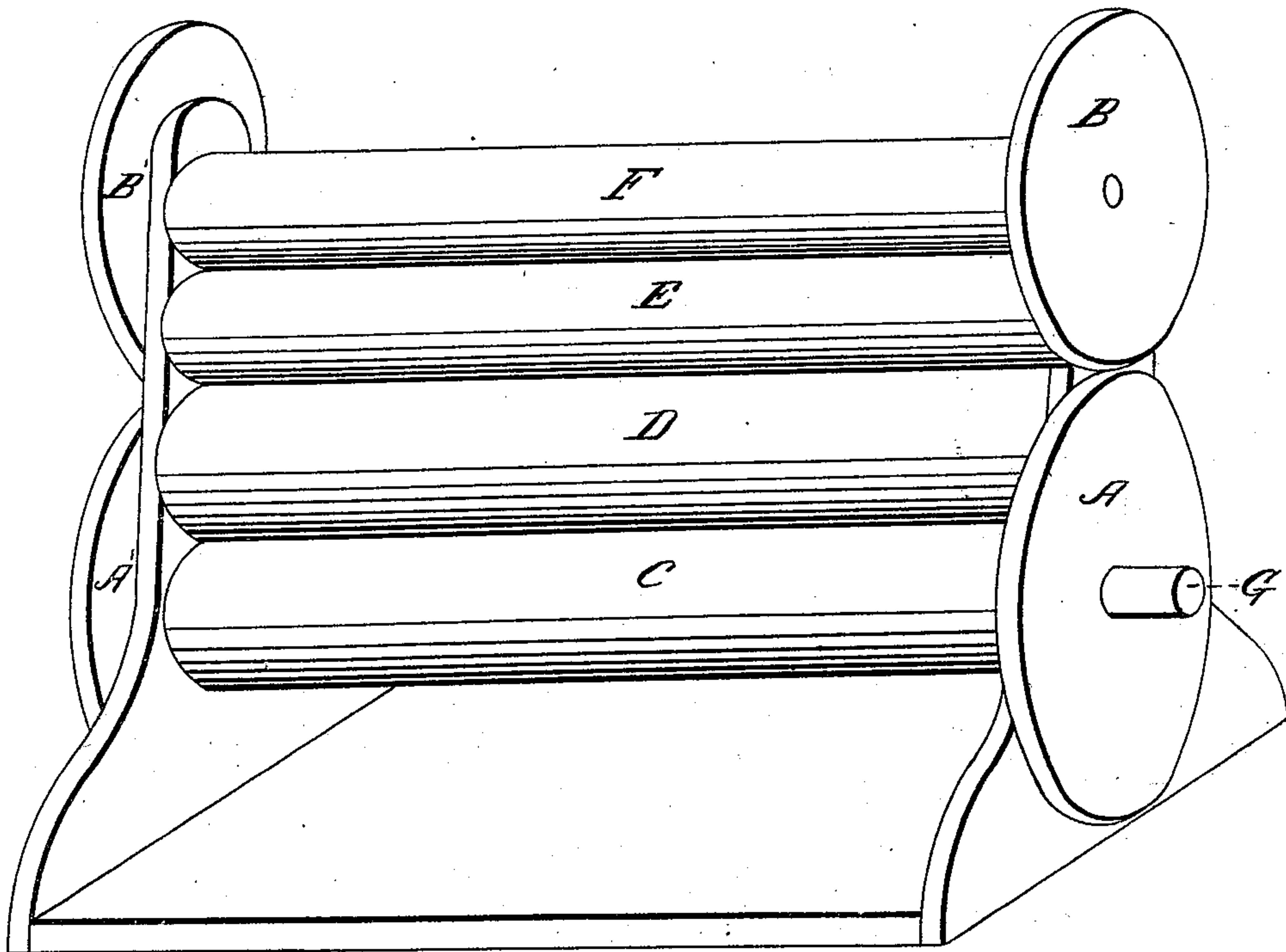


*Harding & Soley*  
*Calendering Mach.*  
*N<sup>o</sup> 87,044. Patented Feb. 16, 1869.*



*Witnesses:*

*George E Buckley*  
*William Kinley*  
*H*

*Inventors:*

*William W Harding*  
*Wm H Soley*



WILLIAM W. HARDING AND WILLIAM H. SOLEY, OF PHILADELPHIA, PENNSYLVANIA.

*Letters Patent No. 87,044, dated February 16, 1869.*

**IMPROVED FRICTION-CALENDER FOR PAPER AND OTHER FABRICS.**

The Schedule referred to in these Letters Patent and making part of the same.

*To all whom it may concern:*

Be it known that we, WILLIAM W. HARDING and WILLIAM H. SOLEY, of Philadelphia, Pennsylvania, have invented a new and useful Improvement in Friction-Calenders for Paper and other Material; and we do hereby declare the following to be a full and exact description of the same, reference being had to the annexed drawing, forming a part hereof, which represents a perspective view of our improvement.

Our invention consists in attaching to the outer ends of the bottom and top rolls, two friction-wheels, to give an unbroken, uniform rubbing or friction to the paper or material.

Hitherto it has been endeavored to accomplish this result by the use of cogs or gear-wheels, but the action in such case was not uniform, and the paper was unequally pressed; and marked by the irregular action of the cog-gears as it worked.

By the use of friction driving-pulleys, as shown in the drawing, this difficulty is overcome, and an even and continuous motion is given to the rolls.

In the drawing—

A A' B B' represent the friction driving-pulleys, the outer circumferences or surfaces of which are covered with rubber, leather, wood, or any other suitable material, to cause a driving adhesion or friction.

C represents a large driving-roll, made of iron, say eighteen inches in diameter.

D is an intermediate roll, made of iron or compressed paper, and

E is a compressed-paper roll.

F is a friction-roll, made of iron or steel, and driven by friction-pulleys B B', at each end, which are in contact, and which, in their turn, are driven by friction-wheels A A', the power being applied by a belt and pulley, at G, in the usual way.

The advantage of this arrangement is, that a uniform, continuous motion is given to the upper roll at all times.

Having thus described our invention,

What we claim, and desire to secure by Letters Patent, is—

The combination of the calender-rolls C, D, E, and F, and the contact friction-driving pulleys A B, or A' B', for driving the upper roll.

WILLIAM W. HARDING.  
WM. H. SOLEY.

Witnesses:

GEORGE E. BUCKLEY,  
W. F. DAWSON.