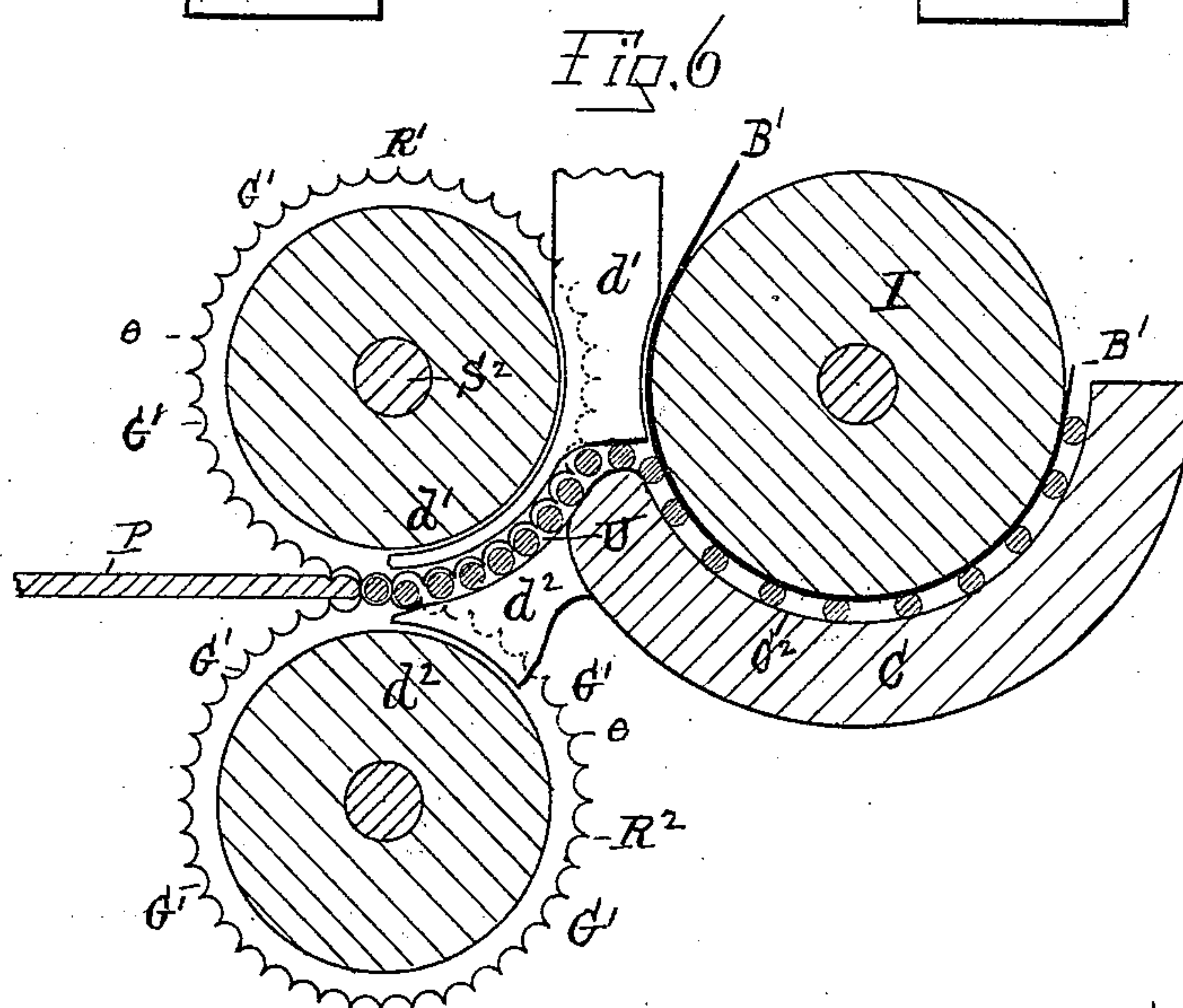
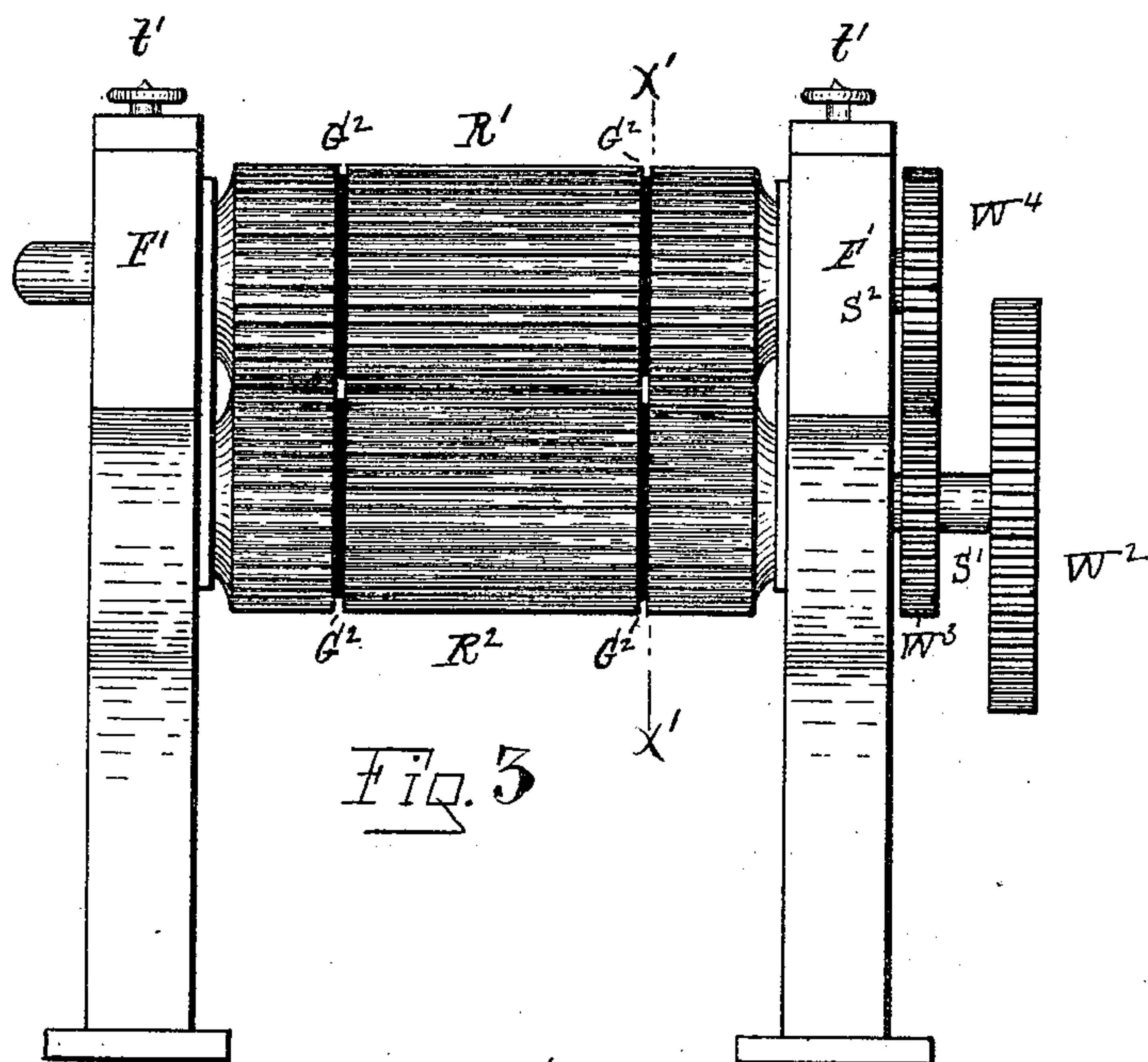
George E. Morris

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4 Sheets—Sheet 3.

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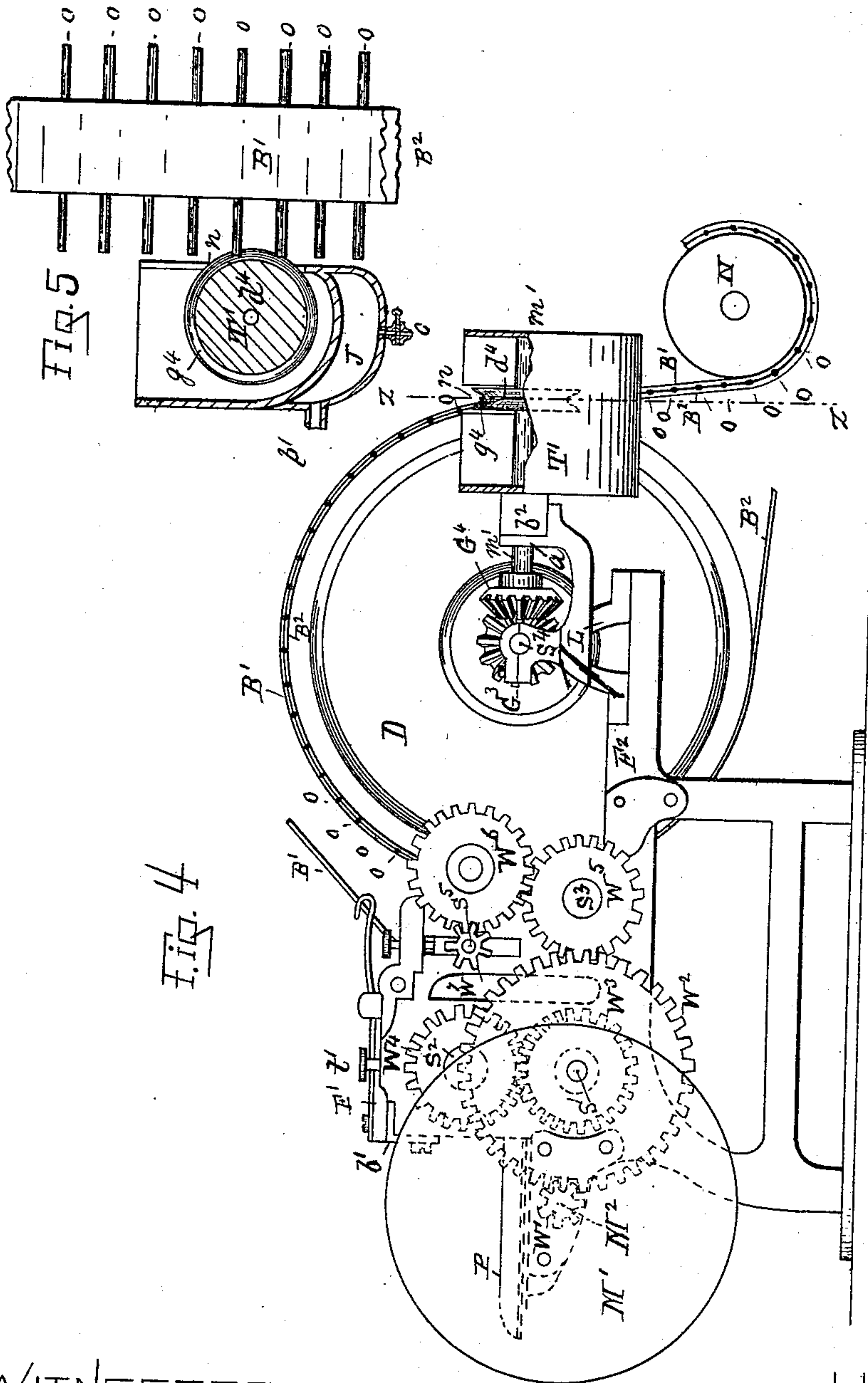
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UNITED STATES PATENT OFFICE.

GEORGE E. NORRIS AND WILLIAM E. HAGAN, OF TROY, NEW YORK, ASSIGNORS, BY MESNE ASSIGNMENTS, TO THE CITIZENS MATCH COMPANY, OF SAME PLACE.

MACHINE FOR MAKING MATCHES.

SPECIFICATION forming part of Letters Patent No. 337,074, dated March 2, 1886.

Application filed December 28, 1885. Serial No. 186,856. (No model.)

To all whom it may concern:

Be it known that we, GEORGE E. NORRIS and WILLIAM E. HAGAN, both of the city of Troy, county of Rensselaer, State of New York, have jointly invented new and useful Improvements in Machines for Making Matches, of which the following is a specification.

Our invention relates to improvements in match-making machines, and more particularly to mechanism for handling the splints and dipping them, with the splints produced by the mechanism described in Letters Patent of the United States, granted to us the undersigned July 7, 1885, and numbered 321,444 and 321,445.

Accompanying this specification, to form a part of it, there are four plates of drawings, containing six figures illustrating our invention, with the same designation of parts by letter reference used in all of them.

Of these illustrations, Figure 1 is a perspective of a machine for making and dipping matches that contains our invention, it being shown with the driving-pulley removed from its shaft. Fig. 2 is a longitudinal central and vertical section of the mechanism shown at Fig. 1. Fig. 3 is an end elevation of the cutting-rollers and the mechanism which operates the latter, the feeding-table being omitted. Fig. 4 is a side elevation of a part of the mechanism shown at Fig. 1, the parts being illustrated in larger proportion than in the latter figure, and showing the belt-connection with the drying-rollers with all but one of the latter omitted. Fig. 5 illustrates a combined end elevation and vertical section of the splint-carrying belts, dipping-tank, and roller, the latter being shown in side elevation and the match-carrying belts illustrated in cross vertical section on the line zz of Fig. 4. Fig. 6 is a vertical section on the line $x'x'$ of Fig. 3, with the parts somewhat enlarged.

The several parts of the mechanism thus illustrated are designated by letter reference, and the function of the parts is described as follows:

The letters R' R^2 designate two cutting and pressing rollers, having their bearings in the frame F' . The circumferential face of these rollers is made to have the grooves G' , which

are arranged in the face of each of said rollers parallel to its axis. The edges of the grooves, as designated at e , are made sharp, and as these rollers are actuated to move together at each revolution the edges of the grooves in each roller come in contact, or nearly to contact, so as to produce a cutting engagement when a veneer of wood is being passed through and between them. Each of these grooves is made to correspond in size to half the circumference of the match blank or splint that is designed to have them cut connectedly and press into a rounded form.

The letter P indicates a platform along and over which the veneer of wood is guided to enter between the rollers.

The letter M' designates the wheel from which actuating power is derived, and M^2 its shaft, on which there is constructed a geared pinion, W' , for transmitting power therefrom to a wheel, W^2 , on the shaft S' of the lower cutting-roller, R^2 , which shaft is also constructed with a gear-wheel, W^3 , and the latter is arranged to mesh into a gear-wheel, W^4 , that is secured to shaft S^2 of the upper cutting-roller, R' , so that when motion is communicated from the motor-wheel M' the latter, by means of its pinion W' , communicates power to the gear-wheel W^2 on the lower cutting-roller shaft, while the gear-wheel W^3 on the latter communicates motion to the gear-wheel W^4 of the upper cutting-roller shaft, to thus operate the cutting-rollers R' and R^2 . The gear-wheels upon the cutting-roller shafts are of the same size, and are thus arranged to have the same speed as they rotate together. The shaft S^2 of the upper cutting-roller has its bearing in the frame F' , and this bearing of the upper roller is made adjustable vertically toward the lower roller by means of the journal-blocks b' and the set-screws t' , arranged at each end of the said roller-shaft.

The letter W^5 indicates a gear-wheel having a pintle-shaft, S^3 , arranged in the frame F' , and this gear-wheel W^5 meshes into a gear-wheel, W^6 , the latter also having a pintle bearing in the frame F' . This wheel W^6 meshes into a wheel, W^7 , on the shaft S^5 of a roller, I , to communicate motion to the latter.

The letters G^2 G^2 designate grooves arranged

circumferentially in the face of the rollers R' and R², and they are arranged in each of said rollers so as to be vertically in line.

The letters *d'* *d'* indicate stripping-fingers, 5 that are attached to the frame F' at their outer ends, with their lower ends adapted to enter the circumferential grooves G' of the upper cutting-rollers, and *d²* *d²* designate fingers adapted to enter the circumferential grooves 10 G' of the lower cutting-rollers to strip the splints from out the cutting and pressing grooves of said rollers, and to direct the splints as impelled along by the expulsive action of the said rollers until they reach a point where 15 they are acted upon by a belt, as will be subsequently described.

The letter C designates a guideway having the concave C², that is produced on the upper face of the standard H, and in which the roller 20 I turns at a short distance therefrom, and into which concave the stripping-fingers direct the splints after taking them from off the cutting-rollers; and B' an endless belt adapted to run on said roller I, and as it moves along thereon 25 to progressively move and roll the splints along over the concave C² of the guideway C by contact with them.

The letter D designates a wheel having a shaft, S⁴, arranged to journal in the rearward 30 extension of the frame indicated at F², and B² an endless belt adapted to run on the face of said wheel D. Where the belt B' leaves the concave C in moving the splints over the latter the belt B², running close up to said concave, also comes in contact with the splints, 35 and the latter are thus caught between the two belts B' and B², both of which run together, one above the other, over the upper half of the peripheral surface of the wheel D, the belt B² 40 being beneath the belt B', and from thence the splints are carried by the said belts onto the drying-pulleys.

The letters G³ designate a beveled gear-wheel that is arranged on the shaft S⁴ of the 45 wheel D, and this beveled gear-wheel meshes into another beveled gear-wheel, G⁴, that is provided with a horizontal shaft, m', the latter having its bearings at a in the bracket L.

The letter T' designates a tank that is adapted 50 ed to contain match composition, said tank being provided with a steam-jacket, J, that has a steam-inlet pipe, p', for a steam-supply to heat the composition, said jacket being also constructed with a drip-cock, c, for the escape 55 of the condensation therefrom.

The letter *d'* designates a dipping-wheel arranged on the shaft m', said wheel being operated to turn within said tank by means of the beveled gear-wheels G³ and G⁴, and at its inner 60 edge to project beyond said tank through the slot n in the side thereof. This dipping-wheel *d'* is provided with a peripheral groove, g', and is adapted to turn in match composition placed in said tank, it being arranged, as shown 65 at Fig. 5, so that the splints o, being held between the belts B' and B² as the latter pass even from off the wheel D, the adjacent ends

of the splints in passing where extended laterally beyond the belts, and while momentarily within the groove of said wheel *d'*, will be 70 tipped with adhering match composition, said dipping-wheel being rotated so as to move with the same speed at its perimeter as that of the downwardly-passing belts that hold the 75 splints. By the continued movement of the said belts the matches are carried onto the drying-pulleys N, and from one to another of the latter until the said belts reach the last ones of said pulleys, (indicated at N² N²), where the said belts separate, and thus re- 80 lease the matches.

The cutting and pressing rollers shown herein operate the same as those that are illustrated and described in our older Letters Patent before named, and these rollers are provided 85 with stripping-fingers that are constructed to run in circumferentially-arranged grooves produced in said rollers to strip the splints from off the latter, as in the older patents named; but the stripping-fingers herein illustrated are differently arranged, in fact that 90 in the older patents named the "stripping-fingers" directed the impelled splints into a horizontal trough, from whence they passed to a concave guideway, while in the mechanism herein shown the fingers are prolonged 95 rearwardly at a sufficient distance apart to produce intermediately a guideway, U, for the splints, and the trough as a distinct factor is omitted. After the belts B' and B² separate at the pulleys N² N², the belt B² at the 100 lower stretch returns to the roller or wheel D, and the belt B', over the return-pulley N², to the roller I.

The connected operation of the mechanism 105 is described as follows: A veneer of wood having the proper thickness and width is passed in between the rollers R' and R² over the guide-platform P, and by the cutting and pressing engagement of the coincident grooves that are 110 formed therein parallel to the axes of the said rollers, the veneer is cut and pressed into splints. At the bottom of the roller R' the fingers *d'* *d'* where within the circumferential grooves G² G² of said roller under-run the 115 splints, so as to strip them from said roller, and the fingers *d²* *d²* of the lower roller, R', perform the same office where within the grooves G² G² of the latter roller. When the splints are thus cut and pressed, they are impelled 120 along by the expelling force of said rollers between the rearward extension of the fingers *d'* of the upper cutting-roller and of the fingers *d²* of the lower cutting-roller through the passage U between the said two sets of fingers until 125 they come under the influence of the belt B', thereat running on the roller I with that stretch of said belt which is nearest to the fingers moving downwardly. As soon as the splints come under the influence of said belt B' they 130 are moved down along and over the guideway C, having the concave surface C², as shown at Figs. 2 and 6. When the splints have reached the rear end of said concave, they are caught

by the belt B² that is thereat moving upwardly on the wheel D, and so that they are firmly held between said belts B' and B². While the two belts and the splints between them are passing down from off the wheel D, the ends of the splints pass into the groove g⁴ of the dipping-wheel d⁴, turning in the tank T', whereby the adjacent ends of the splints as projecting beyond the belts are tipped with composition. From thence the matches are carried on to the drying-pulleys to be discharged from the belts, as before described.

The function of the pulleys N, N², and N³, when combined with the belts B' and B², is merely to keep the belts together, so as to firmly hold the splints and carry them a sufficient distance to dry the composition upon them; to then separate to release the splints, and to in sequence return to the roller I and wheel D, as before described. There may be any number of these pulleys N, and they may be arranged horizontally or in any other way by which they and the belts can co-operate substantially in the same manner to hold and carry the splints.

To facilitate the drying of the splints, the drying pulleys and the belts where running on the latter may be inclosed or housed in, with passages for the ingress and egress of the belts and an opening for the delivery of the finished matches; and said inclosure containing the driving pulleys and belts may be heated by any well-known means to hasten the operation of drying.

By the mechanism thus shown and described matches may be made, dipped, dried, and ready for packing.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. The combination, with the rollers R' and R², each having the grooves G' with intermediate cutting-edges, and the circumferential grooves G² G², said rollers being arranged to operate substantially as described, of the fingers d' d' and d² d², constructed to enter said circumferential grooves, and extended rearwardly to produce the intermediate guide-passage, U, substantially as and for the purposes set forth.

2. The combination of the guide-passage U, adapted to receive match-splints, the guideway C, having the concave surface C² arranged at the rear end of said guide-passage U, the roller I, and the endless belt B', constructed and arranged to operate substantially in the manner as and for the purposes set forth.

3. The combination of the guide-passage U, adapted to receive match-splints, the guideway C, made with the concave surface C² and arranged at the rear end of said guide-passage U, the roller I, arranged to turn within said concave substantially as described; the endless belt B', arranged to be operated by the roller I and to run on a return pulley, the wheel D, the belt B², adapted to run on the latter, and a return pulley, said belts being arranged with reference to each other and said concave guide, substantially as and for the purposes set forth.

4. The combination of the endless belts B' and B², arranged to be operated substantially as described, the dipping-tank T', made with the slot n, and the dipping-wheel d⁴, arranged to be rotated in said tank relatively to the downward movement of said belts, substantially as described.

5. The combination of the splint-delivery passage U, the guideway C, made with the concave surface C², the roller I, adapted to rotate in the latter substantially as described, the wheel D, the pulleys N N² N³, and the belts B' and B², substantially as and for the purposes set forth.

6. The combination of the tank T', made with the side slot, n, and the roller d⁴, adapted to be rotated in said tank with reference to said slot, substantially as and for the purposes set forth.

Signed at Troy, New York, this 5th day of December, 1885, and in the presence of the two witnesses whose names are hereto written.

GEO. E. NORRIS,
WILLIAM E. HAGAN.

Witnesses:

CHARLES S. BRINTNALL.
GEO. A. DARBY.