B. EASTWOOD, Jr. & B. SCHIBLER, Jr.

QUILLING MACHINE.

APPLICATION FILED FEB. 15, 1906.

900,155.

Patented Oct. 6, 1908.

2 SHEETS—SHEET 1.

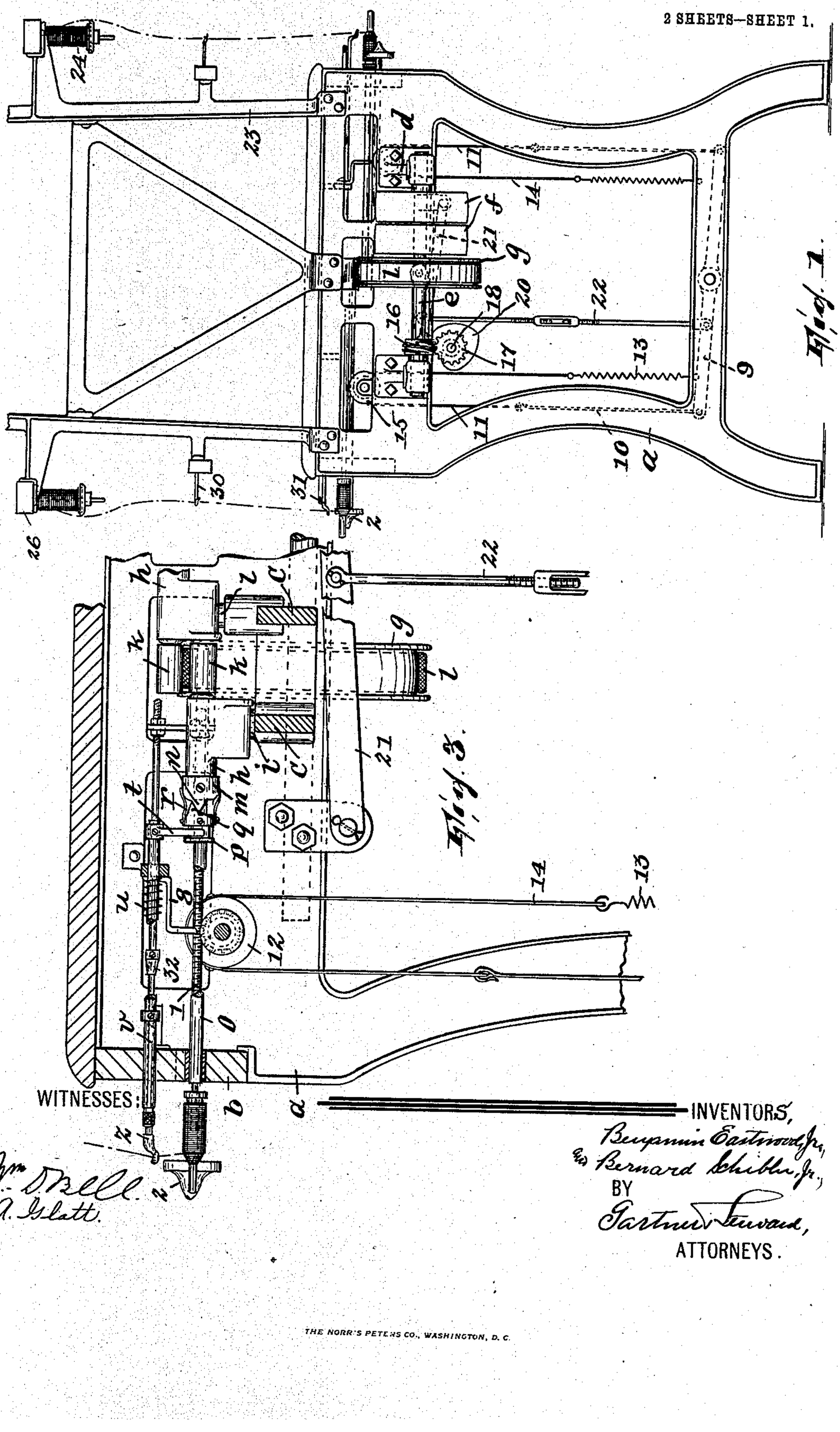

Fig. 1.

Fig. 3.

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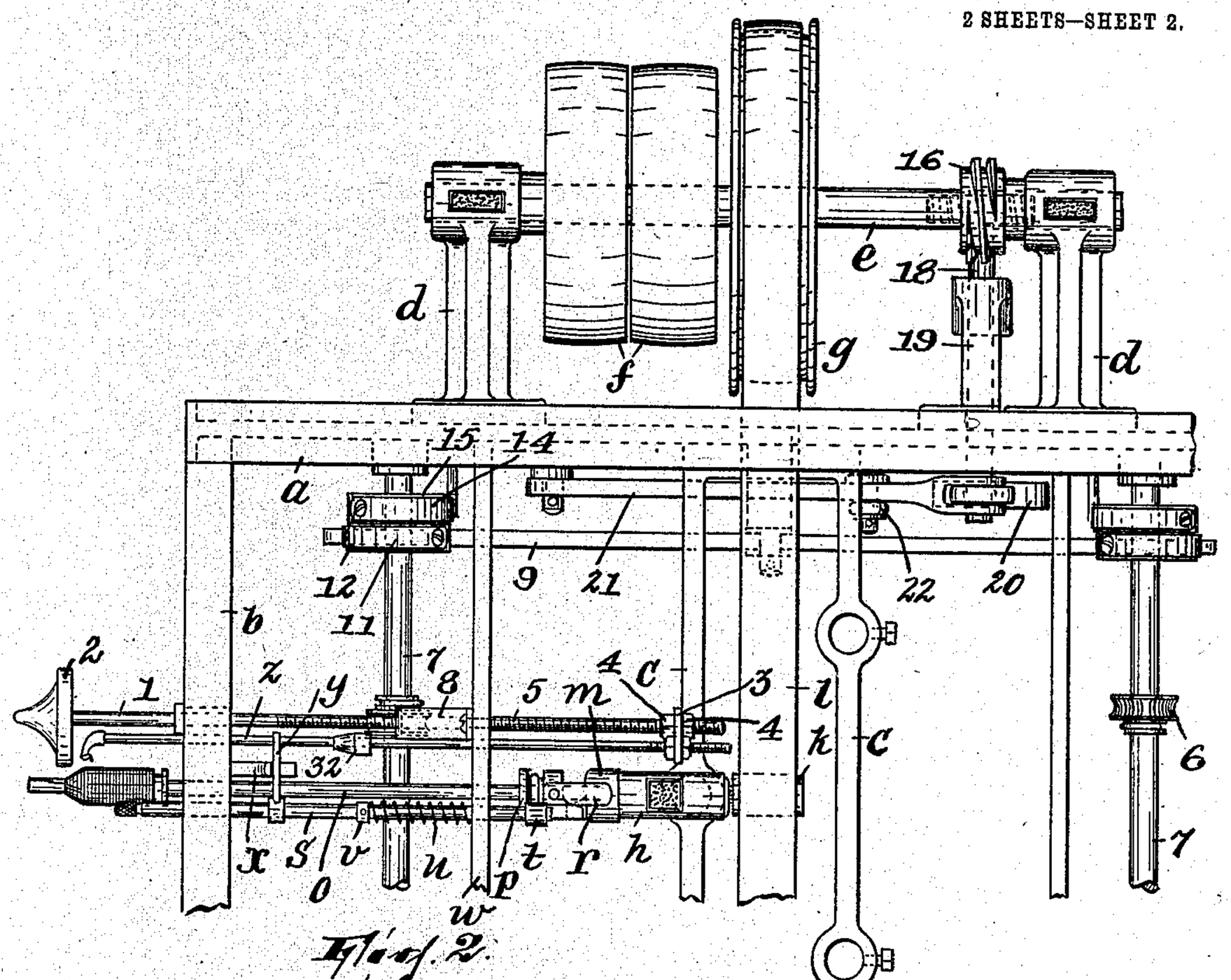

Fig. 2.

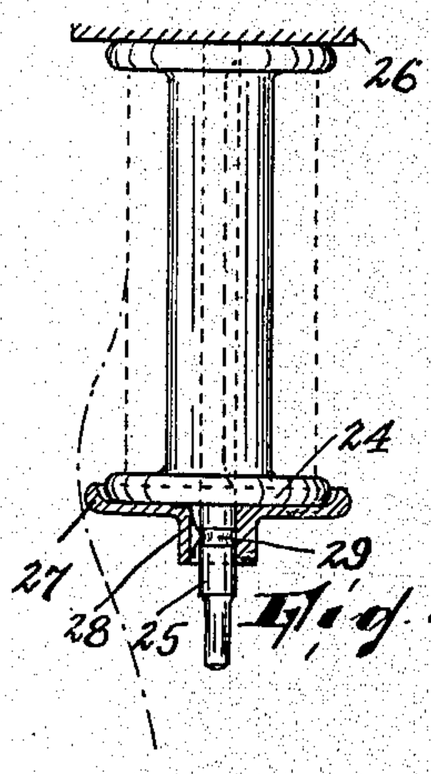

Fig. 7.

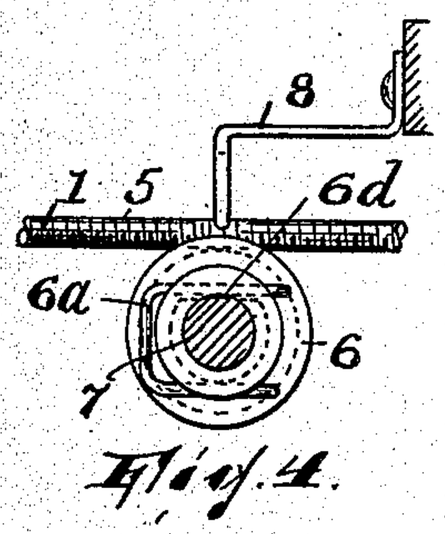

Fig. 4.

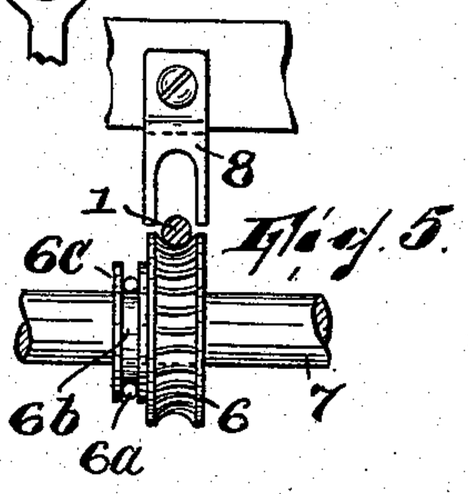

Fig. 5.

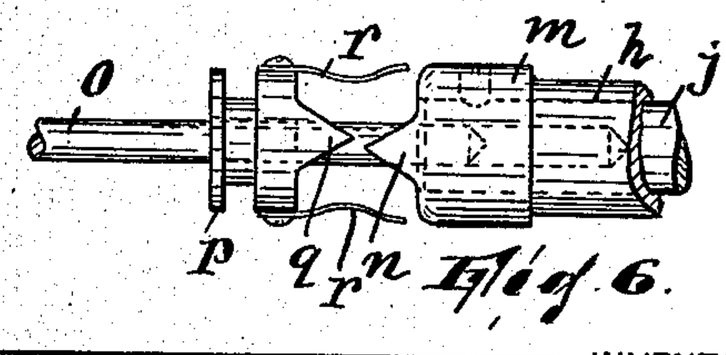

Fig. 6.

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UNITED STATES PATENT OFFICE.

BENJAMIN EASTWOOD, JR., AND BERNARD SCHIBLER, JR., OF PATERSON, NEW JERSEY, ASSIGNORS TO THE BENJAMIN EASTWOOD COMPANY, OF PATERSON, NEW JERSEY, A CORPORATION OF NEW JERSEY.

QUILLING-MACHINE.

No. 900,155. Specification of Letters Patent. Patented Oct. 6, 1908.

Application filed February 15, 1906. Serial No. 301,138.

To all whom it may concern:

Be it known that we, BENJAMIN EASTWOOD, Jr., and BERNARD SCHIBLER, Jr., both citizens of the United States, residing at Paterson, Passaic county, New Jersey ,have invented certain new and useful Improvements in Quilling-Machines; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

This invention relates to that general class of quilling or cop winding machines in which the winding of the cop is effected by rotating the same relatively to the thread-guide while the attenuating or building-up of the cop is effected by advancing the thread-guide relatively to the cop.

Our present invention is directed particularly to, first, the means for oscillating and gradually advancing the thread-guide relatively to the cop being wound; second, the clutch connections between the spindles and their driving means, this feature being an improvement on a clutch mechanism disclosed in the patent to Adsit, # 757,081; and, third, the means for supplying the thread to the quills.

Figure 1 of the accompanying drawings is an end elevation of our improved quilling machine. Fig. 2 is a plan view of the end portion of the machine shown in Fig. 1, the scale being slightly larger than that of Fig. 1; Fig. 3 is a transverse sectional view of the machine taken in a plane between the observer and the winding unit shown in Fig. 2; Figs. 4 and 5 are sectional and front views, respectively, of the means for oscillating and effecting the gradual advance of the thread-guide; Fig. 6 is a view illustrating the clutch connection for the spindles; and, Fig. 7 is a view partly in side elevation and partly in section of the thread-supplying means.

In the drawings, the standard *a;* rails *b;* intermediate rails *c;* brackets *d;* main drive-shaft *e;* fast and loose pulleys *f;* and pulley *g* are or may be all substantially as and for the purposes set forth in the patent to Adsit above referred to.

h designates horizontal bolsters supported by stems *i* in the rails *c*. In each bolster is journaled a spindle-driving shaft *j* carrying a whirl *k* at one end, engaging a belt *l* which extends over the pullley *g* and its counterpart (not shown) at the other end of the machine, and at the other end a clutch member *m* which is a collar on the shaft *k* formed with a tapered longitudinally extending lug or tongue *n*.

o designates the spindles, the same being journaled in the rails *b* and at their rear ends in the shafts *j*. On each spindle is an annularly grooved collar *p* formed with a tapered tongue or lug *q* projecting toward the tongue or lug *n* of collar *m*, said collar *p* being the counterpart clutch member of clutch-member *m*.

r denotes parallel plate springs or clips attached to the collars *p* and so arranged that when a spindle is pushed into its shaft *j* to make the clutch-members abut said clips will first grip clutch-member *m*. The object of this arrangement is to cause the shaft *j*, which is continually rotating, to start its spindle *o* gradually when the latter is thrown into movement, so saving a sudden strain on the thread being wound; when the spindle is pushed back, the clips first act on the collar *m* as a sort of friction clutch, the spindle taking on the rotary movement of the shaft *j* with more or less increasing speed until finally the tongues *q* and *n* abut and both the spindle and shaft rotate together at the same speed. The free ends of the clips *r* are turned outwardly or flared; thus, the rotary action which the spindle assumes merely as the result of frictional contact between said clips and part *m* is itself a gradually increasing one.

s is a push-rod controlling each spindle, the same carrying a fork *t* which engages in the annular groove of the collar *p* of the spindle and being normally pressed outwardly by a spiral spring *u* coiled between a collar *v* on the push-rod and a rail *w* of the frame of the machine.

x is a notched stop on the rail *b* which, being engaged by a finger *y* projecting from the push-rod, holds the push-rod back in the position where the spindle is clutched with shaft *j*. *z* designates the thread-guides, one for each spindle, and 1 the thread-guide-advancing-rod, both being arranged to move freely in a longitudinal direction in the rail

b, which they penetrate; the thread-guide also penetrates and is supported in the rail *w*. The thread-guide-advancing-rod carries the usual cop engaging friction wheel 2, and it is connected with the thread-guide by the usual fork 3 carried by the latter and engaging between nuts 4 on the threaded portion 5 of said rod.

Each thread-guide rests on a small grooved worm wheel 6, the several worm wheels for each row of winding units being fixed on a rock shaft 7 journaled in the standards *a*. In order to permit adjustment laterally and at the same time secure the worm-wheels against free movement longitudinally of shaft 7, we prefer to secure each worm wheel by a U-shaped spring 6^a which is slipped into the annular groove 6^b of a boss 6^c on the worm-wheel, the boss being cut through to its bore in its groove at one side so that the spring may bear against a flat 6^d on the shaft 7. As usual, when the thread-guide has been caused to feed outwardly to the extent necessary to complete a cop by the friction wheel 2 in the reciprocations of the parts 1 and *z* intermittently engaging the rotating cop, the operator presses down on the friction wheel 2, causing the rod 1 to tilt in the rail *b* as a fulcrum whereby to disengage its thread from the worm wheel 6, whereupon rod 1 and the thread-guide connected therewith may be pushed backward and reset. In order to prevent the threaded rod from being unshipped from the worm wheel 6 at this time, a forked guide 8 carried by rail *w* and straddling the rod 1, is provided.

The worm wheel 6 above referred to takes the place of the fork heretofore usually used, and, in addition to several other advantages, it avoids the up and down rocking effect to which the threaded-rod 1, and consequently, more or less, the thread-guide-rod, were subjected.

The rock-shafts 7 are oscillated in the following manner: 9 is a lever fulcrumed in one of the standards *a*. Each arm of this lever is connected with the shaft 7 by a link 10 and a band 11 extending over and secured to the periphery of a band wheel 12 on shaft 7. Tension on the parts 10 and 11 is normally maintained by a spiral spring 13 which connects the standard *a* with a band 14 passing over a band-wheel 15 in the direction reverse to the band 11. Thus as the lever 9 rocks, it causes the shafts 7 to also rock in such manner as to alternately move the rows of thread-guide-advancing-rods 1 outwardly. The rocking of the shaft 9 is effected from the shaft *e* by a worm 16 on shaft *e*, a worm wheel 17 on a shaft 18 journaled in a bracket 19, a cam 20 on shaft 18, a lever 21 fulcrumed in the standard *a* and a link 22 connecting levers 21 and 9.

23 is the usual superstructure for supporting the supply bobbins and their accessory mechanisms. In the present instance, the bobbins 24 are supported in an inverted position, each directly above the spindle which it supplies, by being arranged on a fixed spindle or skewer 25 depending from one of the rails 26 of the superstructure 23. Any suitable means for keeping the bobbin against downward displacement, such as the bobbin cap 27 containing a bent plate spring 28 which engages in an annular groove 29 in the spindle 25 may be provided.

30 and 31 are thread-guides to prevent too much "ballooning" of the threads between the bobbins and the spindles.

In devising this arrangement we have had in mind two well known arrangements of supply bobbins for machines of this character, to wit, the one where the bobbin rotates on a horizontal axis, and the other where the bobbin stands vertically and discharges upwardly. Our present arrangement differentiates from both of these and results in at least three advantages, to wit, first, leading the thread directly, without guide-rods etc. changing its course, and in the most practical, convenient and accessible manner, from the supply, to the quill; second, the ability to start the machine instantaneously at full speed without breaking the thread, which of course can not be done in the case of a horizontal supply bobbin, where inertia and bearing-friction must be reckoned on; and third, a uniform and regular pull-off or feed, without regard to what part of the bobbin is discharging at that time, which latter feature seems to be due to the combined effects of gravity and the tendency of the thread to "balloon" between the quill and bobbin, the thread-coils as their original spooling tension is caused to release literally falling away from the bobbin, even at the angle between its body and lower flange, so that there is no catching of or sudden resistance on the thread at any time. So far as employing the bobbin cap to prevent the end coils from catching in the angle represented by the body and lower flange of the bobbin is concerned, we may thus even dispense with such bobbin cap, though it is of course necessary if the bobbin heads are not without roughness.

The operation is substantially the same as in the case of the Adsit machine herein before referred to, the spindles (clutched with their drive shafts) rotating and thus drawing off the thread from the supply and winding it on the cops while the thread guides are reciprocated through the threaded rods 1 from the oscillating worm-wheels 6 and simultaneously advanced to effect the lengthening of the cop by the friction wheels 2 intermittently turning the threaded rods on the worm wheels as, in their reciprocations, they bring up against the wound cops. When any cop is fully wound, the cone 32 on the

thread-guide engages the finger y and trips the same, permitting the push-rod to spring forward and break the spindle clutch, stopping the rotation of the corresponding spindle.

Practical application of our improvements has demonstrated that thereby machines of this kind may be not only run at a speed much higher than machines at present in use, but that the machine may be precipitously set to full speed, all without breaking or "burning" the threads and causing them at at any time to feed off more copiously than the quills can take them up.

Having thus fully described our invention, what we claim as new and desire to secure by Letters Patent is:

1. In a quilling machine, the combination, with the frame, of a rotary spindle, a longitudinally reciprocating thread-guide, a threaded rod connected with said thread-guide to move therewith longitudinally, and an oscillatory part having a peripherally serrated portion engaged peripherally by said threaded rod, substantially as described.

2. In a quilling machine, the combination, with the frame, of a rotary spindle, a longitudinally reciprocating thread-guide, a threaded rod connected with said thread-guide to move therewith longitudinally, a rock-shaft, and a worm wheel on said rock-shaft engaged peripherally by said threaded rod, substantially as described.

3. In a quilling machine, the combination, with the frame, of a rotary spindle, a longitudinally reciprocating thread-guide, a threaded rod connected with said thread-guide to move therewith longitudinally, a rock-shaft, a worm wheel on said rock-shaft engaged peripherally by said threaded rod, and a forked guide carried by the frame and straddling said threaded rod, substantially as described.

In testimony, that we claim the foregoing, we have hereunto set our hands this 6th day of February, 1906.

BENJ. EASTWOOD, JR.
BERNARD SCHIBLER, JR.

Witnesses:
JOHN W. STEWARD,
WM. D. BELL.