C. A. CLARK.

SLIVERING MACHINE.

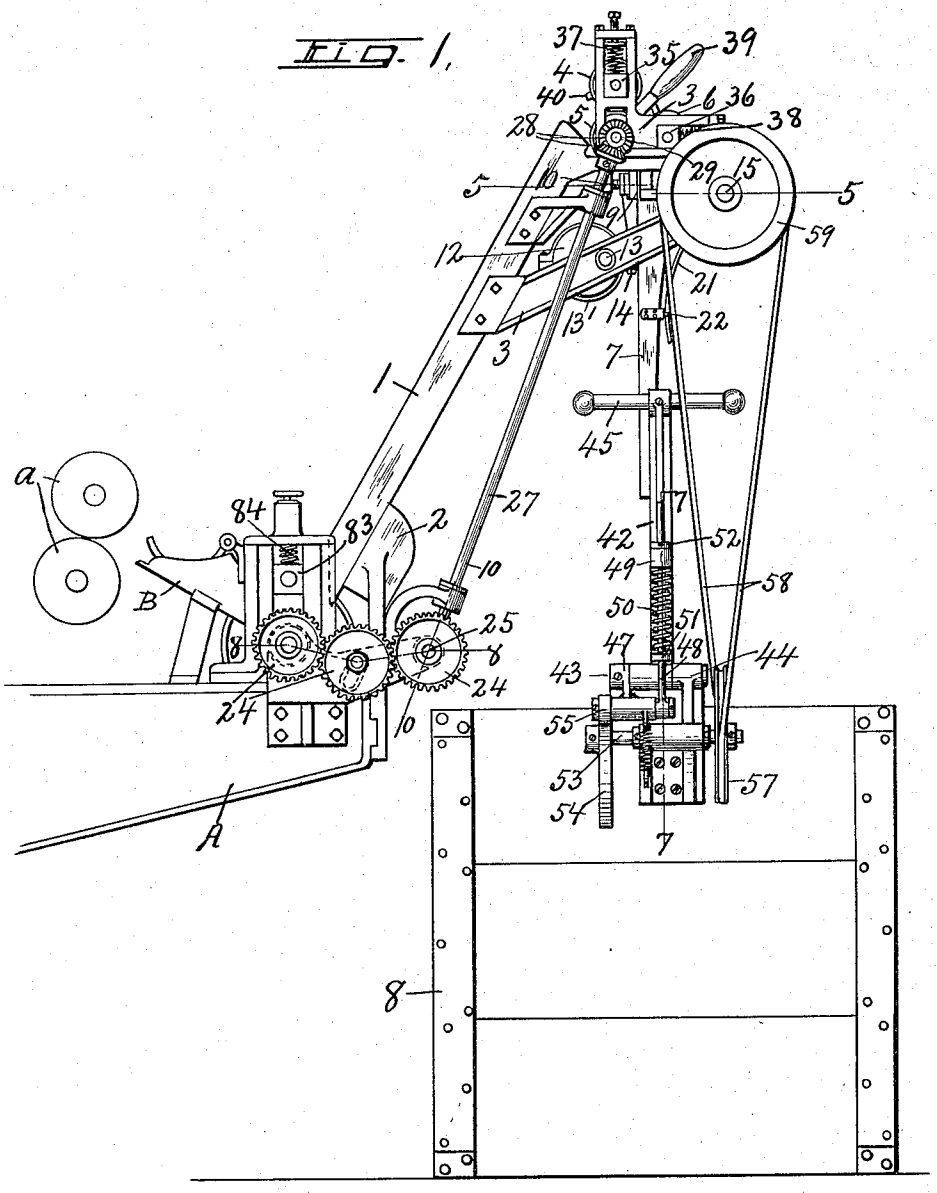
APPLICATION FILED MAY 7, 1914.

1,156,210.

Patented Oct. 12, 1915.

6 SHEETS—SHEET 1.

FIG. 1.



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C. A. CLARK.

SLIVERING MACHINE.

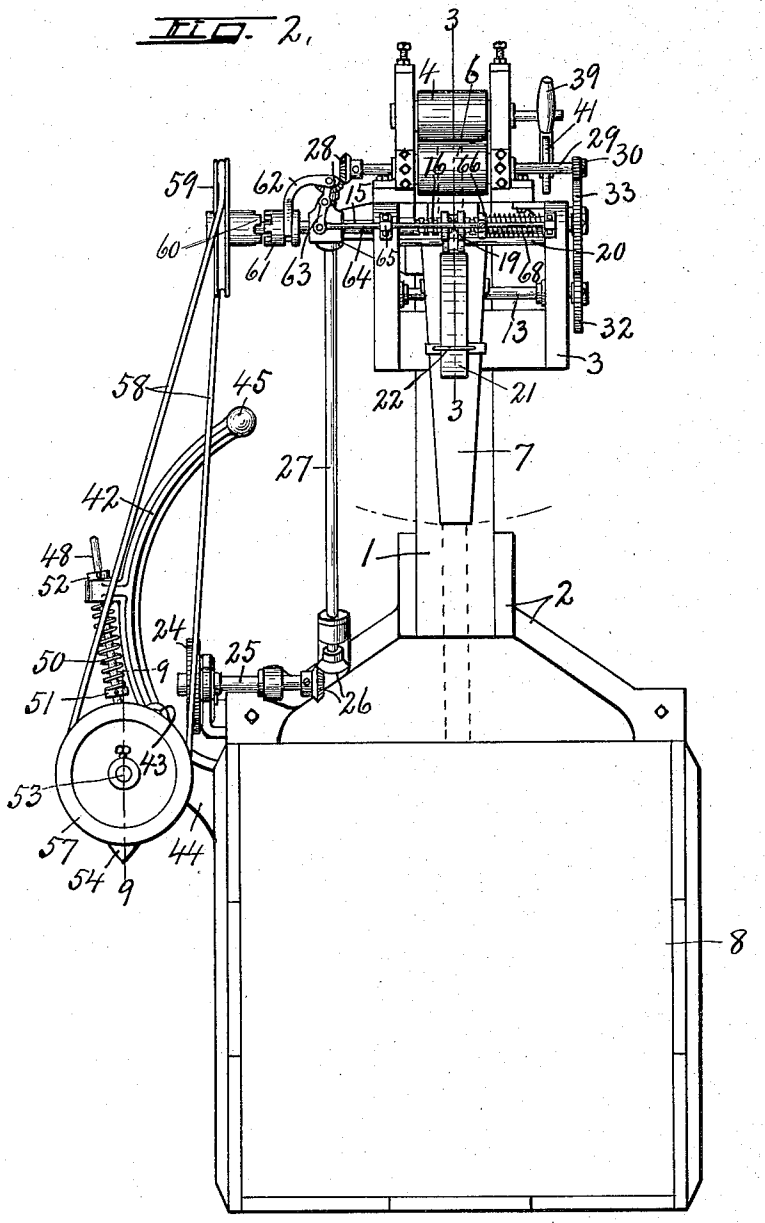
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Patented Oct. 12, 1915.

6 SHEETS—SHEET 2.

FIG. 2.



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6 SHEETS—SHEET 3.

FIG. 3.

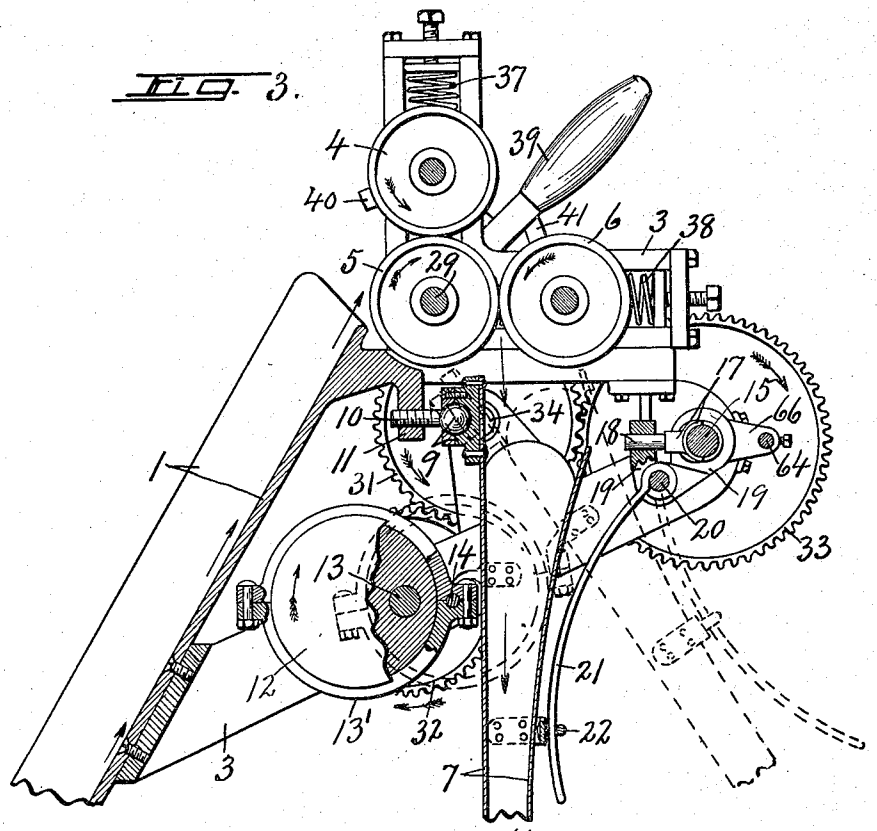
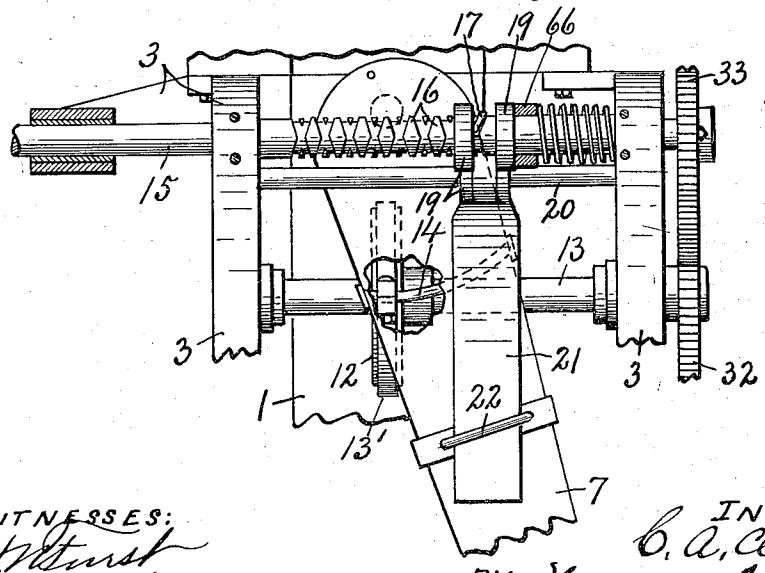


FIG. 4.



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6 SHEETS—SHEET 4.

Fig. 5.

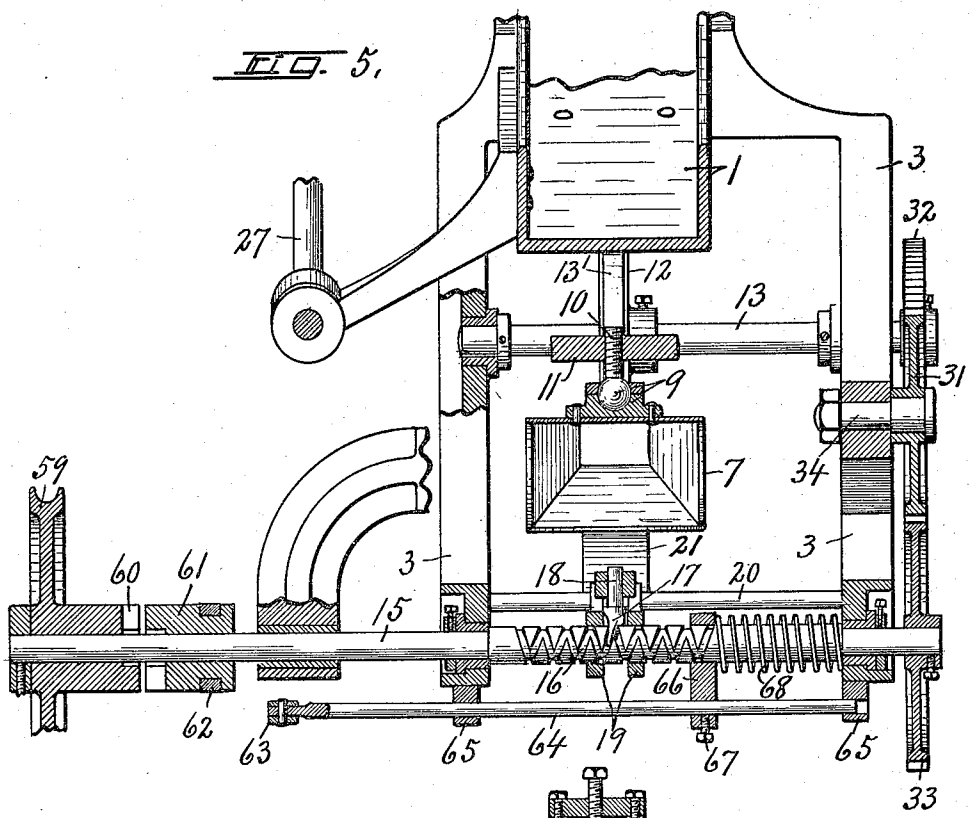
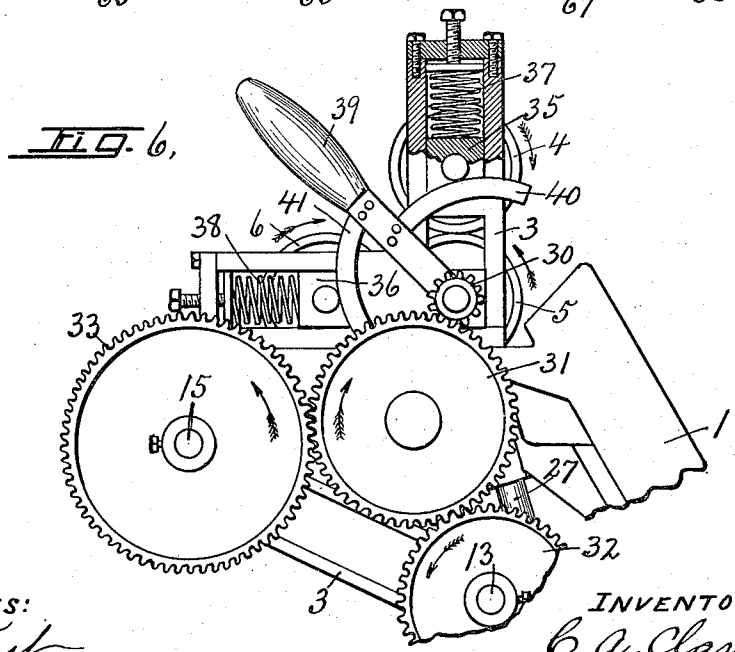


Fig. 6.



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6 SHEETS—SHEET 5.

FIG. 7.

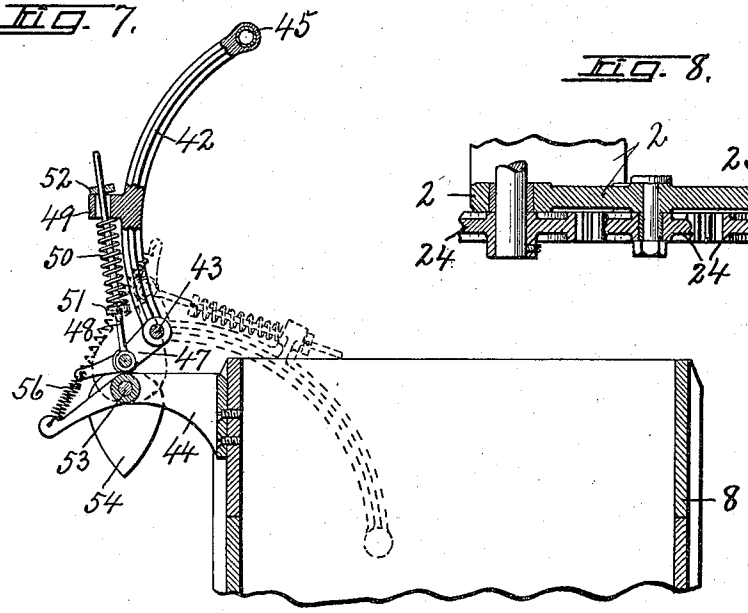


FIG. 8.

FIG. 11.

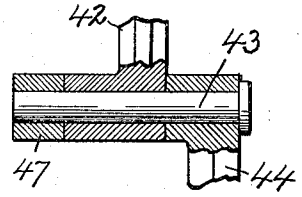


FIG. 9.

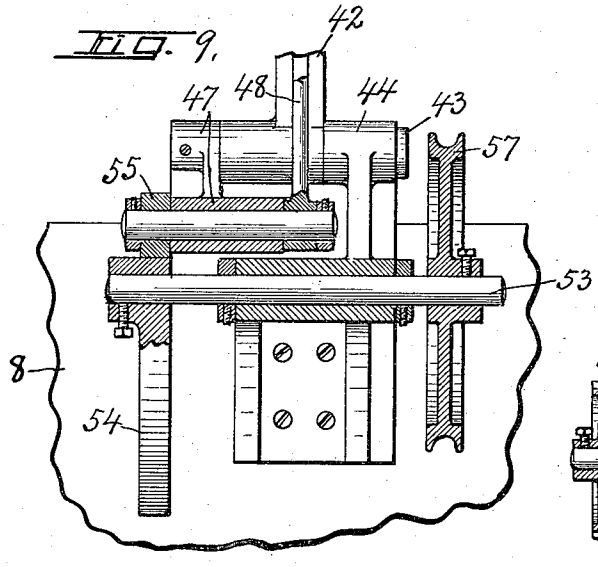
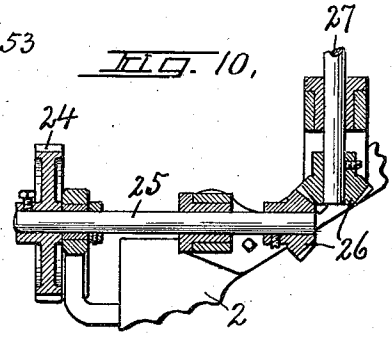


FIG. 10.



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APPLICATION FILED MAY 7, 1914.

1,156,210.

Patented Oct. 12, 1915.

6 SHEETS—SHEET 6.

Fig. 12.

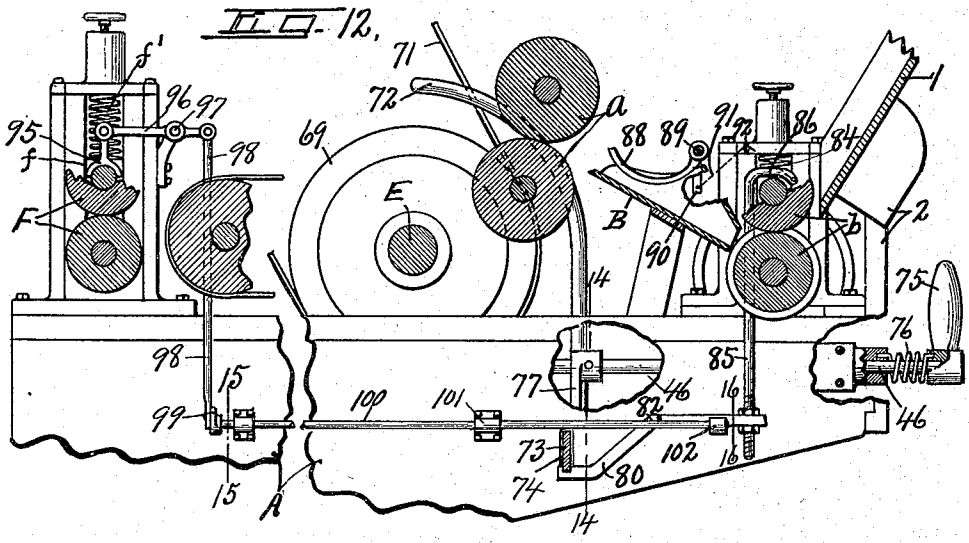


Fig. 13

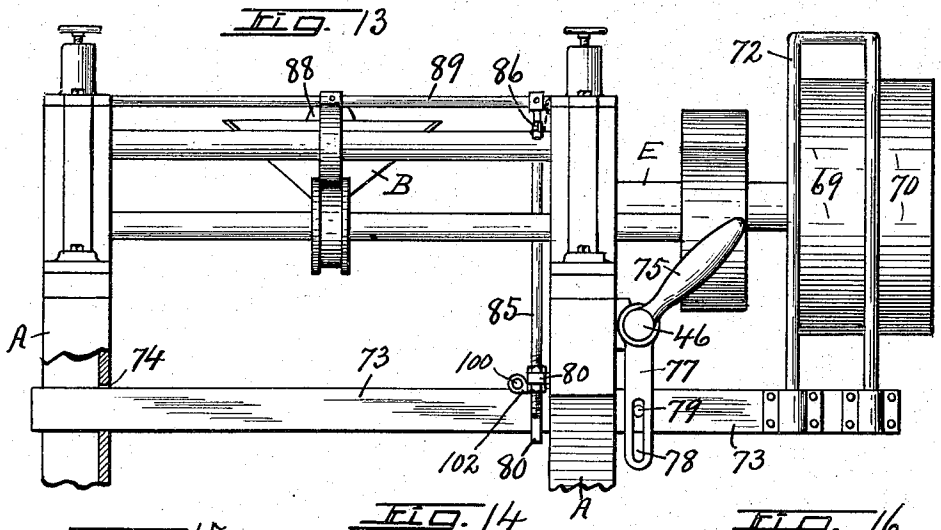


Fig. 15.

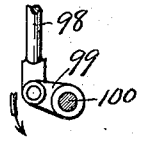


Fig. 14

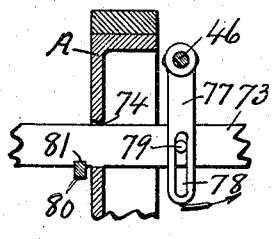
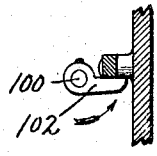


Fig. 16.



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UNITED STATES PATENT OFFICE.

CHARLES ALFRED CLARK, OF AUBURN, NEW YORK.

SLIVERING-MACHINE.

1,156,210. Specification of Letters Patent. Patented Oct. 12, 1915.

Application filed May 7, 1914. Serial No. 836,883.

To all whom it may concern:

Be it known that I, CHARLES A. CLARK, of Auburn, in the county of Cayuga, in the State of New York, have invented new and useful Improvements in Slivering-Machines, of which the following, taken in connection with the accompanying drawings, is a full, clear, and exact description.

This invention relates to certain improvements in feeding and piling attachments for slivering machines as used more particularly in the manufacture of rope from hemp or equivalent fiber, but it will be evident from the following description that the same attachments may be used in the preparation of slivers of any fibrous material and for any purpose where it is necessary to stack or pile loose untwisted strands in relatively small symmetrical and compact space.

Heretofore, so far as I am aware, it has been the invariable custom of rope manufacturers to employ a helper at the delivery end of each machine for directing the delivered sliver into a suitable confining space (such as a box or rack), the usual method being to arrange the loose untwisted strands in coils which not only produces a more or less loose and irregular pile requiring a greater amount of floor space for the storage of a given weight of the fiber but imparts to the strand a certain objectionable twist.

The primary object, therefore, of my present invention is to provide means driven by the machine for laying out or stacking the slivers in layers of uniform length and width as it emerges from the machine without liability of twisting or breaking down at the ends. That is, I have sought to provide an automatic stacker operating in such manner as to cause the sliver to traverse backward or forward over a predetermined area so that the successive strands will be deposited side by side throughout such area without liability of piling up more in one place than in another.

Another object is to provide an automatic packer or pressing device acting intermittingly but in synchronism with the stacking mechanism when the latter is in such position to permit the operation of the packer.

Another object is to prevent the passage of sliver-containing knots or extra heavy quantities of fiber to the automatic stacker or piler by causing such knots or extra heavy quantities of fiber to automatically stop the machine and thereby assure an even supply of the fiber as it emerges from the machine into the automatic stacker.

Other objects and uses relating to specific parts of the machine will be brought out in the following description.

In the drawings Figure 1 is a side elevation of the rear end of a slivering machine showing the automatic stacker or piler and its operating mechanism and also the packing device and box in which the sliver is stacked. Fig. 2 is an end view of the stacking and packing mechanism shown in Fig. 1. Fig. 3 is an enlarged central vertical sectional view through the upper portion of the same device taken on line 3—3, Fig. 2. Fig. 4 is an enlarged rear face view of the upper portion of the oscillatory stacker or laying out device for the sliver and its operating mechanism. Fig. 5 is an enlarged horizontal sectional view through the upper portion of the same device taken on line 5, 5, Fig. 1. Fig. 6 is an enlarged side elevation of the upper portion of the machine opposite to that shown in Fig. 1 showing more particularly the hand-operated cams for separating the feeding rollers which deliver the slivers from the main guide into the stacking chute. Fig. 7 is an enlarged horizontal sectional view through the packing device and upper end of the packing box taken on line 7—7, Fig. 1. Fig. 8 is an enlarged horizontal sectional view through the rear portion of the slivering machine showing the gears for transmitting motion from one of the delivery rollers to the countershaft which drives the feeding rollers and other movable parts of the stacking and packing device taken on line 8—8, Fig. 1. Fig. 9 is an enlarged vertical sectional view through a portion of the packer-operating mechanism taken on line 9—9, Fig. 2. Fig. 10 is an enlarged vertical sectional view of a portion of the driving mechanism for the stacker and packer taken on line 10—10, Fig. 1. Fig. 11 is a sectional view through the lower end of the packing arm, showing

its pivotal connection with its supporting bracket or bearings. Fig. 12 is a side elevation, partly in section, of portions of the front and rear ends of the slivering machine, showing more particularly the automatic belt-shifting and releasing mechanisms whereby a knot or extra heavy quantity of the fiber presented at certain points in the line of feed of the sliver will automatically stop the machine to allow those objectionable parts of the fiber to be removed. Fig. 13 is a rear elevation, partly in section, of portions of the same belt-shifting mechanisms. Fig. 14 is a vertical sectional view through a portion of the frame of the machine taken on line 14—14, Fig. 12, showing a portion of the belt-shifting bar, the detent for holding the bar in operative position and the crank arm for shifting said bar when the detent is released from its holding position. Fig. 15 is an enlarged vertical sectional view through the rock shaft as a part of the mechanism for tripping the detent taken on line 15—15, Fig. 12. Fig. 16 is a similar detail sectional view taken on line 16—16 at the rear end of the rock shaft showing one of the crank arms for tripping the detent.

Automatic stacker or piler.—This stacker or piler is located at the delivery end of the slivering machine as an attachment thereto, and in order that the association may be clearly established, I have shown the rear end of a slivering machine —A— as provided with a pair of feeding rollers —*a*— delivering the sliver into a chute —B— and thence between the additional pair of feeding rollers —*b*— from which the sliver is diverted outwardly into a stationary upright chute or guide —1—, the latter being supported in an upwardly and rearwardly inclined position upon a bracket —2— on the rear end of the machine —A—.

Mounted on the upper end of the guide chute —1— is a framework —3— carrying a plurality of, in this instance three, feed rollers —4—, —5— and —6—, the feed rollers —4— and —5— serving to receive the sliver directly from the upper end of the chute —1— and to divert it rearwardly and downwardly between the feed rollers —5— and —6—, the meeting faces of the latter being located directly over and in vertical alinement with the upper open end of an oscillatory piling or stacking chute —7— which extends downwardly some distance below the feed rollers —5— and —6— toward and directly over the open upper end of a packing box or frame —8— in which the sliver is adapted to be temporarily stacked or piled.

The stacker chute —7— is adapted to be oscillated forwardly and rearwardly and is also movable transversely of the machine and for this purpose its upper rear side is connected by a universal joint —9— to a screw stud —10— which is adjustably secured to a bracket —11— on the upper end of the guide chute —1— as shown more clearly in Figs. 3 and 5, thus permitting the entire chute to be oscillated in any direction about the center of the universal coupling —9—.

The means for oscillating the stacker chute forwardly and rearwardly consists in this instance of a rotary eccentric —12— which is rigidly secured to a rotary shaft —13—, the latter being journaled in suitable bearings in the frame —3— as shown more clearly in Figs. 3, 4, and 5, said eccentric being surrounded by a peripheral band —13′— loose thereon and attached to the rear side of the stacker chute —7— by means of a laterally elongated loop —14— concentric with the axis of movement of the chute and secured to the opposite sides thereof as indicated in Figs. 3 and 4, the connection between the band —13′— and loop being loose to permit the loop —14— to slide freely through the ring or band as the chute is oscillated laterally in a manner presently described. The means for effecting this laterally oscillating movement of the stacker chute —7— consists of a rotary shaft —15— journaled in suitable bearings on the frame —3— transversely of the machine and preferably at the rear of the chute and provided with a double threaded portion —16— constituting a right and left hand thread with which is engaged a sectional nut —17— having a cylindrical shank —18— which is journaled in a yoke —19—, the latter being slidable along and upon the threaded portion of the shaft and is held against turning by sliding engagement with an underlying guide rod —20— also mounted in the frame —3—.

A rock arm —21— has its upper end slidably mounted upon the cross rod —20— in a recess in the yoke —19— so as to move laterally with said yoke as the latter is shifted along the shaft —15— by engagement of the nut —17— with the threaded portion —16—, the lower end of the rock arm —21— being passed loosely through an elongated loop —22— on the rear side of the stacker chute —7— so as to rock said chute laterally or transversely of the machine as the arm —21— and yoke —19— are similarly moved by the screw —16— and nut —17—.

The means for driving the eccentric-carrying shaft —13— and screw shaft —15— is as follows: The lower feed roller —*b*— on the rear end of the slivering machine is connected by a train of gears —24— to a counter-shaft —25— journaled on the bracket —2— on the rear end of the machine and is connected by a bevel gears —26— to an upwardly and rearwardly inclined shaft —27—, the lower end of which is journaled

in a bearing on the bracket —2— while its upper end is journaled in a corresponding bearing on the frame —3— and is connected by bevel gears —28— to a horizontal shaft —29—, the latter being also journaled in suitable bearings on the frame —3— and forms a driving shaft for the feed roller —5— mounted thereon.

The shaft —29—is provided with a pinion —30— driving a train of relatively larger gears —31—, —32— and —33—, the gears —32— and —33— being secured respectively to the eccentric-carrying shaft —13— and to the screw shaft —15— as shown more clearly in Figs. 5 and 6. These gears —30—, —31—, —32— and —33— are, of course, so proportioned as to drive the cam shaft —13— and screw shaft —15— at their required speeds, the gear —31— being journaled on a stud —34— on the adjacent side of the frame —3— and serves to drive the shafts —13— and —15— in the same direction.

The reversely cut threads or screws —16— on the shaft —15— acting on the swivel nut —17— serve to reciprocate the yoke —19— and arm —12— rectilinearly or parallel with the axis of the shaft —15—, this reciprocatory movement of the arm —21— serving in turn to oscillate the chute —7— laterally through the medium of its connection —22— therewith and at the same time permits the eccentric —12— to oscillate said chute in a plane at right angles to that imparted to it by the arm —21—.

The free end of the chute is, therefore, caused to traverse a predetermined area directly over the upper end of the box or stacker frame —8—, the throw of the eccentric —12— being such as to cause the sliver to be returned back and forth from front to rear of the interior of said box while the length of the screw —16— and its connections with the chute are constructed so as to lay out the returns of the sliver from side to side within the box with the return strands in close proximity, thereby stacking the sliver symmetrically and filling the entire space within said box, it being understood that the sectional nut —17— is automatically reversed at each end of the screw for reversing the direction of lateral movement of the arm —21— and chute —7— connected thereto.

The feeding rollers —4— and —6— are journaled in yielding bearings —35— and —36— spring-pressed toward the feed roller —5— by springs —37— and —38— to yieldingly hold said rollers —4— and —6— in contact with the roller —5— for feeding the sliver from the stationary guide —1— into the oscillatory guide delivery chute —7—, but it is sometimes necessary to separate said rollers, as for example when passing the sliver between them by hand in the initial setting up of the machine and for this purpose a lever —39— is fulcrumed on the outer end of the feed roller —5— and provided with two cams —40— and —41— adapted to ride against the inner faces of the shafts of the feed rollers —4— and —6— for forcing said rollers outwardly against the action of their respective springs —37— and —38— when the lever is rocked rearwardly and downwardly, thus permitting the sliver to be passed freely between said rollers.

Packer mechanism.—As the sliver is loosely stacked in the manner described within the box —8—, it becomes necessary to pack it down at intervals and for this purpose I have provided an oscillatory packer arm —42— fulcrumed at its lower end at —43— to a bracket —44— centrally on the upper end of one side of the box —8— as shown more clearly in Figs. 1 and 2.

The upper end of the arm —42— is provided with a cross-bar —45— which is movable into and out of the box against the upper surface of the stacked sliver to press the same downwardly into the box as the arm —42— is oscillated in the manner presently described.

A crank arm —47— is fulcrumed on the bracket —44— coaxial with the axis of movement of the rock arm —42— but movable independently thereof and to this crank arm is pivotally attached a rod —48— passing upwardly through an apertured lug —49— on the rock arm —42—.

A compression spring —50— surrounding the rod —48— is interposed between the shoulder —51— on said rod and the adjacent face of the lug —49— and together with the rod —48— establishes a yielding connection between the crank arm —47— and rock arm —42— to compensate for varying positions which the free end of the rock arm —42— will assume as the height of the stacked sliver in the box varies, the upper end of the rod —48— being provided with a shoulder —52— for returning the rock arm upwardly.

Any suitable means may be employed for oscillating the packer arm —42— intermittingly so as not to interfere with the operation of the delivery chute —7— and for this purpose a cam shaft —53— is journaled in suitable bearings on the bracket —44— and provided with a cam —54— rigid thereon acting against a roller —55— on the crank arm —47— as shown more clearly in Fig. 9 for rocking the arm —42— laterally and downwardly into the box —8— against the action of a retracting spring —56—.

Secured to the cam shaft —53— is a pulley —57—, which is connected by a belt —58— to a loose pulley —59— on the screw shaft —15— so that the action of the packer is synchronized with the lateral movement

of the delivery chute —7— and is adapted to move in a plane parallel with said screw shaft.

Owing to the fact that the free end of the packer arm —42— moves from one side downwardly into approximately the center of the box and that the lateral movement of the delivery chute —7— and sliver delivered thereby into the box are caused to move across the path of movement of the free end of the packer arm, it becomes necessary to prevent the movement of said packer arm when the delivery chute is moving from its central position toward the side of the box to which the packer arm is attached and for this purpose I have provided the pulley —59— with a clutch face —60— adapted to be engaged by a sliding clutch section —61— which is splined or feathered upon the screw shaft —15—, the sliding clutch —61— being operated by a shifting member —62— riding in an annular groove on the clutch section —61— and pivoted to a lever —63— which in turn is fulcrumed intermediate its ends on the frame —3— and is pivotally connected to a horizontally sliding rod —64—, the latter being guided in apertured bearings —65— on said frame parallel with the screw shaft —15—.

A collar —66— is loosely mounted on the screw shaft —15— at the right hand end of the screw —16—, Fig. 5, to slide thereon and is adjustably secured by means of a set screw —67— to the sliding rod —64— to move therewith. A coil spring —68— surrounds the shaft —15— between the collar —66— and adjacent side of the frame —3— nearest the gear —33— for normally holding the collar —66— in the path of movement of the yoke —19— and also for normally holding the clutch section —61— out of engagement with the corresponding clutch face —60— of the pulley —59—.

The action of the packer, therefore, depends upon the movement of the collar —66— against the action of the spring —68— by the yoke —19—, said collar being adjusted along the screw shaft —15— and rod —64— to cause the operation of the packer arm —42— only while the stacker chute —7— is moving from its central position to its position at the right hand of Fig. 2 and back again, during which time the collar —66— will have been shifted by the yoke —19— along the screw spindle —15— against the action of the spring —68—, the latter serving to automatically return the collar and thereby releases the clutch from operative engagement with the pulley —59— as soon as the delivery chute —7— returns to a predetermined position toward the packer arm —42—.

Starting and stopping mechanism.—In Figs. 12 and 13, I have shown a main driving shaft —E— as provided with tight and loose pulleys —69— and —70— for receiving a belt —71— which is shifted from one pulley to another by means of a shifter loop —72— mounted on one end of a bar —73—, the latter being guided in transverse ways —74— in the opposite sides of the main supporting frame of said machine.

A rock shaft —46— is journaled in bearings upon and lengthwise of the machine so as to extend to the rear end thereof where it is provided with a hand lever —75— rigid thereon for turning said rock shaft by hand against the action of a retracting spring —76—, the latter being interposed between the handle and adjacent bearing for the shaft as shown in Fig. 12.

Motion is transmitted from the rock shaft —46— to the belt-shifting bar —73— by means of a crank arm —77— having a slot —78— for receiving a pin —79— on the shifting bar whereby, as the rock shaft —46— is operated by the handle —75— to tension the spring —76—, the bar —73— will be shifted to the left as shown in Fig. 13, thereby shifting the belt from the loose pulley onto the tight pulley in which position the bar —73— will be automatically locked by a detent —80— engaging in a notch —81— in the underside of the bar as shown in Fig. 14, said detent consisting, in this instance, of a lever fulcrumed intermediate its end at —82— to the adjacent portion of the main supporting frame —A— of the machine. This detent is weighted so as to automatically engage in the notch —81—.

Suitable devices are provided in different parts of the machine actuated by knots or extra heavy quantities of the sliver during its passage through said machine for tripping the detent —80—. One of these tripping devices is arranged to coact with the upper feed roller —*b*— on the rear end of the machine and for this purpose such roller is mounted in vertically yielding bearings —83— normally under spring tension of the springs —84— so that in case a knot or extra heavy quantity of material should be caught between the feeding rollers —*b*—, the upper one will be raised against the action of the spring —84—. This lifting movement of the roller is utilized to trip the detent —80— by connecting one end of said lever to the lower end of an upright rod —85— having its other end provided with a hook —86— engaging the upper side of the shaft of the upper roller —*b*— as shown more clearly in Figs. 12 and 13, whereby, as the roller is raised in the manner just previously described, the detent —80— will be forced from holding engagement with the belt-shifting bar —73—, thereby allowing the spring —76— to automatically rock the shaft —46— for returning the shifting mechanism to its starting position with the

belt in engagement with the loose pulley which, of course, will stop the machine and allow the operator to extract the objectionable knot or extra heavy quantity of sliver.

The feeding of the sliver through the machine is aided by a pair of rollers —*a*—, Fig. 12, which deliver the sliver through a rearwardly tapering guide —B— located just in advance of the rear end rollers —*b*—, but it sometimes happens that the sliver will pack up or bunch in the chute and thus prevent the delivery of such sliver in proper form to the stacking device and in order to prevent such condition, a curved rock arm —88— is pivotally mounted in the upper front end of the chute —B— with its convex side facing the bottom thereof, leaving sufficient clearance between the curved arm —88— and bottom of the chute for the free passage of the sliver in its normal condition through said chute. This curved arm —88— is preferably secured to a rock shaft —89— and is provided with a crank arm —90— connected by a cable —91— to the hook —86— on the upper end of the rod —85—, the central portion of the cable being passed over a sheave —92— so that in case the sliver should bunch or collect while passing through the chute, the extra thickness will raise the arm —88— and thereby lift the rod —85— through the medium of the cable —91— to effect the tripping of the detent —80— in a manner similar to that previously described. It is advisable, however, to prevent the entrance of these knots or extra heavy thickness of sliver into the machine or before reaching the chute —B— or rear end roller —*b*— and for this purpose I have shown two feeding rollers —F— forming a part of the ordinary slivering machine and located near the front end thereof, the upper roller —F— being mounted in a vertically yielding bearing —*f*— normally spring-pressed downwardly by a coil spring —*f'*— and permitting the upper roller to rise against the action of said spring in case a knot or extra heavy thickness of sliver should become caught between the rollers —F—. This upward movement of the upper roller —F— is also utilized to trip the detent —80— by engaging the upper side of the shaft of the upper roller with a shoulder —95— which is pivoted to one end of the lever —96—. This lever is fulcrumed intermediate its ends at —97— upon a portion of the main supporting frame —A— and is pivotally connected to the upper end of a vertical rod —98— having its lower end pivotally connected to a crank arm —99— on a rock shaft —100—, said rock shaft being journaled in suitable bearings —101— on the main supporting frame parallel with the rock shaft —74— and extends to a point in proximity to the end of the detent —80— to which the end of the upright rod —85— is detached where it is provided with a crank arm —102— extending under the lower edge of said detent as shown more clearly in Fig. 16.

The crank arms —99— and —102— on the rock shaft —100— project in opposite directions from said shaft so that when the shoulder —95— is lifted by the upward movement of the upper free roller —*f*— it causes a corresponding downward movement of the rod —98— through the movement of the lever —96—, thus rocking the shaft —100— and causing the crank arm —102— to lift the adjacent end of the detent —80—, thereby tripping said detent from holding engagement with the belt-shifting bar —73— and allowing the spring —76— to return said bar to its normal position with the belt —71— in engagement with the loose pulley for stopping the machine.

The operation of my invention will now be readily understood upon reference to the foregoing description and the accompanying drawings, but it will be evident that the mechanisms for stacking and packing the sliver and for starting and automatically stopping the machine as affected by the presence of knots or extra heavy thicknesses of sliver in different parts of the machine may be modified materially without departing from the spirit of this invention and, therefore, I do not limit myself to the structure herein shown and described.

What I claim is:

1. In a slivering machine, the combination with an oscillatory sliver-delivery guide mounted on the delivery end of the machine of means for simultaneously moving said guide in reverse directions at right angles to its oscillatory movement for laying the plaits of successive tiers in the same direction.

2. A slivering machine having a delivery chute, means for oscillating the chute in one direction, and additional means including a traversing screw for moving it in a plane at right angles to such oscillatory movement.

3. In a machine of the character described, a delivery chute for the sliver, means including a traversing screw for moving the chute in reverse directions, and additional means including an eccentric for moving it in a different plane.

4. In a machine of the character described, a vibratory delivery chute for the sliver, actuating means therefor, and mechanism synchronized with the movements of the delivery chute for packing down the sliver as it is deposited from said chute.

5. In combination with a slivering machine in which the fiber is combed and de-

livered in the form of a single continuous ribbon or sliver, an oscillatory sliver-receiving tube attached to the delivery end of the slivering machine, means for oscillating the guide tube at a relatively rapid rate of movement in the direction of length of the fiber as delivered from the machine, and additional means for oscillating the guide tube at a relatively low rate of speed in a direction at substantially right angles to the first-named direction of movement for laying the sliver plates in successive tiers in the same direction without twisting.

In witness whereof I have hereunto set my hand this 2nd day of May 1914.

CHARLES ALFRED CLARK.

Witnesses:
H. E. CHASE,
EVA E. GREENLEAF.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."