

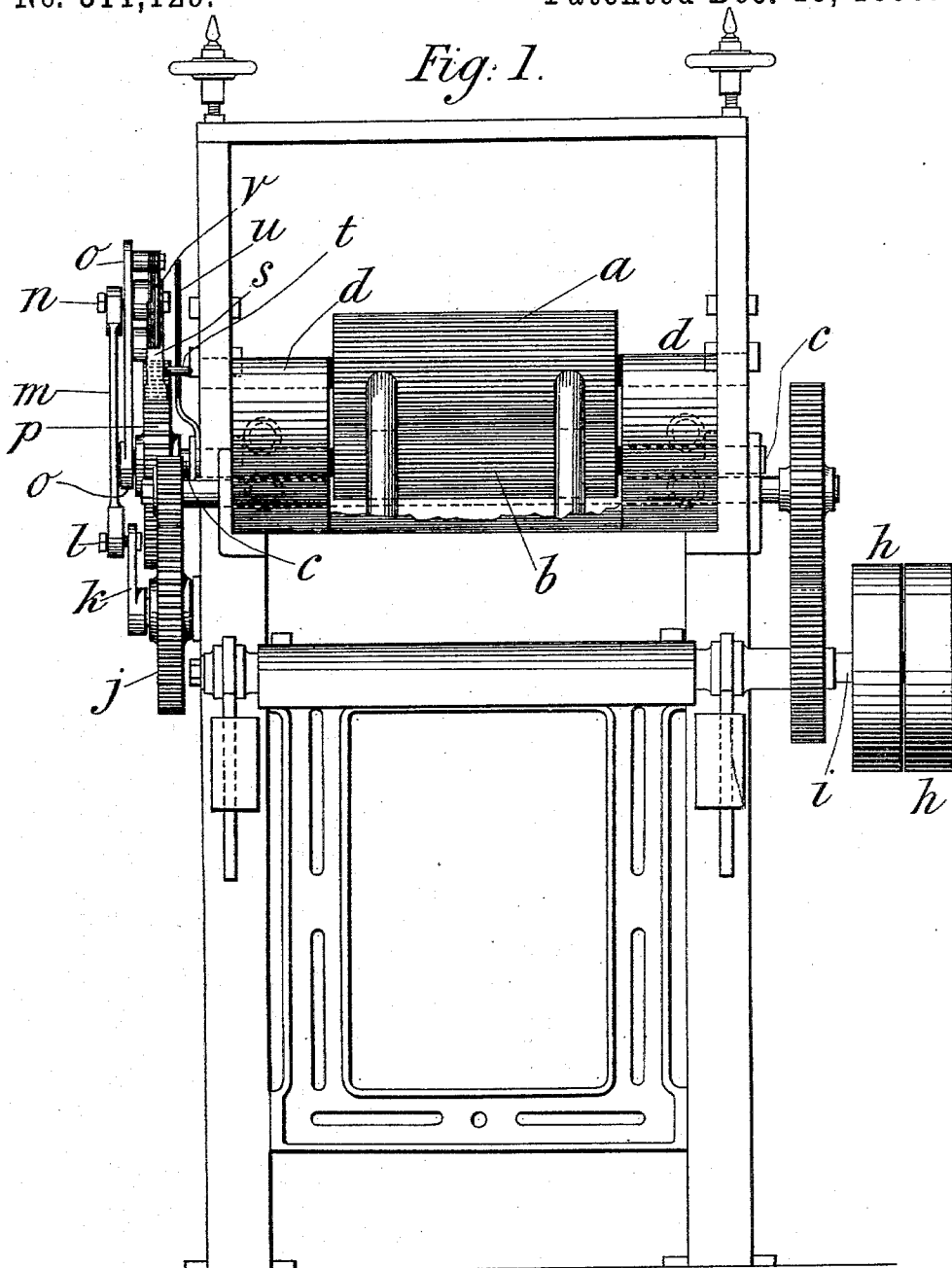
G. E. DONISTHORPE & T. BURROWS.

MACHINE FOR PREPARING FIBERS FOR COMBING OR SPINNING.

No. 511,129.

Patented Dec. 19, 1893.

*Fig. 1.*



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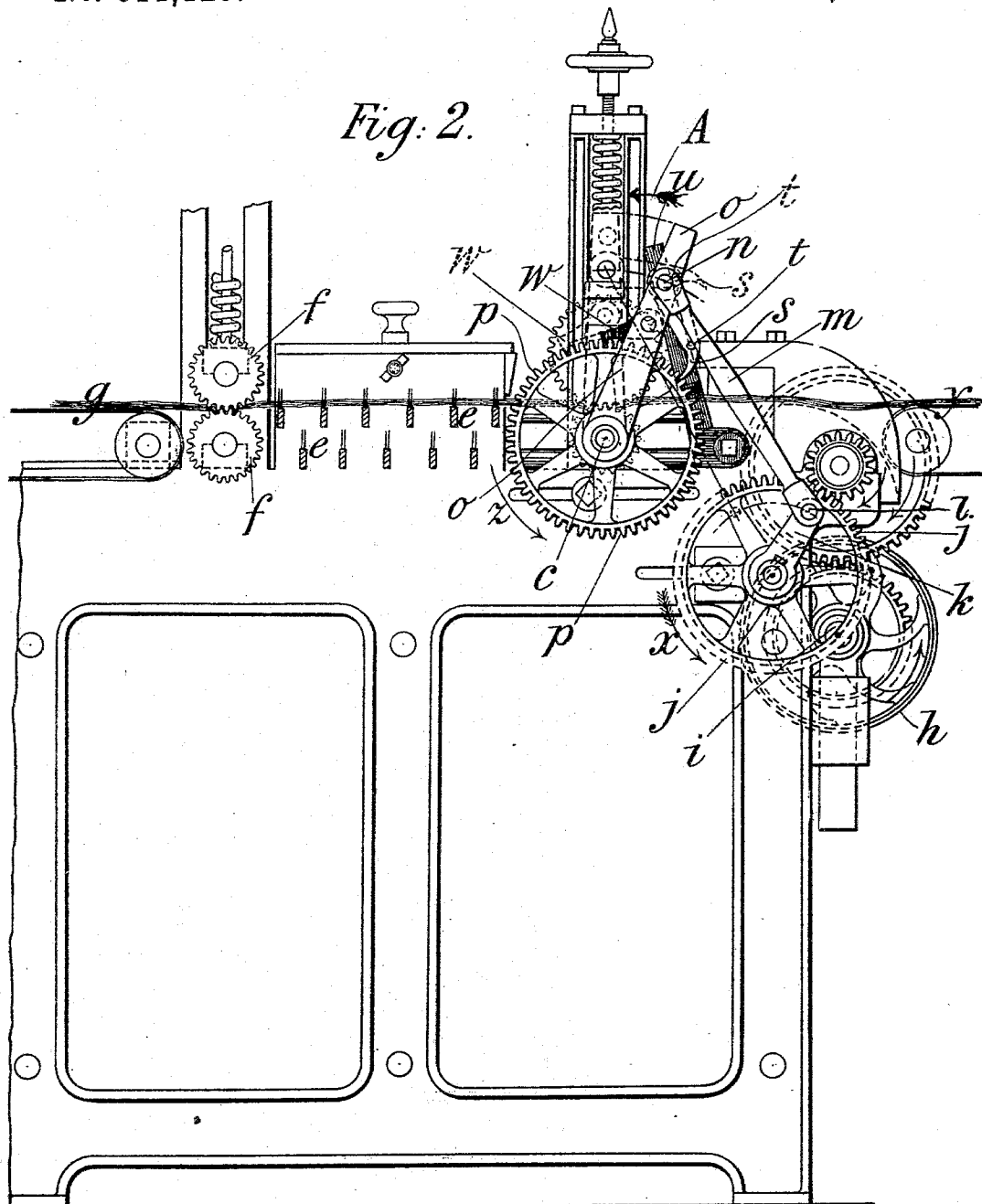
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Fig. 2.



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# UNITED STATES PATENT OFFICE.

GEORGE E. DONISTHORPE AND TAYLOR BURROWS, OF LONDON, ENGLAND.

MACHINE FOR PREPARING FIBERS FOR COMBING OR SPINNING.

SPECIFICATION forming part of Letters Patent No. 511,129, dated December 19, 1893.

Application filed November 1, 1892. Serial No. 450,643. (No model.) Patented in England January 7, 1892, No. 371.

*To all whom it may concern:*

Be it known that we, GEORGE EDMUND DONISTHORPE, merchant, of 12 Oat Lane, and TAYLOR BURROWS, engineer, of 88 Upper Kennington Lane, London, in the county of Surrey, England, subjects of the Queen of Great Britain, have invented Improvements in Machines for Preparing Fibers for Combing or Spinning, (for which we have obtained Letters Patent in Great Britain, No. 371, dated January 7, 1892,) of which the following is a specification.

Our present invention relates to machines of the character known in the trade as "gill boxes" or "drawing frames"—that is our improvements relates to machines or apparatus for softening, piercing and opening the fiber (such as flax, hemp, china grass, silk, &c.,) heretofore usually effected by means of the well known gill box or gill head and then "drawing off" such fiber—after being so treated—by tearing it off (*i. e.*, drawing it from the drawing off end) through the pins, gills or teeth of the gill box. In the old and universally used machines as is well known the "drawing off" strain is put upon the fiber as it comes off the gills, pins or teeth, that is after the fiber has been weakened by being pierced and opened by the pins of the gills; also the resulting sliver has been usually passed directly into a sliver can or vessel in which it is removed.

Now our present invention consists in obtaining a softening and drawing or "lashing" and opening action—on the fiber while in or on the pins or gills—from the feed end of the machine so that the opening and lashing strain is on the unweakened fiber and giving other advantages as will hereinafter be set forth—the fiber coming off such machine being advantageously taken off by any suitable "taking off" device or "lapper" arrangement.

With a suitable "gill box" machine (or set of gills or combs operating in a suitable framework or standard and driven or actuated as is well understood) we use one (or several) pair of feed and softening rollers at the feed end of the machine. For the sake of brevity and clearness we will describe one pair of such rollers only—it being distinctly under-

stood however that more than one pair may be used if desired. For instance we consider four pairs to be very advantageous for some purposes such as when treating china grass according to our present invention. The two rollers are advantageously fluted or corrugated, the flutes or corrugations intersecting with one another; but we do not limit ourselves thereto. The top roller (which may or may not be driven) is pressed down on the lower one by its own weight or by springs or weights if desired. The other or lower roller is rotated forward a certain distance to feed forward the fiber on to the gills and then has a reverse motion given to it about half its forward motion—or more or less.

In order that our present invention may be easily understood and readily carried into practice we will proceed to fully describe the same with reference to the drawings hereunto annexed.

In the drawings, Figure 1 is an end view (*i. e.*, the "feed" end) of a "gill box" machine having our improvements applied thereto. Fig. 2 is a side elevation of Fig. 1—part of each end of the machine being broken away.

For the sake of example we have illustrated only one pair of feed rollers; but as before stated more than one pair of such rolls can be used if desired.

*a* is the top and *b* the lower of the pair of fluted feed rollers which are mounted in suitable fixed or stationary bearings and actuated as hereinafter described.

*c* is the axis or shaft upon which the lower roller *b* is firmly secured and thereby revolved.

*d* are the covers over the ordinary mechanism for actuating the gills of any suitable gill box *e*—as is well understood.

*f f* are the "drawing off" rollers which are driven so as to "draw off" the fiber from the gills of the gill box *e*.

*g* is a horizontal "lapping" apron or it may be vertical (or between the two points) or in place thereof a large drum may be used to lap the sliver as it comes through the rollers *f* or the fiber may be drawn off and delivered in any other suitable manner.

*h h* are fast and loose pulleys which revolve the main driving shaft *i*.

*j* is a toothed wheel which is actuated and

slowly revolved (in the direction of the arrow  $x$  Fig. 2) by a suitable train of wheels geared down and driven from the main shaft  $i$ .

$k$  is a crank arm rigidly fixed to and revolved with  $j$ .

$l$  is a crank pin upon which is pivoted the connecting rod  $m$  which at its opposite end is pivoted on the pin  $n$ .

$n$  is a crank pin on a crank arm or lever  $o$  loosely pivoted so as to freely turn on the axle  $c$  of the roller  $b$ .

$p$  is a toothed or ratchet wheel rigidly keyed or fixed on the axis  $c$ .

$s$  is a pawl on the lever arm  $o$ .

$t$  is a pin or projection on the pawl  $s$ .

$u$  is a cam surface or fixed plate for the purpose of engaging the pin  $t$  and tripping the pawl  $s$  out of the teeth of the ratchet wheel  $p$  during part of the oscillating movement of  $o$ .

$v$  is a spring which normally keeps the pawl  $t$  pressed into teeth  $p$  until disengaged therefrom by  $u$ .

$w$  is a second pawl hung loosely to arm  $o$  and by gravity always resting in the teeth of the wheel  $p$  which it forces around in the direction of arrow  $z$  and rides over said teeth freely when arm  $o$  is moved in the opposite direction.

$y$  is a feeding apron of any suitable form, or same may be dispensed with or replaced.

It will thus be seen that an oscillating or rocking action is imparted to the rocking arm  $o$  (loosely pivoted on  $c$ ) by means of the crank  $k$  and crank pin  $l$  and connecting rod  $m$  and this loose arm  $o$ , having the pawl  $w$  operating on one side thereof, thereby forces the wheel  $p$  round in the direction of the arrow  $z$  say eight teeth and thereby revolves the axis  $c$  and roller  $b$  (which axis  $c$  or roller  $b$  may or may not have a toothed wheel thereon meshing with a toothed wheel on the axis of the roller  $a$  to identically revolve same—or  $a$  may simply revolve by friction.) While the loose arm  $o$  is thus moving in the direction of the arrow  $A$  (Fig. 2) the pawl  $s$  rides loosely over the teeth of  $p$  until about half way when the pin  $t$  of said pawl  $s$  strikes against the fixed plate  $u$  and rides up against same and thus lifts the pawl  $s$  out of the teeth  $p$  into about the position  $s$  shown in dotted lines in Fig. 2. The crank pin  $l$  and connecting rod  $m$  next move the loose arm  $o$  in the opposite direction to the arrow  $A$  and the pawl  $w$  then rides back loosely over the teeth of the wheel  $p$  while the pin  $t$  now rides down the cam surface  $u$  until the arm  $o$  has been rocked (or moved) about half of its journey back whereupon the pawl  $s$  engages into the teeth of the wheel  $p$  and revolves the latter back in the opposite direction to arrows  $z$  and so revolves the roller  $b$  backward about half the distance it had just previously been pushed forward as just described—and so on continuously.

It will be obvious that we do not limit ourselves to any exact proportion of back motion to forward motion as the relative amount of back and forward motion may be varied as

required (according to the fiber under treatment) and such variation readily obtained by altering the shape or the position of the cam surface  $u$  so that the pawl  $s$  is permitted to come into gear with (*i. e.*, to engage) the teeth of the wheel  $p$  at an earlier or later moment according to whether a greater or less amount of backward motion respectively is required.

The operation is as follows:—The fiber is fed between rollers  $a$  and  $b$  and pierced by the pins or gills of the gill box  $e$  and thereby dragged forward—as is well known and understood. After the feed rollers have revolved forward a certain distance they are reversed (in the manner just previously described) for about half the distance fed forward and thereby drag back the fiber on the gills (*i. e.*, in the opposite direction to that in which the gills are traveling and carrying the fiber) and thereby we obtain a very effective and beneficial “lashing” and opening and softening action on the fiber. The fiber is again fed forward between  $a$  and  $b$  for a given distance and again pulled back a part of (that is less than) the distance it was fed forward, and so on. The feed rollers may be made to break, crush and soften the straw or woody part of flax or hemp or to soften china grass or other fibers or separate and special rollers for this purpose may be added if required. We think it desirable however that the fiber should be usually softened and crushed or otherwise subjected to a preliminary treatment, decorticated or scutched (on a separate machine or machines) before being fed to our hereinbefore described machine. The fiber is suitably drawn off from the gills  $e$  by quickly revolving drawing off rollers  $f$  and it may be caused to lap round a drum or an endless apron such as  $g$  (arranged horizontally or otherwise) and then as the “lap” accumulates it may be removed from such “lapper” from time to time by the attendant without stopping the machine.

With some fibers where only required for coarse yarns the fiber—after treatment on this machine—will be found to be so far prepared that it may be taken direct from our said machine to the drawing and roving frames and then spun without any separate combing. For still more coarse work such as binder twines for harvesting purposes the fiber coming from our machine (particularly flax or hemp) may be twisted up or spun (after drawing) into a coarse twine or strands for binding sheaves or other purposes.

Having thus described our invention, what we claim as new, and desire to secure by Letters Patent of the United States, is—

In a machine for preparing fiber, the combination with the feed roller  $a$ , of the feed roller  $b$ , the shaft  $c$  projecting from the end of said roller  $b$ , the cog wheel  $p$  mounted upon said shaft  $c$ , the oscillating lever  $o$  loosely pivoted on said shaft  $c$ , and projecting upward; the pawl  $w$  pivoted to said oscillating

lever and adapted to push said cog wheel forward, the pawl *s* also pivoted to said lever, and adapted to push said cog wheel backward; the pin *t* projecting from said pawl *s*; the cam plate *u* adapted to engage said pin *t* and keep said pawl *s* clear of said cog wheel during part of the backward stroke of said lever, the connecting rod *m*, crank *k*, and gear wheel *j* mounted on the same shaft with said crank *k*; means for turning said gear wheel *j*; and the gill box *e* and drawing off

rollers *f*, substantially as and for the purposes described.

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