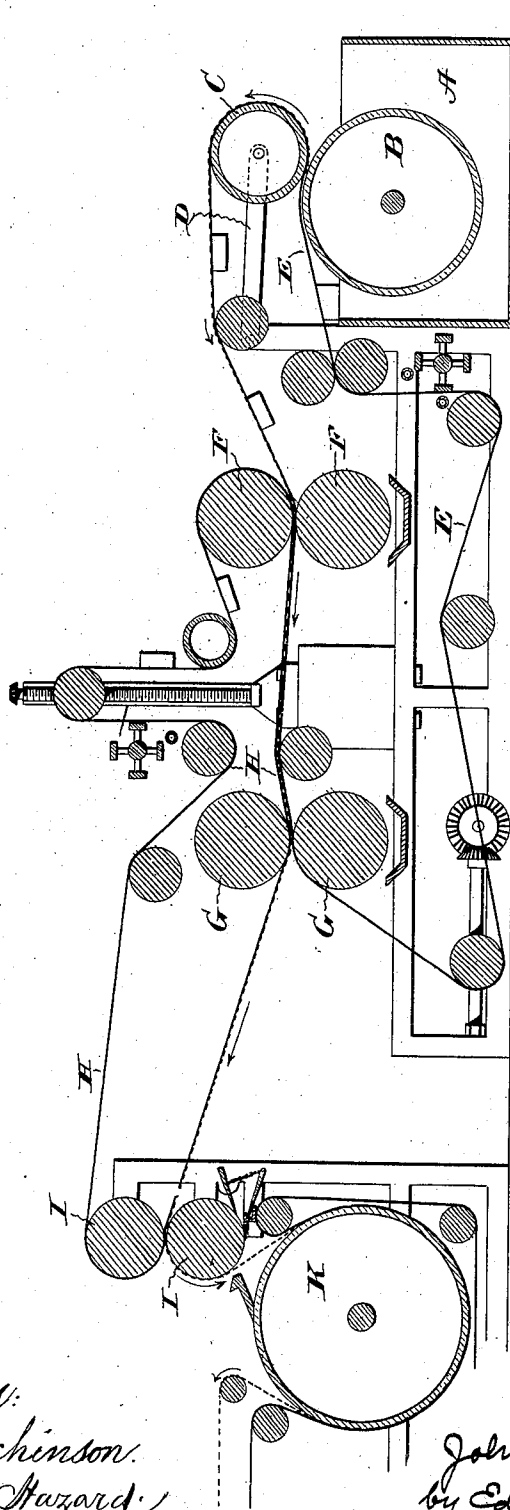


No. 742,259.

PATENTED OCT. 27, 1903.

J. D. TOMPKINS.  
PAPER MAKING MACHINE.  
APPLICATION FILED FEB. 19, 1902.

NO MODEL.



Witnesses:  
Jas. C. Hutchinson.  
Henry C. Hazard.

Inventor:  
John D. Tompkins  
by Edwin J. Prindle,  
his Attorney.

## UNITED STATES PATENT OFFICE.

JOHN D. TOMPKINS, OF VALATIE, NEW YORK.

## PAPER-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 742,259, dated October 27, 1903.

Application filed February 19, 1902. Serial No. 94,803. (No model.)

*To all whom it may concern:*

Be it known that I, JOHN D. TOMPKINS, of Valatie, in the county of Columbia, and in the State of New York, 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 thereof, reference being had to the accompanying drawing, in which the figure is a vertical longitudinal section of a paper-making machine, illustrating one embodiment of my invention.

The object of my invention is to improve the construction of paper-making machines, whereby greater speed in the operation of the same may be secured, likelihood of injury or damage to the paper sheet diminished, economy of time in the operation of the machine effected, and a better product produced; and to this end my invention consists in a paper-making machine having the features of construction substantially as hereinafter specified.

The machine illustrated is a cylinder-machine, having, as usual, a vat A for the dilute pulp, a forming-cylinder B, mounted in the vat, and a couch-roll C, mounted on a swinging frame D above the forming-cylinder. An endless apron E, made, as usual, of felt, runs from the couch-roll to and between a pair of press-rolls F and F, placed one above the other, and thence to a second pair of press-rolls G and G, likewise placed one above the other, and returns to the couch-roll, the arrangement of the apron, press-rolls, and various supporting-rolls being the same as that illustrated in United States Patent No. 668,068, granted February 12, 1901, to myself and William D. Barnes, and therefore not requiring particular description. Also passing between both pairs of press-rolls F and F and G and G is a second apron H, which leaves the apron E at the second pair of press-rolls, and thence passes between a pair of rolls I and I, arranged one above the other, and leaving the upper one of said rolls returns to the upper one of the first pair of press-rolls F and F, where it again meets the apron E.

It will be understood that in the operation of the machine thus far described the pulp will be taken from the forming-cylinder B

by the apron E and carried by the latter to the first pair of press-rolls and then lying between the said apron E and the apron H will be carried to and between the second pair of press-rolls and adhering to the under side of the upper apron H will be carried onward by the same alone to the rolls I and I. I make the apron H of rubber and not of felt, as heretofore, as I have discovered that the employment of such an apron is very advantageous and desirable, as will be hereinafter fully set forth.

The rolls I and I are separating-rolls to separate the sheet of pulp from the apron H, the sheet leaving the latter and passing over the lower roll to and around the drying-drum K, the arrangement of said rolls relative to the drum and the necessary parts to cooperate therewith being the same as in the patent hereinbefore referred to, and therefore not needing to be specially described herein. The lower roll I is of metal, with a polished surface.

It will be seen that the rubber apron H performs the dual function of a protector or shield to the sheet of pulp and a conductor or conveyer therefor operating in the construction shown, first, as a conductor in connection with the lower felt apron to carry the sheet from the first to the second press-rolls and then serving alone as a conductor to convey the paper sheet to the drier, the sheet being made to adhere to its under side by the pressure received from the press-rolls. For the performance of these functions a rubber apron is specially well fitted. Because of its greater density and smoother surface it constitutes a better protector or shield than does a felt apron to the delicate or fragile wet sheet from the press-rolls. Because of its greater softness and elasticity it is better for both the paper and the felt apron, the latter being subjected to less wear than is the case where both aprons are of felt. Less pressure being required from the press-rolls to expel water from the pulp, it follows that flattening of the strands of the felt and closing of the meshes thereof due to excessive pressure are avoided. Thus the life of the felt apron is prolonged, and as the interstices or meshes thereof are maintained in a condition which will permit the free passage of water there-

through the machine can be run at a higher speed and with greater safety to the paper sheet than is the case where both aprons are of felt. As the rubber apron conforms to the meshes or interstices of the felt apron under the pressure of the press-rolls the expression or expulsion of water from the sheet of pulp is more easily and expeditiously effected than is the case where both aprons are felt. In the use of paper-stock—such as straw, ground wood, and old waste paper—there adheres to a felt apron more or less matter from the stock—such as dirt, chemicals, &c.—which if not removed by frequent washing of the apron accumulates until it damages the paper by the making of holes therein. This characteristic of a felt apron is also objectionable since it necessitates running the machine at a lower speed than is desirable. I have found that an apron of rubber takes up from the pulp much less of these objectionable substances than one of felt, so that with a rubber apron less washing of the apron is required and the machine can be run faster and with less danger of injury to the paper. By reason of its greater durability an apron of rubber does not have to be renewed as often as one of felt, and thus the use of the machine is less interfered with by renewal of aprons, and loss of time required to renew the aprons is avoided. Having a smooth surface, the rubber apron produces a smooth surface on the side of the sheet in contact with it, and as the other side of the sheet passes in contact with the polished metal surface of the lower separating-roll I it follows that the paper sheet when delivered to the drier has both of its sides smooth.

I wish it to be understood that by the use of the term "rubber" I do not restrict myself to an apron composed wholly of rubber, but include in such term any material containing rubber, whether it be in the form of a fabric having a layer of rubber or one with rubber otherwise applied or one composed wholly of rubber and any material that possesses the characteristics of and is the equivalent of rubber.

Though I illustrate my invention as embodied in a cylinder-machine, it can of course be embodied in machines of other types and of varied construction.

Having thus described my invention, what I claim is—

1. In a paper-making machine, the combination of a paper-pulp-carrying apron of rubber, and means for subjecting the pulp to pressure, the apron being interposed between the pulp and the pressure-applying means, substantially as and for the purpose described.

2. In a paper-making machine, the combi-

nation of press-rolls, and a paper-pulp-carrying apron of rubber passing between the rolls and beyond the same, substantially as and for the purpose described.

3. In a paper-making machine, the combination of a former, press-rolls, a drier, and an apron of rubber passing between the press-rolls and from the same to the drier, substantially as and for the purpose described.

4. In a paper-making machine, the combination of an apron pervious to water, an apron of rubber, the pulp being carried by and between said aprons, and means for subjecting said aprons to pressure to expel water from pulp lying between them, substantially as and for the purpose described.

5. In a paper-making machine, the combination of an apron pervious to water, an apron of rubber, the pulp being carried by and between said aprons, and two sets of press-rolls between which said aprons with pulp lying between them successively pass, substantially as and for the purpose described.

6. In a paper-making machine, the combination of a former, press-rolls, a drier, a lower apron pervious to water passing between the press-rolls, and an upper apron of rubber passing between the press-rolls and running contiguous to the drier, substantially as and for the purpose described.

7. In a paper-making machine, the combination of a former, two pairs of press-rolls, a drier, an apron pervious to water, and an apron of rubber, said aprons passing successively between the press-rolls with pulp lying between them, and the rubber apron running to a point contiguous to the drier, substantially as and for the purpose described.

8. In a paper-making machine, the combination of a pulp-carrying apron having a smooth surface, and a roll having a smooth surface with which the pulp has contact on the side opposite to that in contact with the apron, substantially as and for the purpose described.

9. In a paper-making machine, the combination of a former, press-rolls, separating-rolls, a drier, an apron pervious to water, and an apron of rubber above the other, both of said aprons being passed between the press-rolls, and the rubber apron alone running between the separating-rolls, substantially as and for the purpose described.

In testimony that I claim the foregoing I have hereunto set my hand this 11th day of December, 1901.

JOHN D. TOMPKINS.

Witnesses:

JOHN BUSBY,

WILLIAM A. SPRINGSTEEN.