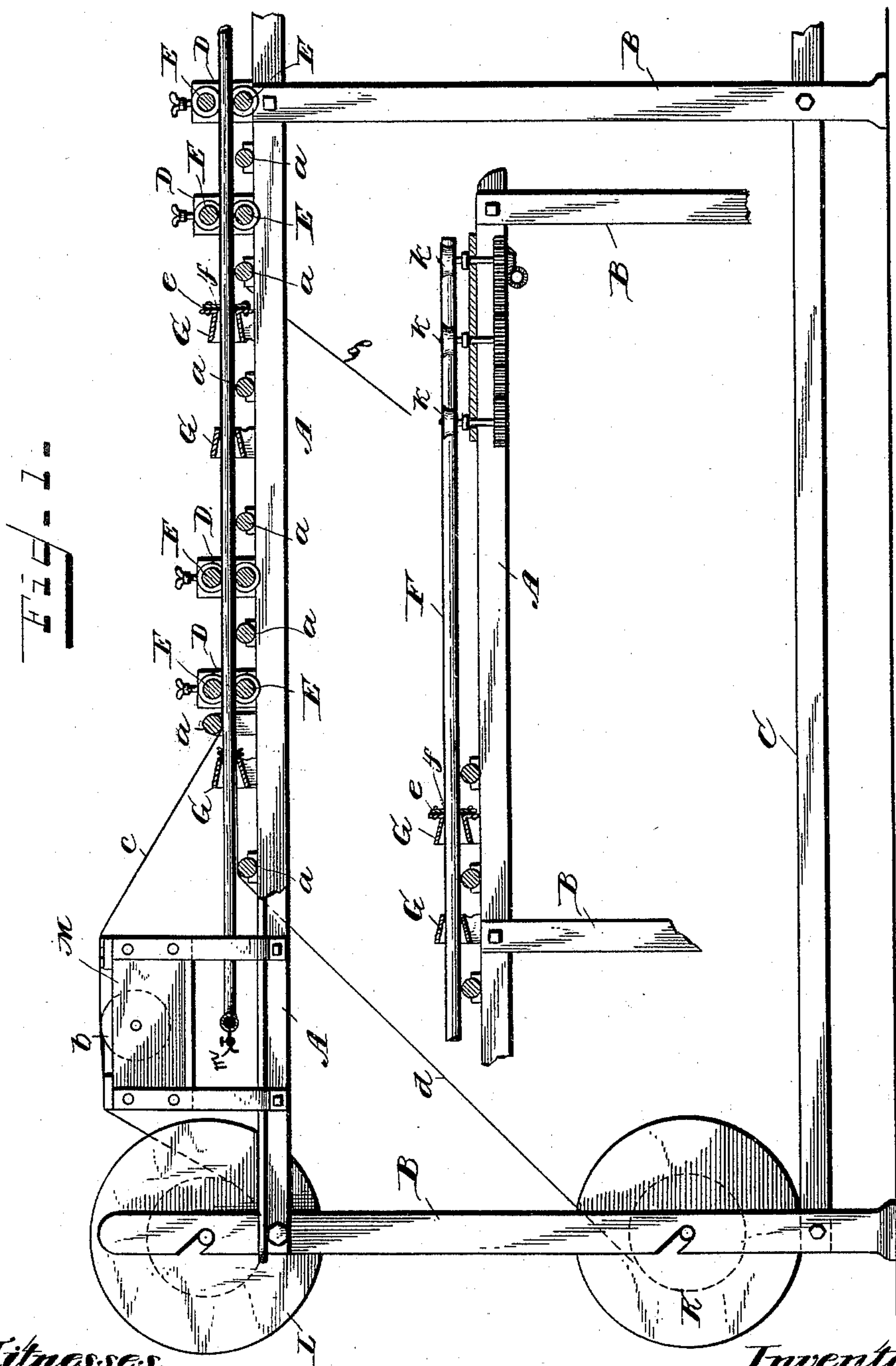


P. CAREY.
MACHINE FOR MAKING PAPER TUBES.

No. 488,384.

Patented Dec. 20, 1892.



Witnesses.

Alfred M. Allen
George Kidman

Inventor

Philip Carey

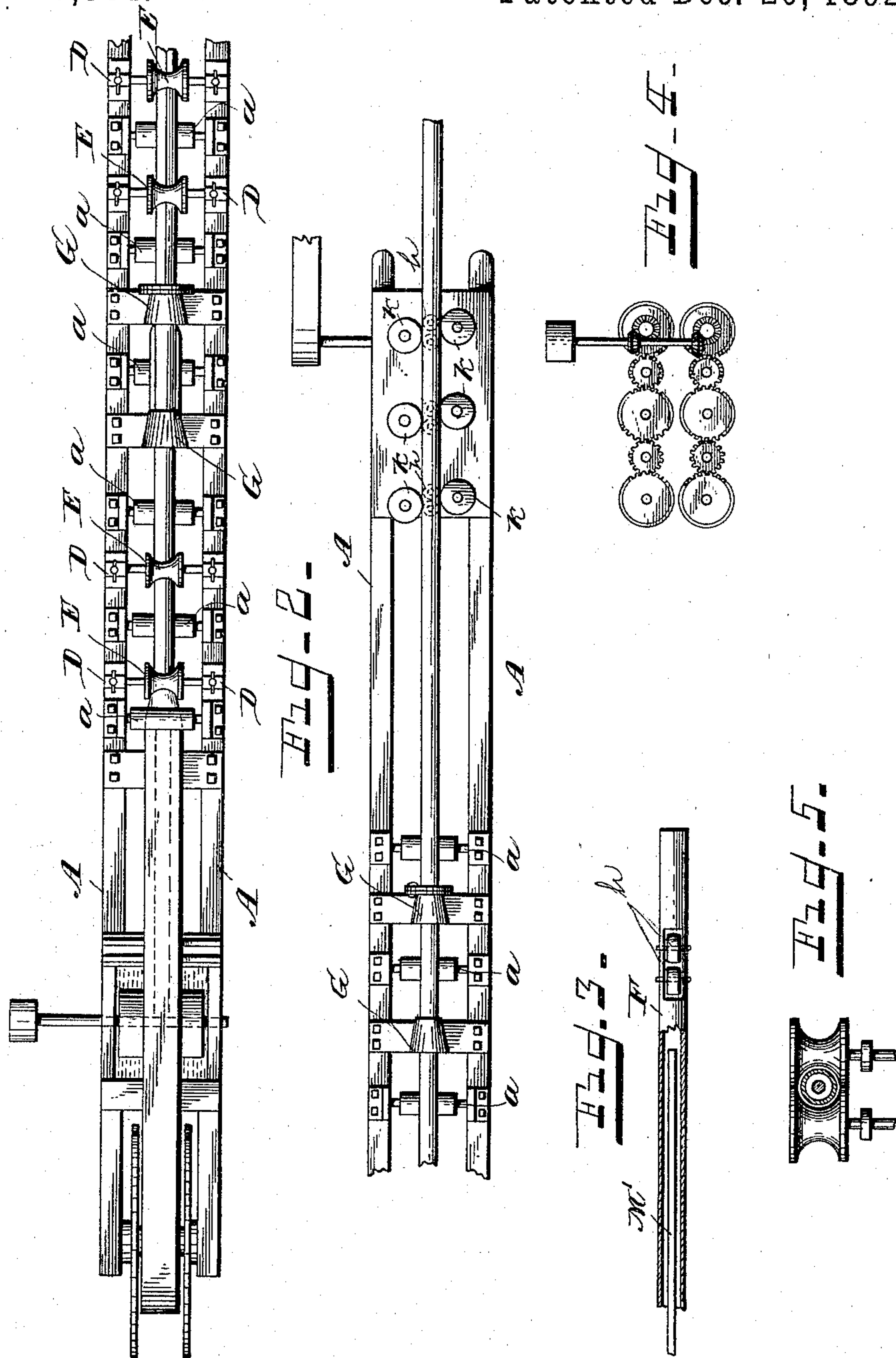
(No Model.)

2 Sheets—Sheet 2.

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Inventor:

White Canyon

UNITED STATES PATENT OFFICE.

PHILIP CAREY, OF CINCINNATI, OHIO.

MACHINE FOR MAKING PAPER TUBES.

SPECIFICATION forming part of Letters Patent No. 488,384, dated December 20, 1892.

Application filed November 25, 1890. Serial No. 372,611. (No model.)

To all whom it may concern:

Be it known that I, PHILIP CAREY, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Machines for Making Paper Tubes, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming
10 part of this specification.

My improvements relate to machines for making continuous paper tubes in which the seams thereof run longitudinally and consist of a new and improved construction and arrangement of parts to be hereinafter more particularly pointed out and claimed.

In the drawings:—Figure 1, is a side elevation of my machine the central portion being broken away and the forming rollers and funnels being in cross section and while the delivery end of the machine is shown underneath the supply end in order to economize space in the drawings. Fig. 2, is a top plan view of same. Fig. 3, is a side view of the
25 delivery end of the pipe on which the tubes are formed, partly in longitudinal section to show the inner steam pipe. Fig. 4, is a bottom plan view of the gearing used to operate the feeding rolls. Fig. 5, is an end view of a
30 modified form of feeding rolls.

My paper tubes are formed on a pipe which extends longitudinally between various forming rolls and funnels. The operating parts are supported in a frame work consisting of
35 two horizontal parallel tracks or beams A, A, which are supported at various intervals by the perpendicular beams B, B, the frame work being further braced by the bars C, bolted to the beams B, B. Journaled in journal boxes D, D, D, secured to each track at
40 suitable intervals, are the forming rollers E, E, E. These rollers are shaped to fit around the pipe F, as shown in Fig. 2, with their edges approaching each other on each side of
45 the pipe. This pipe F runs lengthwise of the machine from end to end, and upon this pipe the paper tubes are formed. At suitable intervals preferably alternating with every two pairs of forming rolls, are the funnels or cone
50 shaped formers G, G, G, securely bolted to the track A, A. Guiding rolls *a, a, a*, are

also arranged at proper points and journaled in supports bolted to the tracks B, B.

The paper for making the tubes is supplied from the paper rolls K, L, which are supported in spools journaled in the supporting
55 beams B.

M, is a box for holding paste or other adhesive material, in which is a roller *b* and the paper strip *c*, from roll L, is passed over the
60 roller *b* so as to come in contact with this roller *b* and be supplied with paste therefrom. The paper *d* from roll K passes up over the guide roll *a* and into the funnel G, where it is folded up around the pipe the strip
65 being of such a width as to just allow its edges to meet on top of the pipe. This strip of paper is passed first into the machine and the pipe is made slightly smaller at the first funnel G, and the first forming rollers E, E, in
70 order that the edges of the strip may come together very closely around the pipe. This lower strip being started first through the machine, the strip *c* from roll L, after passing over the paste roll is then brought down
75 under guide roll *a* and between the forming rolls E, where it is turned down over strip *d*, both strips of paper being of a width to just encircle the former pipe. In order to more
80 perfectly press the strips of paper together several of the funnels are provided at their narrow ends with rubber collars *e*, firmly secured thereto by plates *f*, these collars surround and press firmly against the paper
85 passing along the former and thus assist materially in forming a smooth and perfect tube.

It will be understood that when a tube of greater thickness is desired as many strips of paper may be added thereto as needed. I have shown a third strip *g* and as other strips
90 are required, they can readily be arranged to be fed to the machine alternately from above and below, so that each additional strip will cover the seam left by the preceding one, and leave a seam on the opposite side and with
95 these succeeding strips a paste box must be suitably arranged to supply paste thereto, just as paste is supplied to strips *c*. At the delivery end of the pipe F, I provide means for feeding or drawing off the finished tube.
100 Within the pipe are journaled the pairs of wheels *h, h*, the periphery of one wheel of

each pair extending slightly beyond the external surface of the pipe on one side and the periphery of the other on the other side. Against these wheels *h, h*, the pair of grooved wheels *k, k*, bear one on one side and the other on the other. These outside wheels I preferably cover with leather, rubber or other suitable material to produce greater friction and at the same time not mar the paper tube. By means of the system of gearing shown in Fig. 4, or any other convenient arrangement these wheels *k, k*, are operated by shaft and pulley. The paper tube as it is formed, comes along the pipe between these sets of grooved wheels, and the wheels in the pipe and is drawn along by the friction clutch between the wheels, while the peripheries of the wheels being smooth the paper tube is in no way marred thereby. I use as many sets of these feeding or drawing rolls as may be desired for the character of tubing being manufactured.

In Fig. 5, I have shown a modified form of feeding rolls in shape like my forming rolls, which on being revolved by suitable gearing, draw the tube along by their friction against the pipe. Much difficulty has been experienced in the manufacture of paper tubes in drying them properly; in the ordinary manufacture the tubes after being formed in the machine, have to be removed and dried in a separate compartment for that purpose, which rehandling necessarily increase the cost.

In order to dry the tubes during the process of manufacture, I supply steam to the former pipe *F*, but as a part of this steam necessarily condenses, means must be employed to remove the water of condensation and to let out the waste steam. The live steam entering the forming pipe at the supply end of the machine, it is manifest that there will be little or no condensation at that end, but that condensation will take place more freely at the other or delivery end of the pipe *F*. To exhaust this dead steam and water through the ordinary steam cocks in the pipe *F* would be impractical as the removal of such water of condensation would interfere with the proper working of the machine. In order to overcome these defects, I place in the pipe *F* a small steam pipe *M'* which is open at its inner end and extends the full length of the pipe, coming out through the pipe *F* at the front end where a cock *m* lets off the condensed water and waste steam. This cock can be op-

erated without interfering in any way with the operation of the machine and thus the pipe *F* be kept full of good live steam at all times. The steam being supplied at the supply end of the machine and the pipe being plugged up at the delivery end to prevent the escape of the steam. When the cock *m* is opened the waste water and steam will be blown out through the small pipe *M'* by the pressure of the live steam as it enters the pipe *F* exactly as it would be through an ordinary steam cock at the delivery end of that pipe *F*, but such latter arrangement would be impractical as I have already pointed out, interfering with the operation of the machine. By the use of this arrangement I am thus enabled to thoroughly dry my tubes in the process of manufacture, and in forming the tube with the seams on opposite sides running longitudinally of the pipe, I produce a new paper tube of any length desired and much more durable and stronger than the spirally wound tubes. Upon the delivery of the tube from the machine, it is then cut up into any desired lengths by means of a saw, not shown in the drawings, operated in any well known mechanical way.

Of course it will be understood that I do not wish to be limited to the shape of funnels shown as various other forms could be used to accomplish the same results by being larger at one end and smaller at the other in order to turn the paper or other material while being formed.

Having thus described my invention, what I claim and desire to secure by Letters Patent, is:—

1. In a machine for making paper tubes, the combination with a series of forming rollers of a series of funnels, forming pipe running directly through the same, and rubber collars pressing around said pipe, substantially as shown and described.

2. In a machine for making paper tubes, the combination with a series of forming rolls and funnels, of a steam pipe running between the same, upon which the tubes are to be formed and a small pipe within said steam pipe, opening therein at its further end and running longitudinally through the same, to carry off the condensed water and waste steam, substantially as shown and described.

PHILIP CAREY.

Witnesses:

ALFRED M. ALLEN,
GEORGE HEIDMAN.