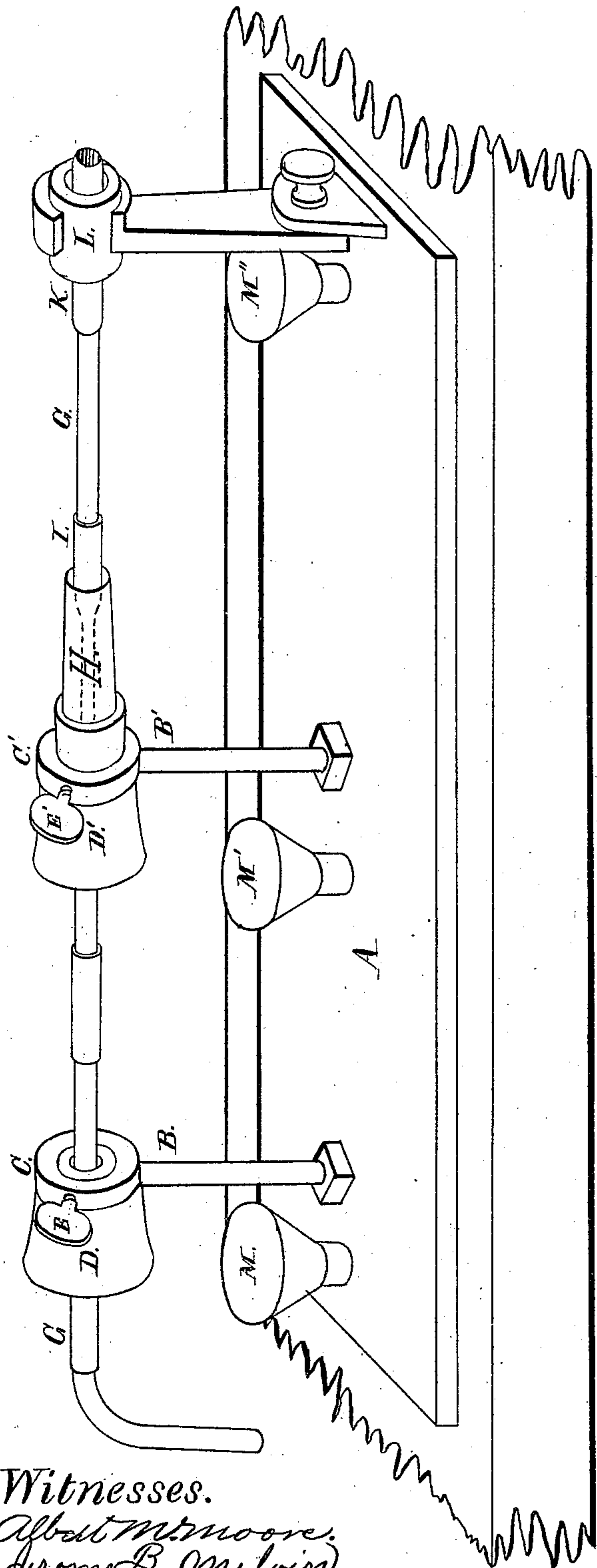
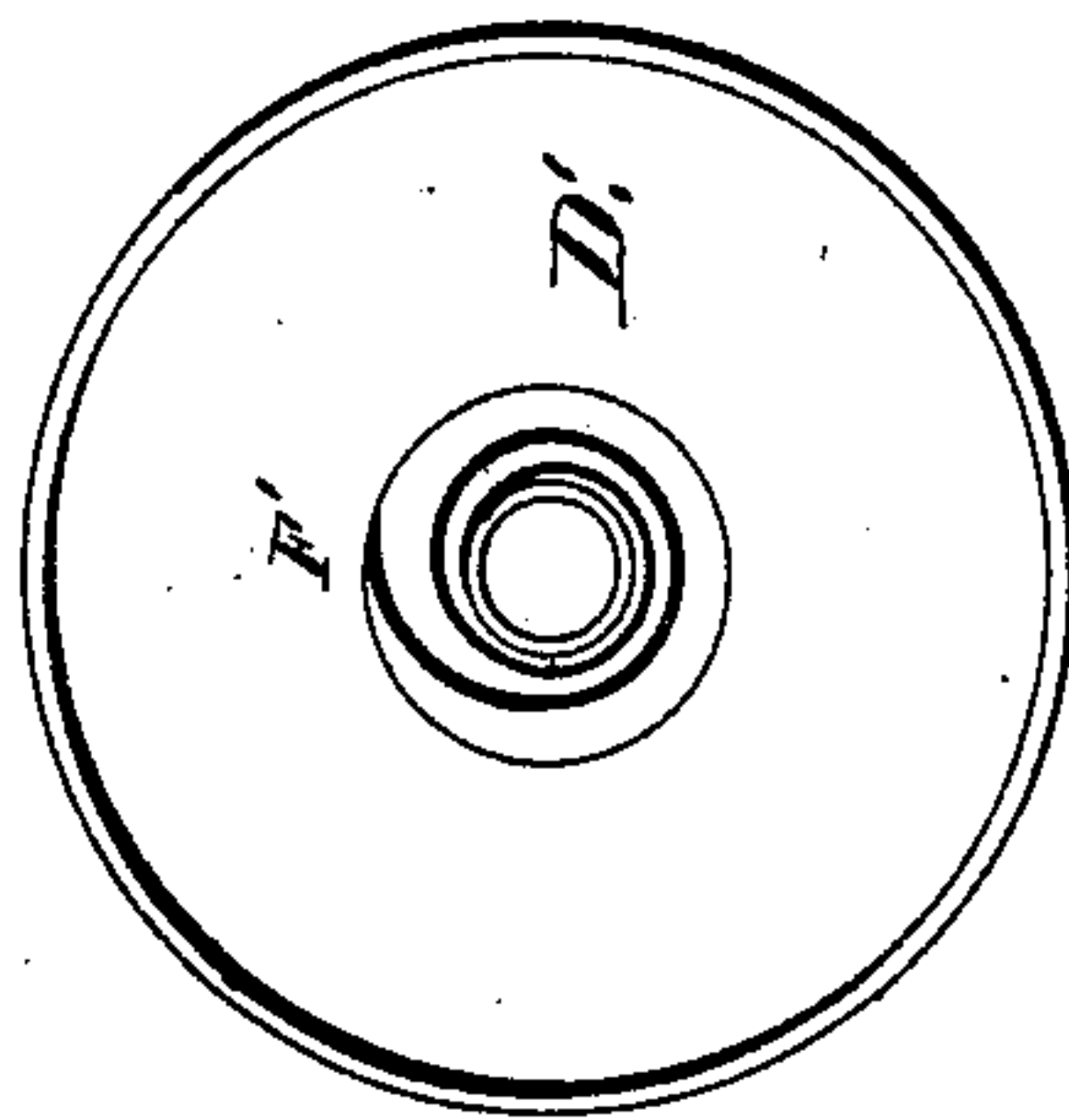


PAPER COP TUBE MACHINE.

Patented May 9, 1876.



*Fig. 1.*



*Fig. 3.*

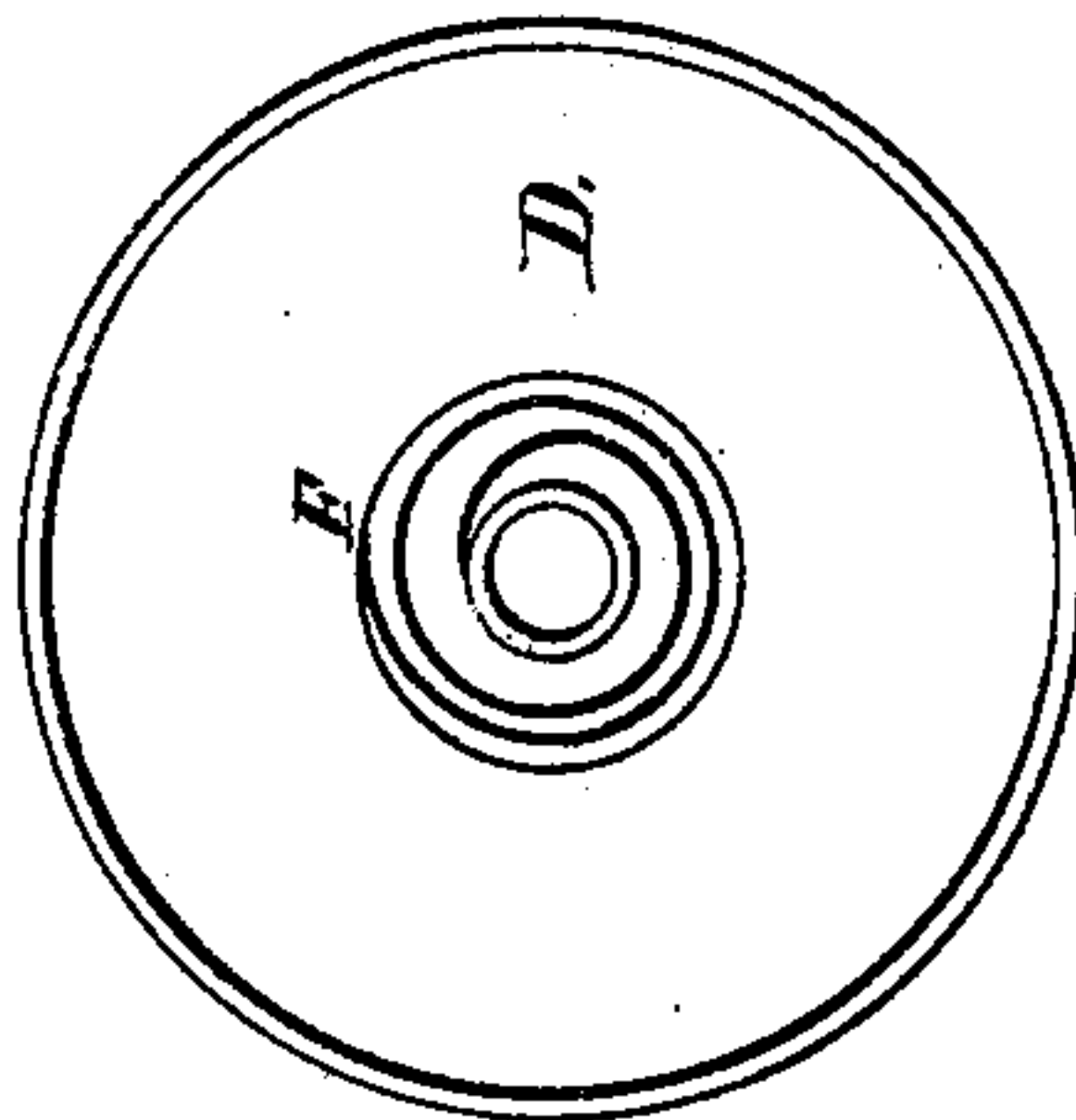


Fig. 2.

*Witnesses.*

Albat Moore.  
Jerome B. Melvin

*Inventor*

Luther Smith

# UNITED STATES PATENT OFFICE.

LUTHER SMITH, OF LOWELL, MASSACHUSETTS.

## IMPROVEMENT IN PAPER-COP-TUBE MACHINES.

Specification forming part of Letters Patent No. **177,167**, dated May 9, 1876; application filed July 6, 1875.

*To all whom it may concern:*

Be it known that I, LUTHER SMITH, of Lowell, in the county of Middlesex and Commonwealth of Massachusetts, have invented certain Improvements in Machines for Making Paper Cop-Tubes, of which the following is a specification:

My invention consists, first, in the combination, with the mandrel, of a coiled ribbon of sheet metal, which serves to roll the paper into such a form that it may readily be closed into a tube; and, second, in the combination, with said mandrel and coiled ribbon, of a conical tube, to press the different coils or layers of paper together; and, thirdly, in the new and improved process hereinafter described.

The accompanying drawings represent my invention, Figure 1 being a longitudinal view of the same, Fig. 2 representing the sheet-metal coil which rolls the paper into such a shape that said paper may readily be formed into a tube, and Fig. 3 representing a finer coil of the same construction.

A is the bed of the machine. Into the bed A are fastened uprights B B', which support metallic rings C C', into which rings are set other metallic rings or tubes D D', the latter being held in place by set-screws E E'. Ribbons of sheet metal F F', stiff enough not to be moved by the paper, are secured at their outer ends to the inside of said tubes D D', and at their inner ends to the outside of the hollow mandrel G, after coiling a sufficient number of times about said mandrel. The number of times the coils pass around the mandrel is determined by the number of coils or layers which are intended to be given to the paper. The tubes D and D', and the coils contained by them, are essentially alike, the second tube and coil completing the work of the first, and the two coils serving as guides to the paper. With very wide paper three or more coils may be used. After the paper passes through the coil F', it goes through the conical former H, which closes the lap of the paper, and makes a tube of it. The former H is a conical tube, having its large end secured to the rear end of the tube D', and surrounding the mandrel G. There is

just space enough between the former H and a boss, I, on said mandrel, partly within the small end of said former, to allow the paper to pass between said former and said boss. Between said boss I and the boss K at the end of said mandrel G, the diameter of said mandrel is diminished to avoid friction of the paper on the mandrel. The boss K is larger in diameter than the boss I, and serves to stretch the tube to its proper size, or, in other words, to take the stretch out of it. The socket L is for the usual purpose of smoothing and finishing the outside of the paper tube. The tunnels M M' M'' catch the superfluous paste that drips from the paper as it passes through the coils and the socket. The paper tube is made in lengths from strips of paper, to which paste is applied in the usual manner, and the paper is drawn through the coils by the clamps now in use.

The tube made on the above-described machine is constructed from a single strip of paper, wide enough to go around the mandrel at least twice, and lap, and is of uniform diameter, so that a double thickness of paper is secured without leaving angular ridges on the tube where the paper is lapped, as is the case where two or more strips are used, or where very thick paper is used, and the two edges are very slightly lapped.

My machine works with less friction than any other known to me, is simple, and cannot get out of order readily.

I claim as my invention—

1. The combination of the mandrel G and the coil F, as and for the purpose specified.
2. The combination of the mandrel G, one or more coils, F F', and the former H, as and for the purpose specified.
3. The process herein described of forming a paper tube from a single strip of paper, by drawing said paper through a coil surrounding a mandrel, as and for the purpose herein described.

LUTHER SMITH.

Witnesses:

ALBERT M. MOORE,  
JEROME B. MELVIN.