

H. C. GRAYSON.
Automatic Roving Piecer and Breaker for
Spinning-Machinery.
No. 227,427. Patented May 11, 1880.

Fig. 1.

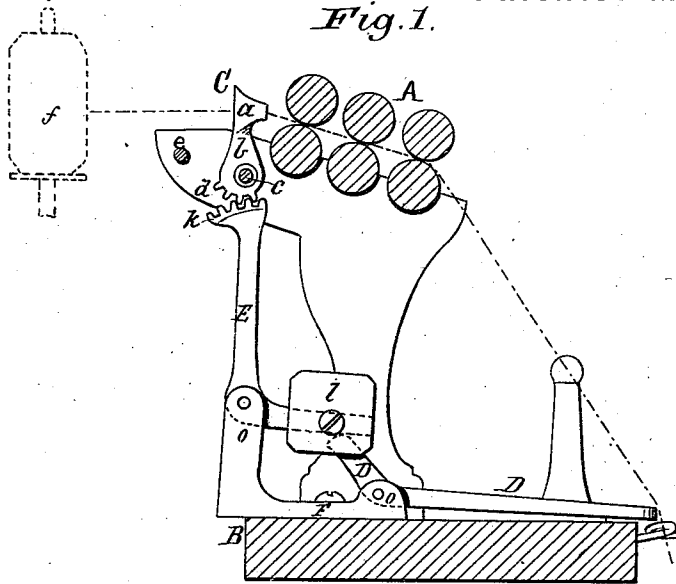
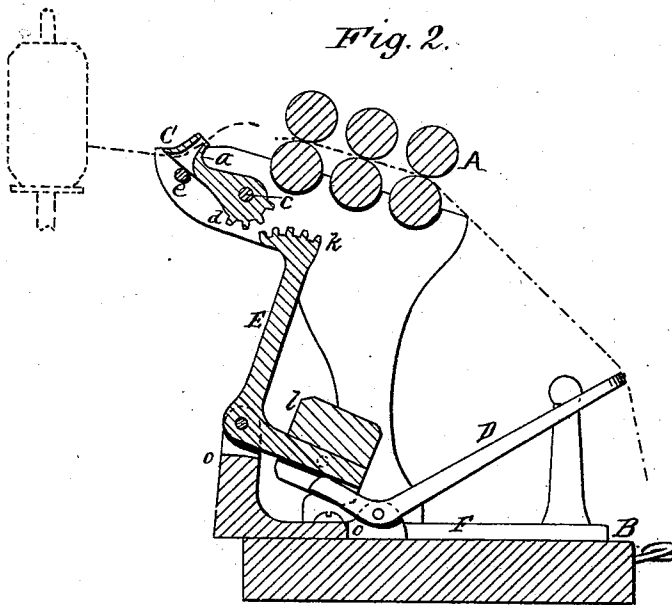


Fig. 2.



Witnesses:
Philip F. Garner
Howell Battle.

Inventor:
Henry C. Grayson
By *Wm. C. Wood*
Attorney

H. C. GRAYSON.
Automatic Roving Piecer and Breaker for
Spinning-Machinery.
No. 227,427. Patented May 11, 1880.

Fig. 3.

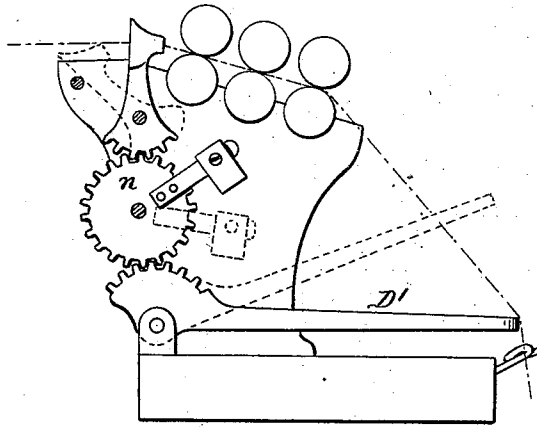


Fig. 4.



Fig. 5.

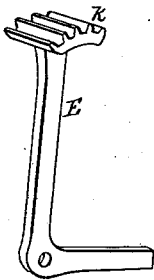


Fig. 6.

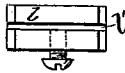


Fig. 7.

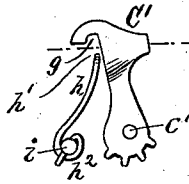


Fig. 8.

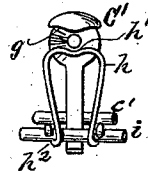
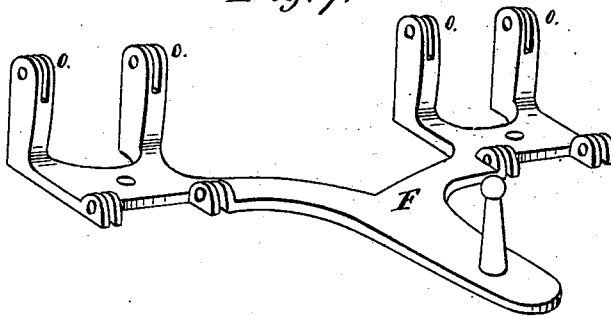


Fig. 9.



Witnesses:
Philip F. Larner
Howell Barthe.

Inventor
Henry C. Grayson
By *Wm. M. Moore*
Attorney

UNITED STATES PATENT OFFICE.

HENRY C. GRAYSON, OF CENTREVILLE, RHODE ISLAND.

AUTOMATIC ROVING PIECER AND BREAKER FOR SPINNING MACHINERY.

SPECIFICATION forming part of Letters Patent No. 227,427, dated May 11, 1880.

Application filed August 13, 1879.

To all whom it may concern:

Be it known that I, HENRY C. GRAYSON, of Centreville, in the county of Kent and State of Rhode Island, have invented a certain new and useful Automatic Roving Piecer and Breaker for Spinning Machinery; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part of the same, is a clear, true, and complete description of my invention.

My invention relates to means for the mechanical control of "initial" or "broken" ends of roving back of drawing-rolls, for the purpose of mechanically delivering said ends to the rolls in "piecing" without manipulation of the roving by the spinner.

In spinning-machines for working flax, hemp, jute, &c., roving-breakers have heretofore been employed, and so, also, in such machines vibrating forks have been so connected with the yarn-levers as to cause the forks to move in a plane parallel with the surface of the feeding or back rolls, so that on the breaking of yarn in front of the rolls and the breaking of the roving back of the rolls said forks would swing the broken end of roving to the one side beyond the bite of the feeding-rolls, and said forks, by the readjustment of the yarn-levers to their normal position, have also been so arranged as to swing the broken roving end back to a position adjacent to the bite of the rolls, in order that the latter might take hold of the end, carry it through the front rolls, and present it for piecing at the hands of the spinner. A forked lever thus arranged is capable of operating as a piecer when in a flax, hemp, or jute spinning machine, because such fibrous staple is of greater length than cotton and comparatively stiff, and also because the roving in such machines usually approaches the rolls in a vertical line.

In cotton-spinning the conditions are changed, in that the fibrous staple is comparatively short, fine, soft, and free from stiffness, and the roving approaches the back rolls in a practically horizontal plane.

In flax-spinning the broken end of roving beyond the bite of a roving-breaker is long in proportion as the staple is long, while in cotton-spinning the broken end beyond the breaker

is proportionately as much shorter than the flax-roving end as cotton staple is shorter than flax, so that a device which might readily deliver a flax end for piecing, because of the great length, coarseness, and stiffness of the staple, would fail to operate in cotton-spinning, because of the opposite conditions, as stated.

My roving-piecers are specially adapted for cotton-spinning, and they move in a curved line toward the bite of the rolls, in a plane at right angles thereto, and therefore they deliver a broken end directly to and force it into the bite of said rolls and secure the desired result regardless of the usual comparative shortness of the roving end or the character of the fibrous staple.

The mechanical delivery of initial ends of roving—i. e., from a fresh spool or bobbin—to drawing rolls is of comparatively little practical importance; but when considered with reference to broken ends said mechanical delivery is of great practical value, and this is more especially true when mechanism is employed for breaking the roving immediately after a break occurs in the yarn in front of the rolls. This last-named class of mechanism, until my invention set forth in my Letters Patent dated April 8, 1879, No. 214,124, involved more or less manipulation in controlling the roving-breaker and maintaining it in an inoperative position while piecing, as well as actual manipulation of the broken end of roving in passing it from the breaker to the drawing-rolls.

The improvements which are the subject of said prior Letters Patent enable the spinner to so set the roving-breaker that it will remain inoperative until the piecing operation is completed.

I have now devised roving-piecers which may be employed in connection with certain portions of said roving-breaker improvements.

The main feature of my present invention consists in the combination, with drawing-rolls, of a roving-piecer, which is pivoted to move to and from the bite of the back rolls in a plane at practically right angles thereto, and a yarn-lever, together with suitable connecting mechanism, for enabling the spinner to impart to the roving-piecer its proper move-

ment in carrying a roving end and delivering it to the back rolls.

Although I hereinafter describe a roving-piecer in the combination stated which operates in itself as a roving-breaker, and another piecer which operates as a part of a roving-breaker, I do not embrace within this, the main feature of my invention, any roving-breaker whatever, because a variety of suitable breakers may be employed, and with them in or added to the combination above stated I can employ the roving-piecer pivoted to move to and from the drawing-rolls in a plane at practically right angles thereto, for forcing the roving end between the rolls.

Inasmuch as the separate organization of a roving-breaker and roving-piecer involves what I have proved to be unnecessary expense and complication, I prefer that said devices, although distinct in their operation, be embodied as one device, as hereinafter described, and shown in the drawings.

The particular device hereinafter described, and shown in the drawings, as a combined roving breaker and piecer is in the form of the well-known trumpet commonly employed in back-stop motions and eveners. It differs essentially therefrom, however, in its internal proportions with relation to the size of roving used, as this latter, being of little tensile strength, must pass more freely than when the trumpet is used as a controlling element in a back-stop motion or evener. Considered simply as a roving-breaker, the trumpet form is of no consequence, because the breaking of the roving by it is wholly due to the position assumed by it with relation to the rolls. As a roving-piecer, the trumpet form, so far as relates to the projecting nose thereof, is important, it being thereby fitted to enter between the rolls closely adjacent to their points of contact in delivering a broken end in piecing.

In this connection my invention further consists in the combination, with drawing-rolls, of a trumpet-shaped roving breaker and piecer and a yarn lever or levers, with suitable intermediate mechanism for throwing the breaker and piecer backward from the rolls when the yarn breaks, and also for throwing the same forward for piecing. With this trumpet-shaped device a yarn-lever (with or without an auxiliary yarn-lever and a latch) may be employed with stop-rods, substantially as shown in my former Letters Patent, herein referred to. So far as my knowledge extends, this roving-breaker operates in breaking the roving unlike any heretofore known, in that, instead of biting or clamping the roving, it merely, by a change in position, so far increases the friction between it and the roving that the roving is drawn apart by the rolls, leaving in the breaker a projecting end of sufficient length to be readily delivered to the rolls, when the device next operates as a piecer.

To more particularly describe my invention, I will refer to the accompanying drawings, of which there are two sheets, and in which—

Figure 1, Sheet 1, represents, in section, a set of drawing-rolls with my improvements attached, as if operating normally. Fig. 2 Sheet 1, represents the same after a break in the yarn in front of the rolls has occurred. Fig. 3, Sheet 2, represents, in side view, a roving piecer and breaker as operated without an auxiliary lever. Fig. 4 is a perspective view of a detached breaker and piecer. Fig. 5 is a perspective view of one of the weighted levers which impart motion to a roving piecer and breaker. Fig. 6 is a bottom view of one of the lever-weights, showing the slot which serves as a guide for the rear end of an auxiliary lever. Figs. 7 and 8 are side and back views of a biting roving-breaker and roving-piecer embodying my invention. Fig. 9 is a perspective view of the standard bed-plate detached from the roller-beam.

The drawing-rolls A are mounted, as usual, on a roller-beam, B, and this latter may or may not be provided with the common hinged guide-eye board, as shown in my prior patent.

The combined roving piecer and breaker C consists of a trumpet, *a*, at one end of lever *b*, which is pivoted on a rod, *c*, parallel with the rolls. The opposite end of the trumpet-lever *b* is provided with a toothed segment, *d*. The rod *c* is so located with reference to the distance of the trumpet from said rod, and also to the point of contact between the two rear drawing-rolls, that when the trumpet-lever is vibrated on said rod the trumpet will move in the arc of a circle toward and from the points of contact between the rolls. When thrown backward, away from the rolls, the trumpet-lever is arrested and held in position by means of a back rod or bar, *e*. When in its most rearward position the axis of the opening through the trumpet is nearly vertical, but when in its most forward position its axis is horizontal. The roving, in passing from the bobbin *f* to the rolls, passes through the trumpet, and so long as it is in its forward position the roving passes freely to the rolls; but when the trumpet is thrown backward the course of the roving is substantially as before—from the bobbin to the mouth of the trumpet, thence upward therein, and from thence to the rolls. This abrupt change of direction in passing through the trumpet occasions considerable friction between it and the roving, which, in connection with the fact that the distance from the nose of the trumpet to the rolls is much greater than the ordinary length of staple, results in the roving being broken or drawn apart, usually about midway between trumpet and rolls, leaving a protruding end in the trumpet, as illustrated in the drawings.

It will be seen that the breaking of the roving is not due to the form of the trumpet, either externally or internally, but that it is due to the abrupt change of direction to which the roving is subjected by the change of position of the trumpet. The prime value of such a roving-breaker is not merely due to the fact that it does not bite or clamp the roving, but

to the fact that it is conducive to the presentation of a long protruding end of roving.

In Figs. 7 and 8 I show a piecer, *C'*, which, as in the previous figures, will deliver a broken end to the rolls in piecing, but which, when considered as a part of the roving-breaker, operates as a roving-eye, and in itself has no breaking capacity.

As in my former patent, the biting or clamping operation is, however, therewith involved. The rear upper end of the trumpet is provided with a recess, *g*. A clamping or biting effect is produced by means of the clamp *h*, composed of wire bent so as to afford a seat for engaging with the roving, as at *h'*, and at *h''* further bent or coiled so as to form a spring, and secured to the rod *i*, which should be parallel with and secured to the rod *c'*, so that both can be moved together by a traverse motion. In its normal position the clamp is inclined toward the rear of the trumpet, but not in contact therewith, during the passage of the roving. When the trumpet is thrown backward its rear surface engages with the clamp, which readily yields by reason of its coils; but in assuming a more vertical position it enters the recess at *g* and clamps or bites the roving, substantially like roving-breakers heretofore constructed. When the spinner moves the trumpet forward the clamp immediately releases the roving, and the protruding end is of sufficient length to be readily delivered to the rolls. I prefer, however, because of simplicity and economy in construction, the simple trumpet-shaped device for performing alternate service as breaker and piecer, as previously described.

The precise construction and arrangement of levers for operating the piecer and breaker is of comparatively little consequence so long as the yarn in front of the rolls, in operating through such levers, maintains the breaker in an inoperative position until a break in the yarn occurs, and if, when a break does occur, said levers cause the breaker to operate, and if, also, said levers, when placed in normal position by the spinner, cause the delivery of the broken end to the rolls. I have shown two modes of operation—one with an auxiliary yarn-lever, as in my prior patent, and one with a single lever.

In Figs. 1 and 2 the breaker and piecer is controlled through the auxiliary yarn-lever *D*, which engages with the weighted lever *E*, this latter being provided with a segmental geared plate, *k*, which engages with the segment-gear *l* on the piecer or breaker lever *b*. When the yarn is sound it maintains the outer end of the auxiliary lever in a depressed position upon the guide-eye, and the roving-breaker in an inoperative position, as in Fig. 1; but when the yarn breaks the outer end of the auxiliary lever rises, permitting the weighted end of lever *E* to fall and its upper end to move forward, thereby throwing the breaker backward, as shown in Fig. 2, in

which position, resting on the bar *e*, the course of the roving through the trumpet is so far changed as to occasion such friction as to break the roving, usually midway between the nose of the trumpet and the bite of the rolls.

The desirability of having the roving controlled by a traverse motion is well known, and I have therefore mounted the breaker and piecer on a traverse-rod, which necessitates the employment of such operative mechanism between them and the weighted levers as will admit of the traverse movement without breaking the operative connection. This is provided for by the geared plates *k* on levers *E*, these plates being somewhat longer than the extent of traverse movement.

Other well-known and obvious connecting mechanism may be employed instead of the segmental geared levers; but these are simple and effective. As shown in Figs. 1 and 2, the segmental geared levers are separated when the roving-breaker operates; but that is not essential, and by properly increasing the dimensions of the segments they will always occupy geared relations with each other.

It will be seen, referring to Fig. 2, that when the spinner depresses the outer end of the yarn-lever the piecer delivers its protruding end to the rolls, and that if a latch be employed, substantially as in my prior patent, for controlling the lever during the piecing of the yarn, the spinner will have both hands free for that purpose.

The weights *l* on levers *E* are adjustable thereon, so as to be properly set, not only with reference to the proper degree of upward pressure on the outer end of the yarn-lever, but also with relation to a prompt backward throw of the roving-breaker.

It is obvious that the levers should move with a minimum of friction on their pivots, and also that the auxiliary and yarn levers should always be maintained in proper connection at their points of engagement. I have provided each weight *l*, on its under side, as heretofore in similar connections, with a slot, *u*, which receives the rear end of the auxiliary lever, and serves as a guide for maintaining the two levers in proper relations with each other.

In Fig. 3 I show how the lever *E* may be dispensed with by substituting as an equivalent the loosely-mounted gear-*n*, which serves as an intermediary for connecting the yarn-lever *D'* and the combined breaker and piecer. The weight is adjustably applied to the gear *n* by means of a radial arm at one end thereof. In this mode of communication between the yarn-lever and the piecer and breaker there is no disconnection of the gearing, as in the previously-described arrangement.

It is well known that the yarn slackens up when the speed of the spindles decreases; and in order that the roving-breakers may be properly controlled during the stopping and starting of the spinning-machine, a stop-rod com-

mon to all the roving-breaker levers is employed by me, as provided for in my prior Letters Patent.

It will be seen that the levers D and E are mounted in stands or standards *o*, which heretofore have always been separately attached to the upper or the lower side of the roller-beam, necessitating their careful adjustment in each case with relation to each roving-breaker and the rolls. In this connection, with a view to lessening the cost of construction and of the application of roving-breakers to spinning machinery, I have provided a bed-plate, F, which is common to all the standards, which, when properly applied with reference to a single roving-breaker, is necessarily properly applied for all the rest which belong to that particular section of rolls in a drawing-frame, whether there be two or more of the breakers.

I have shown the levers mounted on top of the roller-beam; but, if desired, they can, by mere mechanical variations of arrangement,

be mounted beneath the roller-beam, as in my prior patent.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, with drawing-rolls, of a roving-piecer pivoted to move to and from the back rolls in a plane practically at right angles thereto, and a yarn-lever and suitable connecting mechanism, substantially as described, whereby a broken end of roving may be delivered directly to and forced between the back rolls by the spinner in placing the yarn-lever in its normal position, as set forth.

2. A trumpet-shaped roving breaker and piecer, in combination with drawing-rolls and a suitable yarn-lever and connecting mechanism, substantially as described.

HENRY C. GRAYSON.

Witnesses:

PHILIP A. SWEET, 2d,
FRANK N. BABCOCK.