Sheet 1. 4 Sheets.

W. J. Innis.
Corn Tube.

No. 50,204. Patented Sep. 26, 1865.

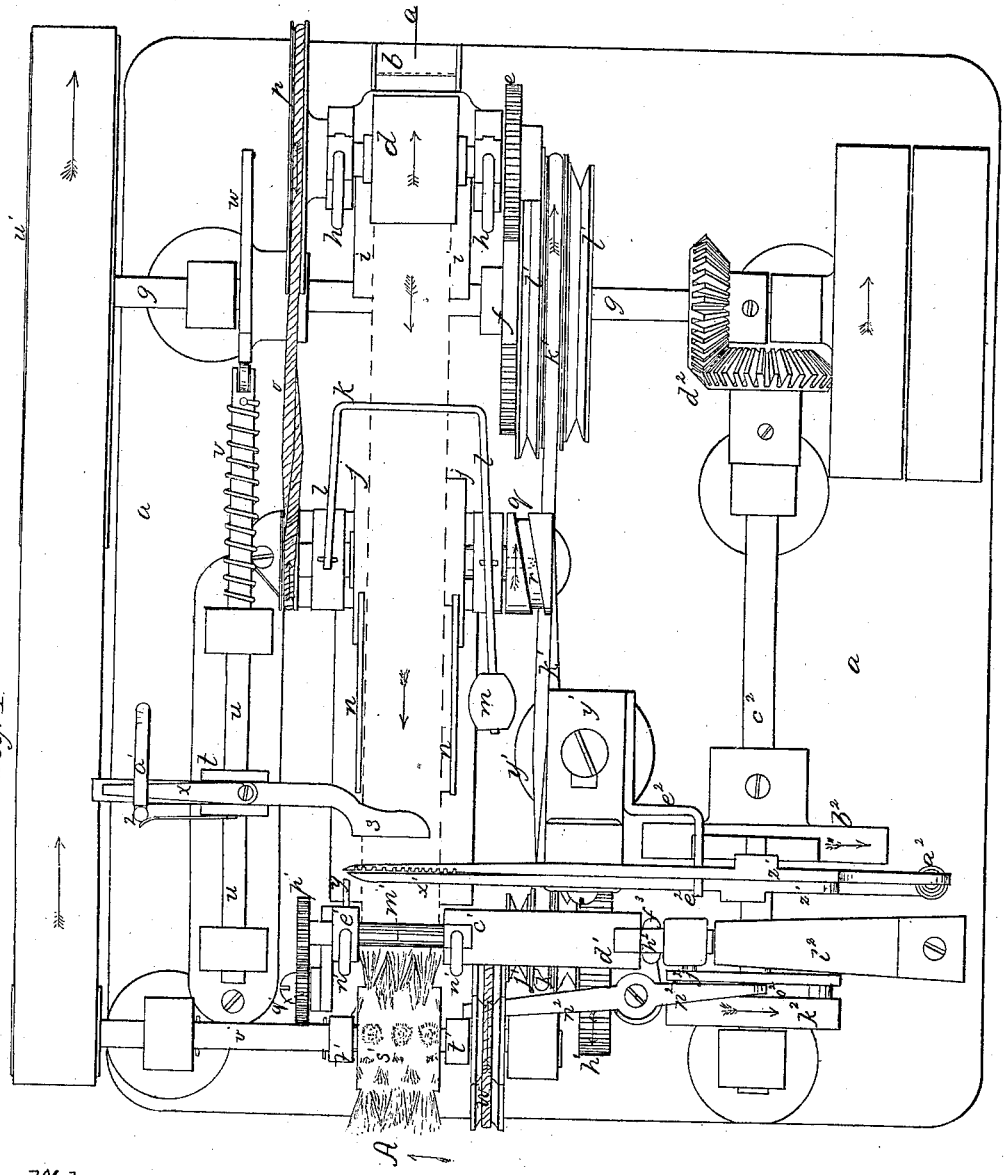

Fig. 1

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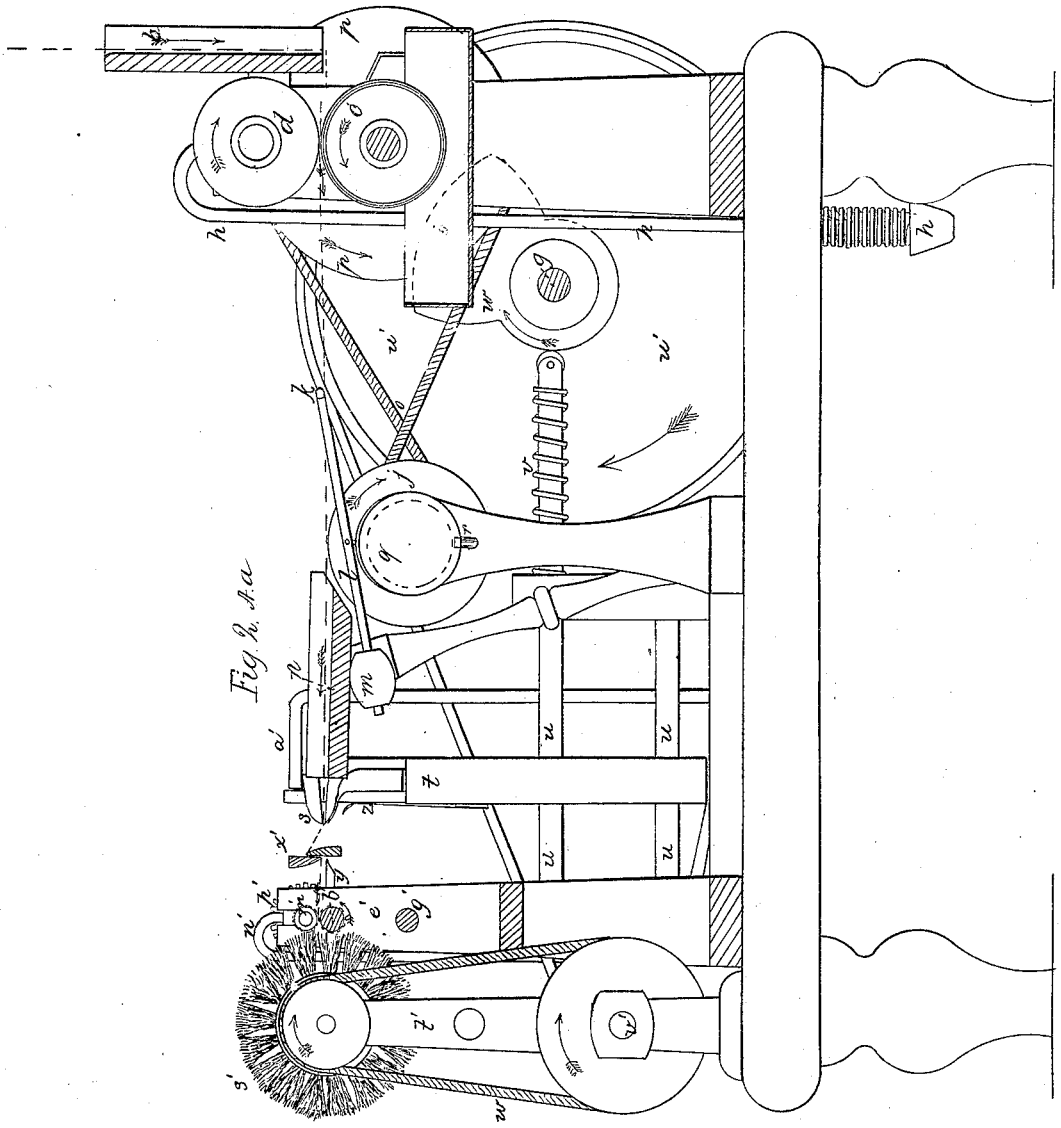

Fig. 2. Side

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Fig. 4.

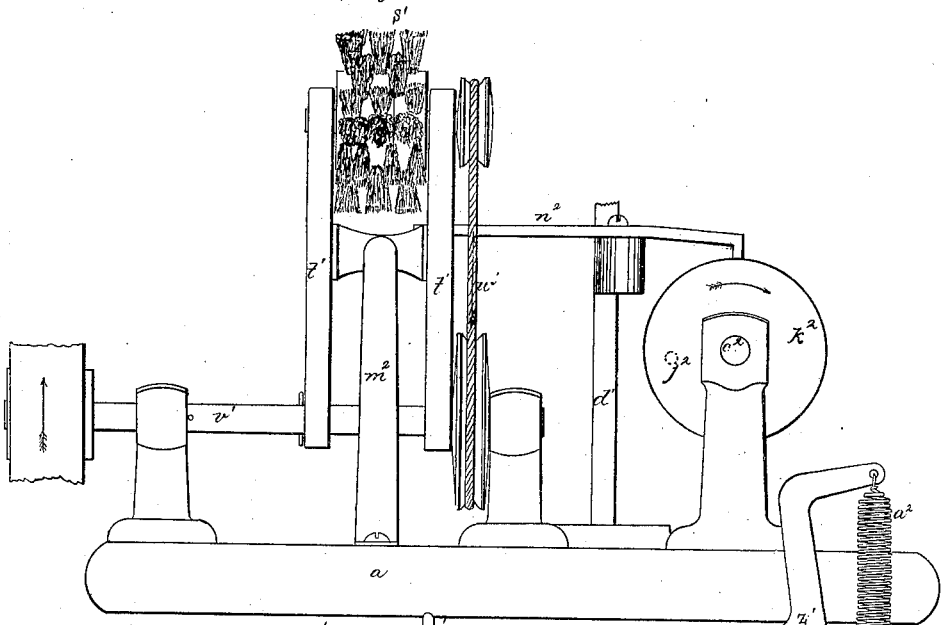
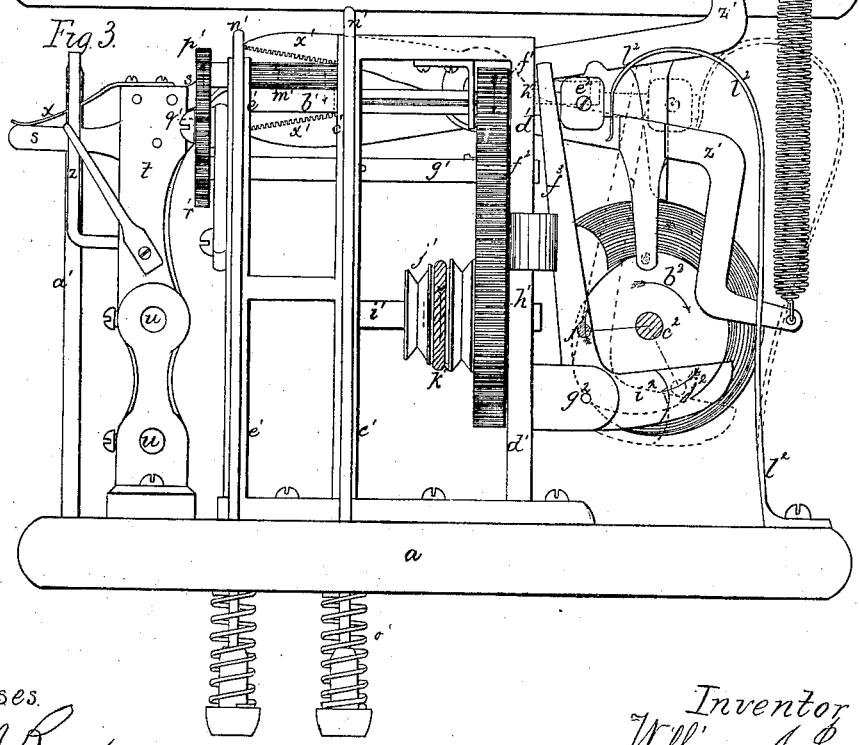


Fig. 3.



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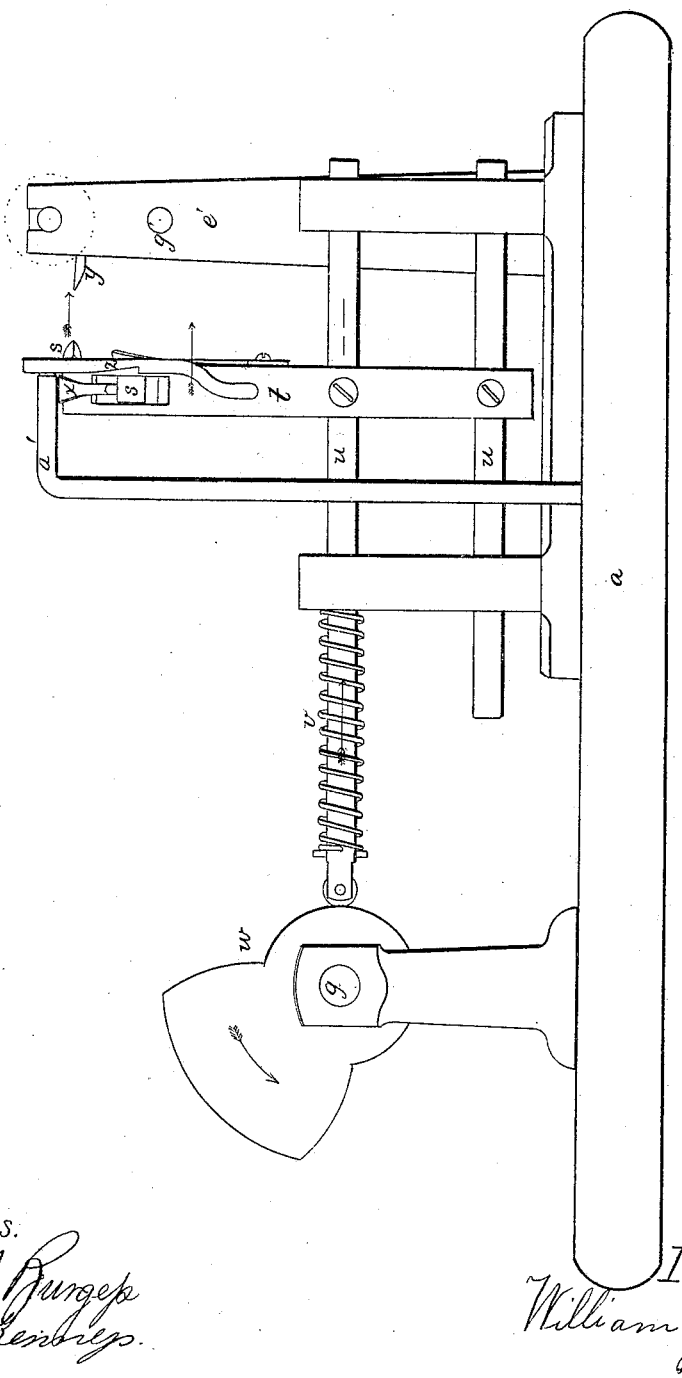

Fig. 5.

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UNITED STATES PATENT OFFICE.

WILLIAM J. INNIS, OF PROVIDENCE, RHODE ISLAND, ASSIGNOR TO A. BURGESS & CO., OF SAME PLACE.

IMPROVEMENT IN MACHINES FOR MAKING PAPER COP-TUBES FOR SPINNING-MACHINES.

Specification forming part of Letters Patent No. **50,204**, dated September 26, 1865.

To all whom it may concern:

Be it known that I, WILLIAM J. INNIS, of Providence, in the State of Rhode Island, have invented a new and useful Machine for Making Paper Cop-Tubes; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, making part of this specification, in which—

Figure 1 is a plan; Fig. 2, a vertical section taken at the line A *a* of Fig. 1; Fig. 3, an elevation of the front end of the machine, with the brush and its appendages for turning down the end of the paper and for knocking off the formed paper tubes removed; Fig. 4, an elevation of the said brush with its appendages; and Fig. 5, a separate view of the nippers, with the mechanism by which they are operated.

The same letters indicate like parts in all the figures.

In spinning cops which are to be taken from the spindles and transferred to shuttles it has long since been found convenient and economical to slip a short paper tube onto the lower part of the spindle, and the lower part of the cop in spinning is formed on this paper tube, so that the tube forms part of the cop, and is drawn from the spindle with it, and prevents the disturbance of the threads and the production of waste in transferring the cops from the spindles to the shuttles. These paper cop-tubes have heretofore been made by hand at considerable expense, and my said invention relates to machinery for making them.

In the accompanying drawings, *a* represents a suitable frame. The paper, of the required width, is, for convenience, wound on a drum, to be therefrom presented to the machine. The paper so presented, or in any other suitable manner, passes down a channel-way, *b*, which guides it to the bite of a pair of rollers, *c d*. The shaft of the lower roller, *c*, carries a cog-wheel, *e*, which receives an intermittent motion from a cogged sector, *f*, on the main driving-shaft *g*, driven by any suitable motor, the length of the sector being such as to give the roller *c* at each operation the requisite range of motion to feed or advance the length of paper required for making one cylinder, and then to let it stop until the cylinder is completed.

The upper roller, *d*, is a smooth cylindrical pressure-roller, borne down by rods *h h*, having helical springs or equivalent means for making the requisite pressure to insure the feeding in of the paper. The lower part of the roller *c* runs in paste or other suitable cement contained in a vat, *i*, and its periphery is grooved, the better to take the required quantity of paste, carry it up, and apply it to that surface of the paper which passes in contact with it. From the feed-rollers the strip of paper passes to and over a distributing-roller, *j*, covered with cloth or other equivalent substance, and on its way to this roller it passes under a balance-bar, *k*, which keeps it smooth and even. This bar is on arms *l l* hung on pivots, one of them having a weight, *m*, which nearly balances the bar, that it may make but slight pressure on the strip of paper; and from the distributing-roller the paper passes over a table, *n*, with sides which act as guides to keep it in line. The distributing-roller *j* turns in opposite direction to the feed motion, and receives this motion by a cross-band, *o*, from a band-wheel, *p*, on the shaft of the feed-roller *c*; and while the distributing-roller rotates, the better to distribute the paste on the under surface of the paper, it vibrates endwise, which motion it receives from a cam-groove in the periphery of a wheel, *q*, on its shaft, the said cam-groove running on a fixed stud or pin, *r*, attached to the frame. As the forward end of the sheet of paper is advanced a short distance beyond the front end of the table *n* it is griped a little back of the forward end by a pair of feeding-nippers, *s*, attached to the upper part of a sliding frame, *t*, composed, for convenience of construction, of a vertical bar, *t*, and two parallel horizontal bars, *u u*, which latter are fitted to slide accurately but freely in holes in two standards of the frame *a*. One of these bars has a helical spring, *v*, wound around it, the tension of which forces and keeps the end of the bar provided with a friction-roller against the periphery of a cam, *w*, on the main driving-shaft, and the form of this cam, as represented, is such as to cause the nipper to be moved back at the proper time to gripe the paper, and then to be advanced to present the end of it to the mechanism which forms the cylinder.

The upper jaw of the nippers is permanently attached to the bar *t* of the sliding frame, and

the lower jaw is pivoted in a mortise through the said bar, and extends some distance beyond the bar to form a handle by which to open and close the nippers. They are closed by the tension of a spring, x, and opened by a wedge, y, which projects from that part of the main frame in which the machinery for forming the cylinders is mounted, so that as the nippers approach this part of the machinery the wedge y enters between the two nippers and depresses the lower jaw to liberate the paper, and as they must remain open during their back movement preparatory to taking a fresh gripe, they are held open by a spring-catch, z, which snaps under the handle when the lower jaw is depressed by the wedge y. At the end of the back movement the lower jaw is liberated to gripe the paper by the spring-catch z striking a stop, a'.

The paper tubes are formed on a mandrel, b', which is mounted to rotate and slide endwise in standards c' d', and when rotating that portion of its length on which the paper is rolled up extends beyond the standard c' to a slight socket in a third standard, e. The other end of it is adapted to slide in and is feathered to a pinion, f', by which it is rotated, the said pinion receiving motion from a like pinion, j^2, on a parallel shaft, g', mounted below it in the three standards c' d' e'; and the pinion f^2 receives motion from a cog-wheel, h', on a shaft, i', mounted in the standards c' d', and this shaft carries a cone of pulleys, j', driven by a band, k', from a cone of band-wheels, l', on the main driving-shaft.

Above the mandrel there is a fluted roller, m', to make pressure on the paper as it is being wound upon the mandrel. The journals of this pressure-roller are fitted to boxes which are adapted to slide in the standards c' e', and are borne down to make pressure by rods n' n', provided with springs o' o' or equivalent weights. This pressure-roller is rotated in an opposite direction to the mandrel by a train of pinions, p' q' r', the latter being on the shaft g', before described. As the nippers advance and present the end of the strip of paper it is griped in the bite of the mandrel and pressure-roller and drawn in between, and as it projects beyond them it is bent down to make it wind around the mandrel by the rotation of a brush, s', mounted in a frame, t', and which receives rotary motion from a belt-wheel, u', on the main shaft, which drives a small shaft, v', which in turn drives the brush by a band, w'. So soon as the requisite length of paper has been supplied, and just before the rolilng up on the mandrel is completed, the required length of paper is cut off by a pair of shears, x', placed between the mandrel and the table n. The two blades of the shears are pivoted to a standard, y', and their handles z' z' are drawn together to close the shears to cut off the paper by a helical spring, a^2, and they are opened immediately after and kept open until the next cutting operation by an external and an internal cam, b^2, on the shaft c^2, which receives motion from the main driving-shaft by bevel cog-wheels d^2. There is a stop, e^2, between the two handles z' z' to limit the closing of the blades. (See Fig. 1, and shown by dotted lines in Fig. 3.)

I prefer to serrate the cutting-edges of the shears, as that leaves the edges of the paper in a better condition to paste down than if cut smooth. After the winding has been completed the mandrel is drawn out of the paper tube so formed, and that is effected by a lever, f^3, which vibrates on a fulcrum-pin at g^2, its upper end being forked to embrace a collar, h^2, on the outer end of the mandrel, and its tail-end i^2 being acted upon at the proper time by a tappet-pin, j^2, projecting from the face of a wheel, k^2, on the shaft c^2, before described. As the mandrel is drawn out the face of the standard c' acts as a stop to prevent the formed paper tube from following it; but as the formed paper tube, thus liberated by drawing out the mandrel, is liable to adhere to the fluted pressure-roller, it is necessary to knock it off before the mandrel is forced back to its working position by a spring, l^2, which bears against its outer end. The tube is knocked off by the rotating-brush, which for this purpose has a reciprocating motion from and toward the mandrel. For this purpose the frame t', which carries the brush, is mounted at its lower end on the shaft v', so that it can vibrate thereon. It is forced toward the mandrel by the tension of a spring, m^2, (see Fig. 4,) and it is moved back by a lever, n^2, which receives motion for that purpose from a cam-groove, o^2, in the periphery of the wheel k^2 on the shaft c^2, before described. By this means, at the time the mandrel is drawn out of the tube, the cam-groove o permits the brush to be forced by its spring against the formed tube to knock it off and into a suitable receptacle, completed.

It will be obvious to any competent machinist, from the foregoing, that some parts of the said invention may be dispensed with by substituting equivalents, and, therefore, I wish it to be distinctly understood that I do not limit my claim of invention to the employment of all the above-described parts in connection, nor to the specially-described mode of construction, as this may be variously changed, so long as the mode of operation is retained.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. The combination of the rotating and sliding mandrel with the pressure-roller, su b - tially as described, for rolling up and discharging the tubes, as set forth.

2. The combination of the rotating and sliding mandrel and pressure-roller with the reciprocating motion of the brush, or equivalent therefor, substantially as described, for discharging the paper tubes when completed.

3. The combination of the rotating mandrel and pressure-roller to roll up the paper with the rotating brush, substantially as described,

whereby the end of the paper, when introduced, is caused to lap around on the mandrel, as set forth.

4. The reciprocating nippers, in combination with the rotating mandrel, substantially as described, and for the purpose of properly presenting the paper to the mandrel, as set forth.

5. The combination of the shears or the equivalent thereof, substantially as described, to cut off the length of paper required for each tube, with the feeding mechanism for moving the sheet of paper, and the mandrel for winding up the paper, as set forth.

6. The combination of the rollers for feeding the paper and applying paste thereto, the vibrating roller for distributing the paste on the face of the paper, and the mandrel for forming the paper tubes, substantially as described.

7. The combination of the rollers for feeding and applying paste to the paper, the roller for distributing the paste, the shears for cutting off the length of paper required for each roll, the reciprocating pinchers, and the mandrel for winding up the paper, or the equivalents of all or any of them, as described.

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Witnesses:
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