

No. 778,371.

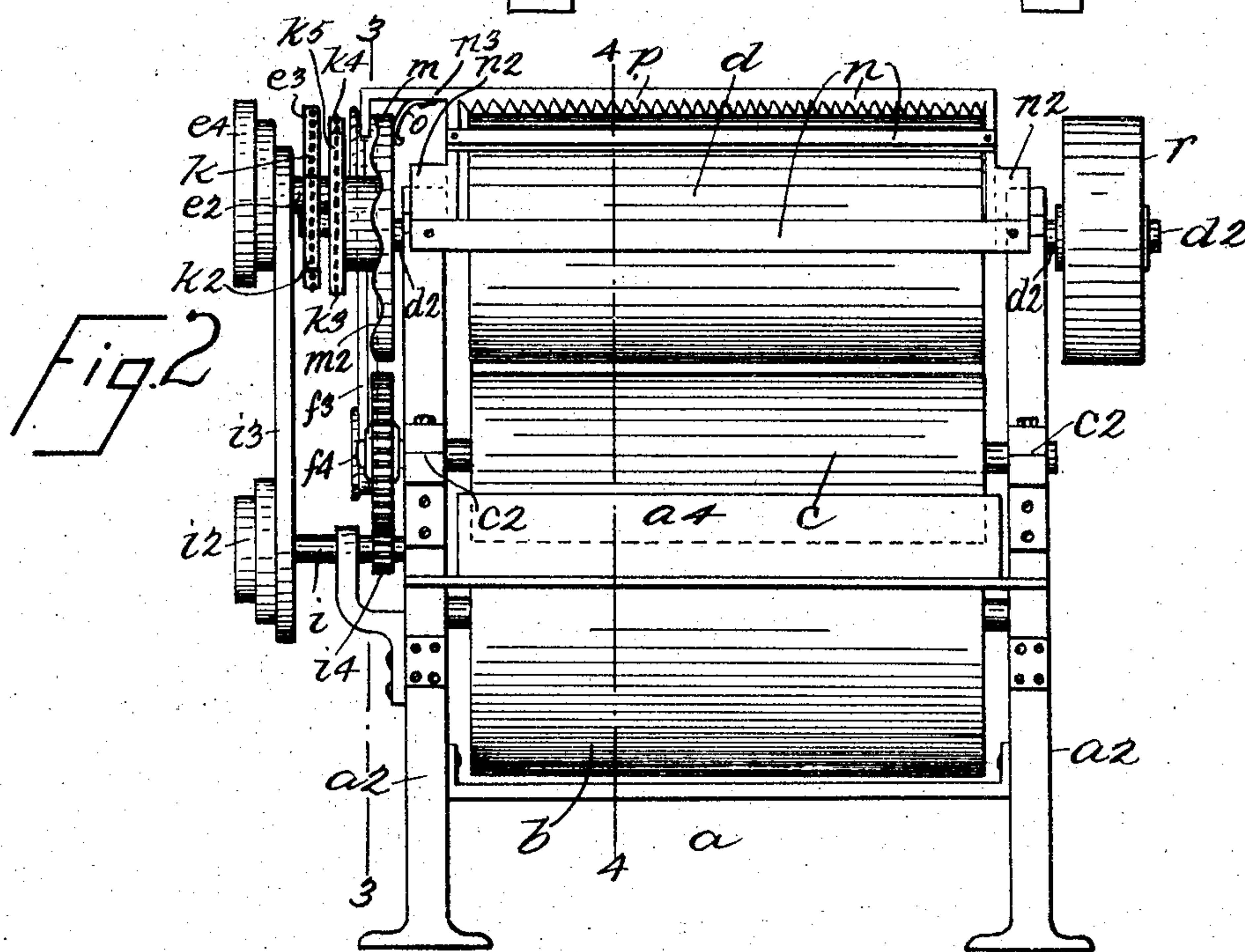
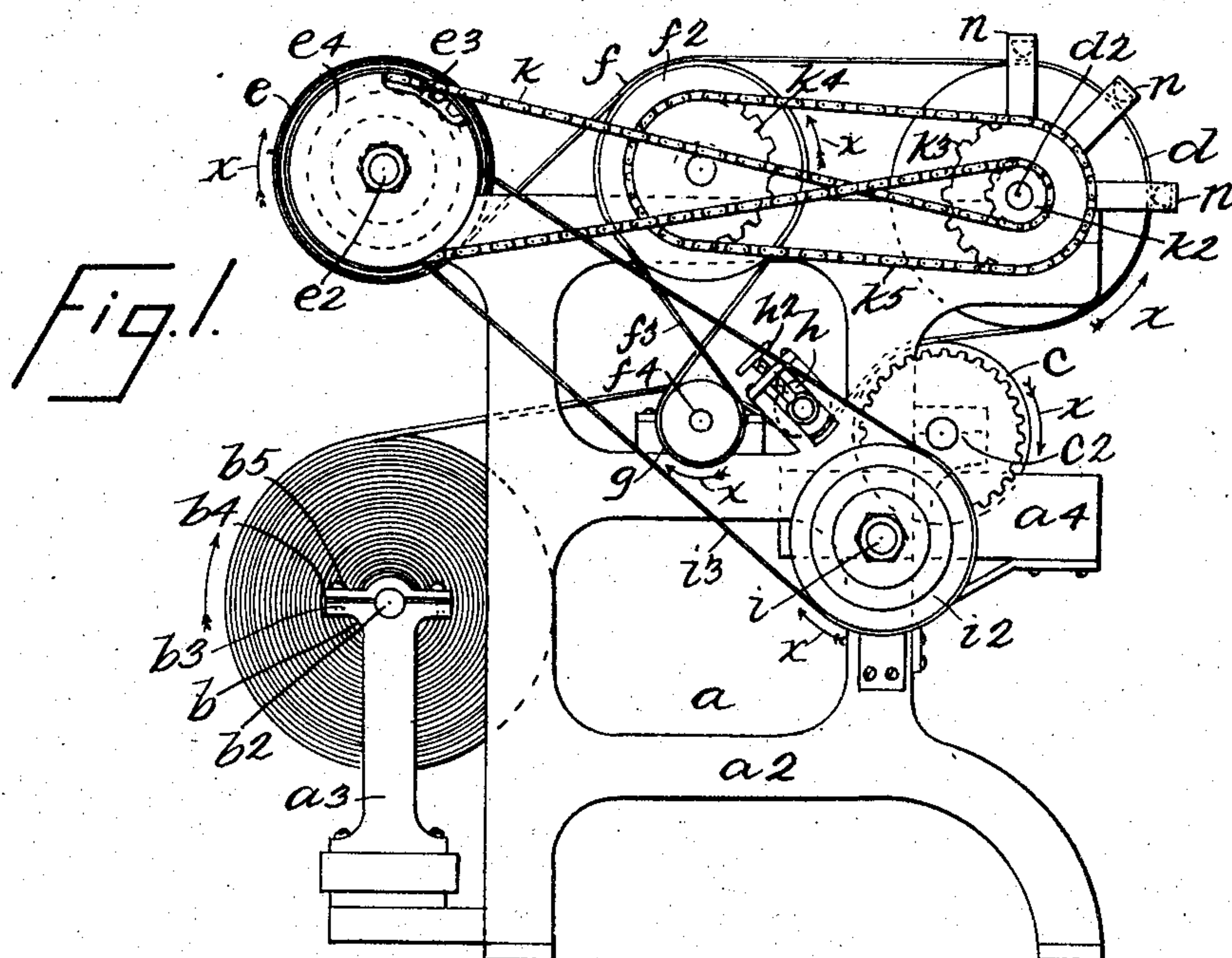
PATENTED DEC. 27, 1904.

W. P. & C. J. PEMBROKE.

CARBON PAPER MACHINE.

APPLICATION FILED JUNE 16, 1903.

2 SHEETS—SHEET 1.



WITNESSES

J. C. Larssen
F. A. Stewart.

INVENTORS

Winfield P. Pembroke
BY and Charles J. Pembroke.

Edgar Tate & Co
ATTORNEYS

ATTORNEYS

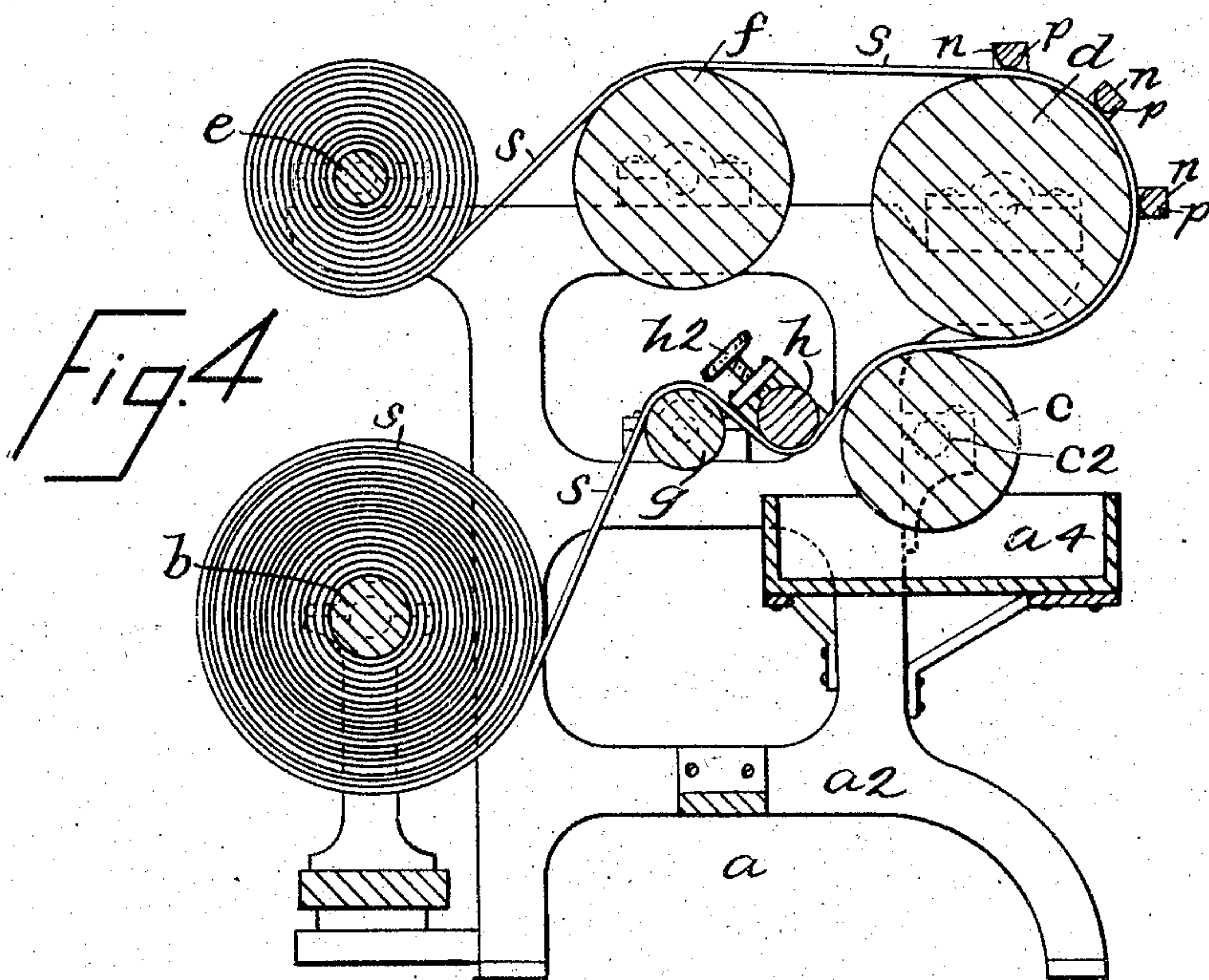
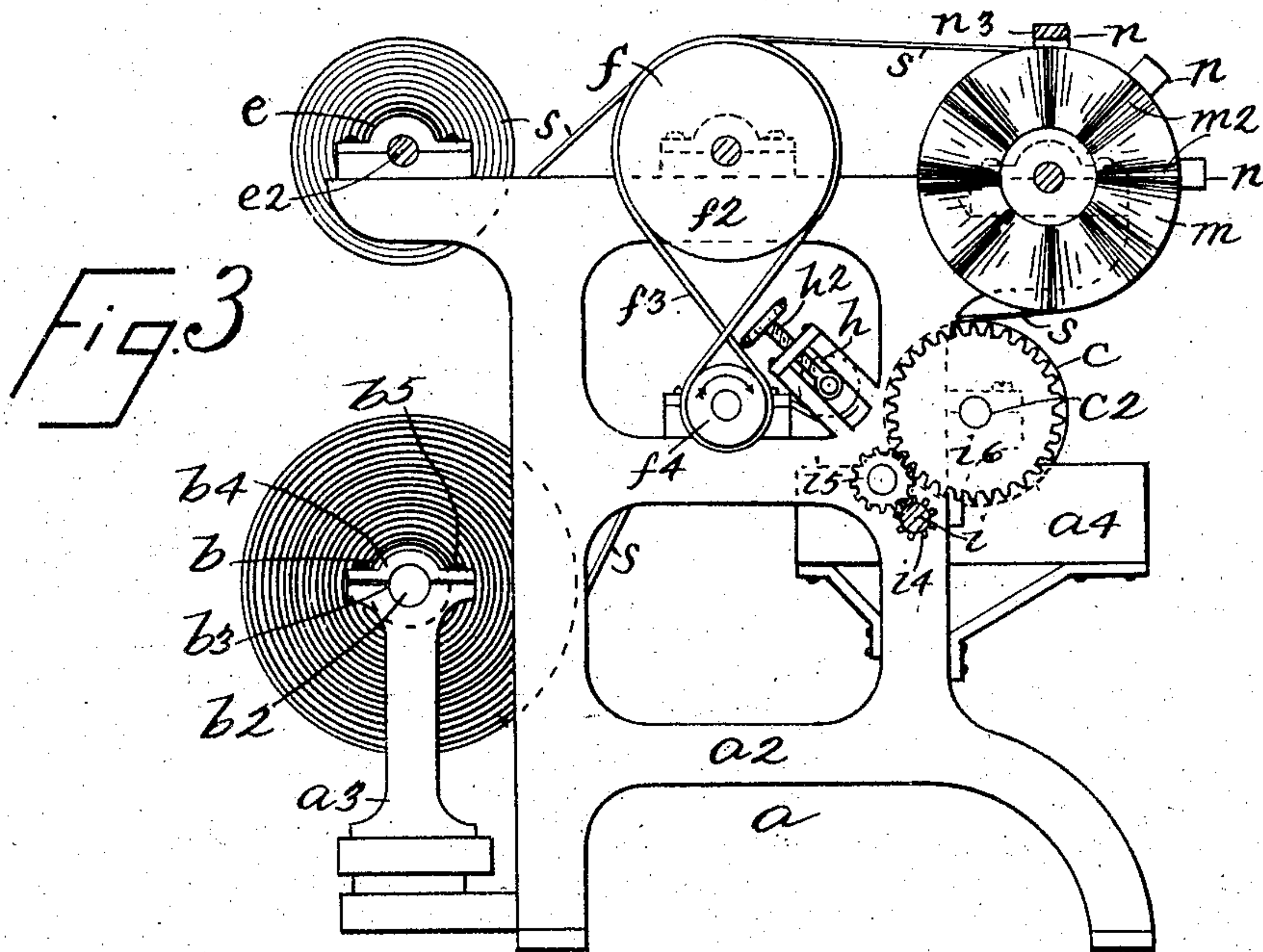
No. 778,371.

PATENTED DEC. 27, 1904.

W. P. & C. J. PEMBROKE.
CARBON PAPER MACHINE.

APPLICATION FILED JUNE 16, 1903.

2 SHEETS—SHEET 2.



WITNESSES

J. C. Larver
F. A. Stewart

INVENTORS

Winfield P. Pembroke and
Charles J. Pembroke.

BY

Edgar Tate & Co

ATTORNEYS

UNITED STATES PATENT OFFICE.

WINFIELD PERRY PEMBROKE AND CHARLES JOSEPH PEMBROKE, OF
ROCHESTER, NEW YORK.

CARBON-PAPER MACHINE.

SPECIFICATION forming part of Letters Patent No. 778,371, dated December 27, 1904.

Application filed June 16, 1903. Serial No. 161,741.

To all whom it may concern:

Be it known that we, WINFIELD PERRY PEMBROKE and CHARLES JOSEPH PEMBROKE, citizens of the United States, residing at Rochester, in the county of Monroe and State of New York, have invented certain new and useful Improvements in Carbon-Paper Machines, of which the following is a specification, such as will enable those skilled in the art to which it appertains to make and use the same.

The object of this invention is to provide an improved machine for coating carbon-paper, removing wrinkles therefrom and preventing the formation of wrinkles therein, and for marking the paper; and with this and other objects in view the invention consists of a machine of the class specified constructed as hereinafter described and claimed.

The invention is fully disclosed in the following specification, of which the accompanying drawings form a part, in which the separate parts of our improvement are designated by suitable reference characters in each of the views, and in which—

Figure 1 is a right-hand side elevation of our improved machine; Fig. 2, a front view thereof; Fig. 3, a sectional side view of the left-hand side of the machine, and Fig. 4 a transverse section of the machine in the position shown in Fig. 3.

In the practice of our invention we provide a main frame *a*, comprising suitable side members *a*², connected in any desired way, and a rear extension *a*³, and in the front lower portion of this frame is mounted a dope-box *a*⁴.

Rearwardly of the main frame and supported by the extension *a*³ is a paper-roll *b*, provided with a shaft or end trunnions *b*², mounted in bearings or supports *b*³, the upper part *b*⁴ of which is held in place by means of screws or bolts *b*⁵, so that friction may be applied to the shaft or trunnion of the paper-roll *b*.

At the front of the main frame and revolvably in the dope-box *a*⁴ is a dope-roll *c*, the shaft or trunnions of which have bearings at *c*², and above the dope-roll *c* and slightly in front thereof is mounted an ironing-roll *d*, having shafts or trunnions *d*².

At the back of the machine and at the top

thereof is a winding-roll *e*, and intermediate of the ironing-roll *d* and winding-roll *e* is a cold-roll *f*. Directly beneath the cold-roll *f* and rearwardly of the dope-roll *c* is a smoothing-roll *g*, and between the smoothing-roll *g* and dope-roll *c* is a tension-roll *h*, the position of which may be adjusted by set-screws *h*² or other suitable devices. The shaft *e*² of the winding-roll *e* is provided with a sprocket-wheel *e*³, as shown in Figs. 1 and 2, and said shaft is also provided with a cone or stepped pulley *e*⁴.

Mounted in the left-hand side of the main frame is a stub-shaft *i*, provided with a cone or stepped pulley *i*², and the pulleys *e*⁴ and *i*² are geared in connection by a belt or band *i*³. The stub-shaft *i* is provided with a pinion *i*⁴, which meshes with a pinion *i*⁵, which operates in connection with a gear-wheel *i*⁶ on the shaft of the dope-roll *c*, and the object of this gearing is to turn the dope-roll in the same direction as the paper-roll *b* in the operation of the machine, as hereinafter described, and the object of the gearing consisting of the cone or stepped pulleys *e*⁴ and *i*² and the belt or band *i*³ is to give the dope-roll *c* a variable speed with relation to the speed of the winding-roll *e*.

Passing over and around the sprocket-wheel *e*³ on the shaft *e*² is a drive-chain *k*, which is crossed intermediate of the winding-roll *e* and the ironing-roll *d* and passed around a pinion *k*² on the shaft of said ironing-roll. The shaft of the ironing-roll *d* is also provided with a sprocket-wheel *k*³, and the shaft of the cold-roll *f* with a similar sprocket-wheel *k*⁵, and passing around these sprocket-wheels *k*³ and *k*⁴ is a drive-chain *k*⁵, and the sprocket-wheels *k*³ and *k*⁴ are of the same size and provided with the same number of teeth; but the sprocket-wheel *k*² on the shaft of the ironing-roll is but one-third of the diameter of the sprocket-wheel *e*³ on the shaft of the winding-roll *e*, the object of this being to give the ironing-roll a speed three times greater than that of the winding-roll. The shaft of the cold-roll *f* is provided with a pulley *f*², which is preferably of the same diameter as the cold-roll itself, and mounted on this pulley is a

belt f^3 , which is crossed between the cold-roll and the smoothing-roll and passed around a pulley f^4 on the shaft of said smoothing-roll, and the diameter of the pulley f^4 is preferably about one-quarter that of the pulley f^2 , whereby the speed of the smoothing-roll g is preferably made four times that of the cold-roll.

The means for marking the paper is of the following construction. A disk m is secured to the shaft of the ironing-roll, and this disk is provided on its outer face with radially-arranged convolutions m^2 , and arranged longitudinally of the ironing-roll and at the front upper portion thereof are bars n , three of which are shown, and these bars are connected in the form of construction shown with segmental boxes n^2 , which rest on the bearings of the shaft d^2 and are movable thereon, and one of said bars is provided with a projecting member n^3 , which projects downwardly radially across the face of the disk m , and said member n^3 is also provided with a spring-finger o , which bears on the inner face of said disk, and as the shaft d^2 is turned the disk m will give the bars n an oscillating movement longitudinally of the ironing-roll. The bars n are provided with longitudinally-arranged and inwardly-directed teeth, needles, or reeds, or similar devices p , which are adapted to bear on the surface of the paper as it passes over the ironing-roll, and this gives the paper in the operation of the machine as hereinbefore described a mark which may be seen when the carbon-paper is held up to the light.

The shaft d^2 of the ironing-roll is the power-shaft of the machine and is provided with a pulley r , to which in practice is applied a band, belt, or similar device, and the machine may be driven by any suitable power.

In practice the paper s is wound on the paper-roll b , and one end thereof is passed over the smoothing-roll g beneath the tension-roll h , over the roll c , in front of and over the ironing-roll d , backwardly over the cold-roll f , and under and around and secured to the winding-roll e . It will be understood that the dope may be placed in the box a^1 at any time, but is preferably placed therein after the paper has been arranged as described, and when the power is applied the ironing-roll d , the cold-roll f , the winding-roll e , the paper-roll b , the smoothing-roll g , and the dope-roll c will be turned in the direction of the arrows w , as shown in Fig. 1, and from this it will be seen that the ironing-roll d and cold-roll f are turned in a direction opposite to that of the other rolls. The smoothing-roll g is intended to take out any wrinkles that may be in the paper s and also prevent the formation of any wrinkles therein, and the object of the tension-roll h is to facilitate this operation and to also give a greater surface of the paper for the dope-roll c to operate upon, this last object being accomplished by placing the tension-

roll h comparatively low. It will also be understood that the paper-roll b is also under tension by means of the bearings thereof, and this tension may be increased or decreased, as desired, and this also aids the smoothing-roll g to accomplish the result for which it is intended. The dope is applied to the surface of the paper as the latter passes over the dope-roll c , and the amount of dope deposited upon the paper and the condition thereof on the paper may be regulated by the speed of the dope-roll, and that speed, as hereinbefore stated, is variable and may be regulated by means of the belt i^3 and the stepped or cone pulleys e^4 and i^2 , and the movement of the dope-roll c in the direction in which the paper is moved also aids in properly distributing the dope on the surface of the paper.

It will be understood that the bars n and their connected parts may be detached whenever necessary in order to pass the paper around the ironing-roll, and said bars may be dropped back into position before the machine is set in motion. It will also be understood that our invention is not limited to the means herein shown and described for giving the bars n a movement longitudinal of the ironing-roll, and any suitable mechanism may be employed for this purpose.

The ironing-roll d is preferably moved at a much greater rate of speed than the dope-roll, as hereinbefore stated, and also at a much greater rate than the speed of the winding-roll, and as the paper passes from the ironing-roll it is held taut and perfectly smooth by the tension device hereinbefore described, and in this operation of the ironing-roll the bars n , as hereinbefore described, are oscillated longitudinally of said roll, and the teeth, fingers, or reeds p on said bars bear on the doped surface of the paper and form thereon the mark hereinbefore referred to, this mark being undulated or wave-like in appearance transversely of the paper. The mark produced in this manner forms no part of the invention herein described and claimed, but is made the subject of a separate application for Letters Patent of the United States filed by us on the 27th day of March, 1903, Serial No. 149,795.

After the paper leaves the ironing-roll it passes from the cold-roll f , the speed of which is the same as that of the ironing-roll, which chills the surface of the paper and thoroughly dries the dope, and from the cold-roll f the paper passes to and is wound on the winding-roll e , from which it may be removed at any time, and this winding-roll e may be of any preferred diameter.

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

1. In a machine of the class described, a frame, a paper-roll mounted therein, a dope-roll, a smoothing-roll mounted between the

paper-roll and the dope-roll, an ironing-roll mounted over the dope-roll, a cold-roll mounted rearwardly of the ironing-roll, and a winding-roll mounted rearwardly of the cold-roll, and means for driving said rolls, substantially as shown and described.

2. In a machine of the class described, a main frame, a dope-roll mounted therein, a smoothing-roll mounted between the dope-roll and the paper-roll, an ironing-roll mounted over the dope-roll, a winding-roll, a cold-roll between the ironing-roll and the winding-roll, and means for giving the dope-roll a variable speed as compared with the speed of the winding-roll, ironing-roll and cold-roll, substantially as shown and described.

3. In a machine of the class described, a main frame, a paper-roll mounted therein, a dope-roll also mounted therein, a smoothing-roll mounted between the dope-roll and the paper-roll, an ironing-roll mounted over the dope-roll, a winding-roll mounted over the paper-roll, a cold-roll mounted between the ironing-roll and the winding-roll and means for giving the smoothing-roll a greater speed than the ironing-roll, the cold-roll and the winding-roll, and devices for giving the dope-roll a variable speed, substantially as shown and described.

4. In a machine of the class described, a main frame, a paper-roll mounted therein, a dope-roll also mounted therein, a smoothing-roll mounted between the dope-roll and the paper-roll, an ironing-roll mounted over the dope-roll, a winding-roll mounted over the paper-roll, a cold-roll mounted between the ironing-roll and the winding-roll, and means for giving the smoothing-roll a greater speed than the ironing-roll, the cold-roll and the winding-roll, and devices for giving the dope-roll a variable speed, and the ironing-roll and cold-roll being also moved at a greater speed than the winding-roll, substantially as shown and described.

5. In a machine of the class described, a main frame, a paper-roll mounted therein, a dope-roll, a smoothing-roll mounted between the dope-roll and the paper-roll, a tension-roll mounted between the dope-roll and the smoothing-roll and below the top surface of the dope-

roll, an ironing-roll mounted above the dope-roll, a winding-roll mounted above the paper-roll, a cold-roll mounted between the ironing-roll and the winding-roll, and means for operating said rolls, substantially as shown and described.

6. In a machine of the class described, a main frame, a paper-roll mounted therein, a dope-roll, a smoothing-roll between the dope-roll and the paper-roll, an ironing-roll mounted above the dope-roll, a winding-roll arranged rearwardly of the ironing-roll, a cold-roll between the ironing-roll and the winding-roll, and a marking device movable longitudinally of the winding-roll, substantially as shown and described.

7. In a machine of the class described, a main frame, a paper-roll, mounted therein, a dope-roll, a smoothing-roll between the dope-roll and the paper-roll, a tension-roll between the dope-roll and the smoothing-roll, an ironing-roll over the dope-roll, a cold-roll arranged rearwardly of the ironing-roll, a winding-roll arranged rearwardly of the cold-roll, and marking devices movable longitudinally of the ironing-roll, substantially as shown and described.

8. In a machine for making carbon-paper, a main frame provided with supports for a paper-roll, a dope-roll mounted in the front of said support, an ironing-roll mounted over said dope-roll, a winding-roll arranged rearwardly of the ironing-roll, a cold-roll between the ironing-roll and the winding-roll, a smoothing-roll between the supports of the paper-roll and the dope-roll, a detachable tension-roll mounted between the smoothing-roll and the dope-roll, and marking devices movable longitudinally of the winding-roll and adapted to bear on the paper as it passes thereover, substantially as shown and described.

In testimony that we claim the foregoing as our invention we have signed our names, in presence of the subscribing witnesses, this 11th day of June, 1903.

WINFIELD PERRY PEMBROKE.
CHARLES JOSEPH PEMBROKE.

Witnesses:

JAMES THOMAS MILLER,
CLARA MAY MEYER.