

No. 631,953.

Patented Aug. 29, 1899.

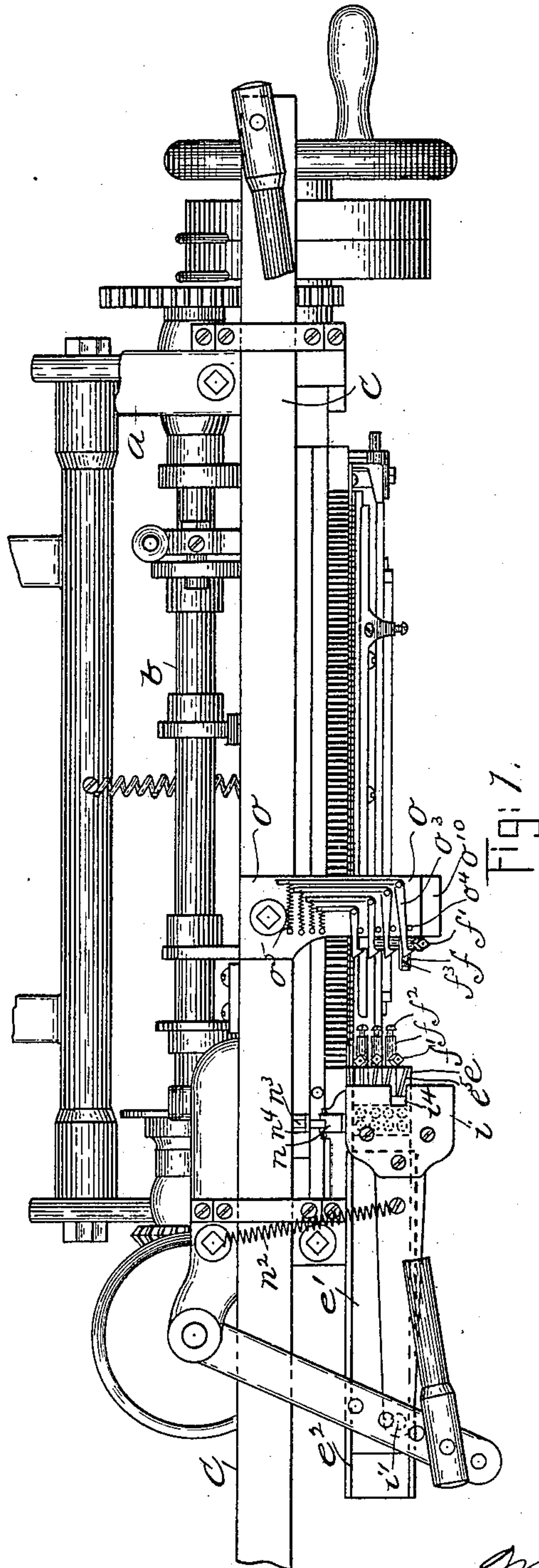
W. COULT.

STRIPING ATTACHMENT FOR KNITTING MACHINES.

(Application filed Sept. 6, 1898.)

(No Model.)

4 Sheets—Sheet 1.



Witnesses:

H. B. Davis.

J. L. Hutchinson

Inventor:

Walter Coult

by B. J. Hayes  
att'y

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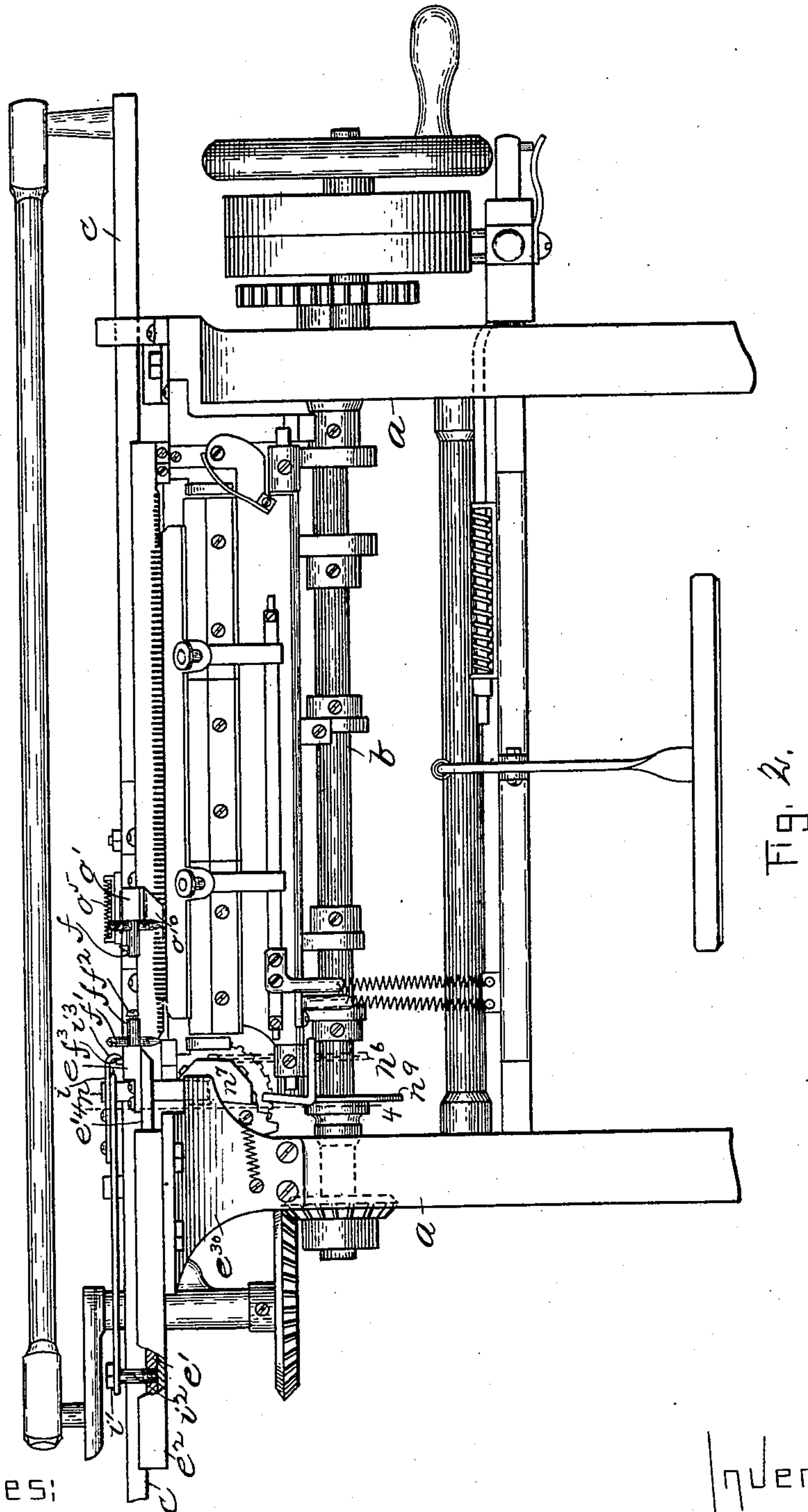
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4 Sheets—Sheet 2.



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H. B. Davis.  
Jesse L. Hutchinson

Inventor:

Walter Coult  
by B. J. Hayes,  
Atty

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4 Sheets—Sheet 3.

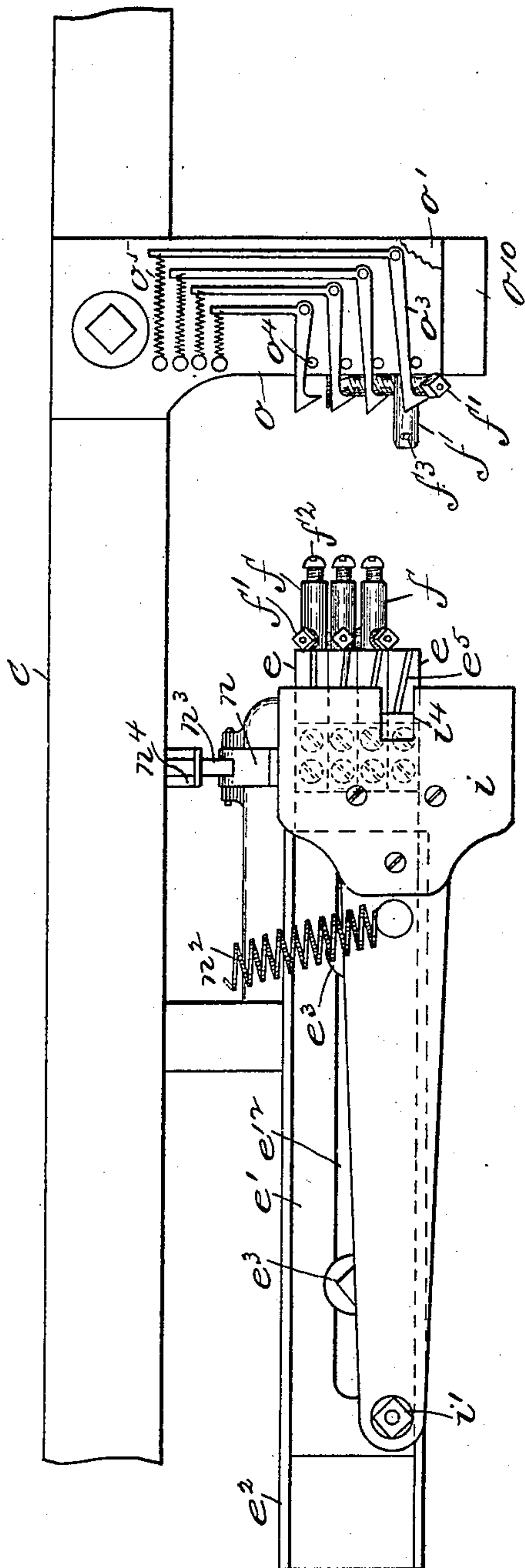


Fig. 3.

Witnesses:

H. B. Davis.  
J. L. Hutchinson

Inventor:  
Walter Coult  
by J. J. Hayes  
Atty.







# UNITED STATES PATENT OFFICE.

WALTER COULT, OF NEEDHAM, MASSACHUSETTS, ASSIGNOR TO THE JOHN F. BROOKS COMPANY, OF SAME PLACE.

## STRIPING ATTACHMENT FOR KNITTING-MACHINES.

SPECIFICATION forming part of Letters Patent No. 631,953, dated August 29, 1899.

Application filed September 6, 1898. Serial No. 690,269. (No model.)

*To all whom it may concern:*

Be it known that I, WALTER COULT, of Needham, county of Norfolk, and State of Massachusetts, have invented an Improvement in Striping Attachments for Knitting-Machines, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

10 This invention has for its object to improve the construction of striping attachments for knitting-machines, it being herein shown as applied to a straight-knitting machine of ordinary construction, and the striping attachment has the capability of working two, three, 15 or more yarns, as may be desired.

In accordance with this invention a number of independent yarn-carriers are provided, there being as many as may be desired, and a repository or stationary receptacle is provided for holding them. The reciprocating draw-bar or equivalent traveling device, hereinafter termed the "traveler," by which the yarn is carried back and forth and 25 delivered to the needles, is provided with a number of engaging devices for engaging said yarn-carriers, there being as many engaging devices as there are yarn-carriers, and means are provided whereby any one of the yarn-carriers may be taken from its holder or receptacle by the traveler and while held by one of the engaging devices thereof will be moved to deliver the yarn to the needles. The means provided for thus controlling the 35 yarn-carriers consists of a locking device for the yarn-carriers and a pattern-chain controlling the position of said locking device. The locking device is constructed and arranged to engage and hold all but one of said 40 yarn-carriers in a position of rest in the receptacle provided for them, and the yarn-carrier which is not thus held may be withdrawn by one of the engaging devices on the traveler, and the pattern-chain is constructed 45 and arranged to automatically operate said locking device, whereby the different yarn-carriers may be disengaged at predetermined times. Means are provided for operating the engaging devices on the traveler to disengage 50 or release any yarn-carrier that may be held

by it and also to engage any other yarn-carrier and withdraw it from its holder.

Figure 1 shows in plan view a knitting-machine provided with a striping attachment embodying this invention; Fig. 2, a front elevation of the machine shown in Fig. 1; Fig. 3, an enlarged detail showing a plan view of the striping attachment; Fig. 4, an enlarged vertical section of a portion of the machine, taken on the dotted line 4 4, Fig. 2; Fig. 5, a 60 detail of a portion of the pattern-chain. Fig. 6, a detail showing the engaging device on the traveler by which any one of the yarn-carriers may be engaged and held by it while delivering the yarn to the needles; Fig. 7, a 65 detail of the holder or receptacle for the yarn-carriers by which they are held in a position of rest and in position to be engaged by the engaging devices on the traveler, the yarn-carriers being removed for clearness; Fig. 8, a 70 longitudinal section of one of the yarn-carriers, and Fig. 9 a detail of the guide-pin through which the yarn passes.

*a* represents the main frame of a machine of the type usually called "straight-knitting 75 machines," *b* the cam-shaft bearing the usual cams by which the machine-needles are operated, and *c* the usual draw-bar bearing the support for the yarn-carriers which are delivering the yarn to the needles and bearing 80 the usual latch-opener, and consequently constituting a traveler.

The yarn-carriers *f*, of which there are four herein shown, each consist of a short cylindrical plug provided about midway its length 85 with a transverse hole through it, which is internally screw-threaded and which receives an externally-screw-threaded tubular pin *f'*, through which the yarn travels, and a set-screw *f<sup>2</sup>* is provided, which is turned into the 90 end of said plug, which is brought to bear against the tubular pin and hold it in place. The plug *f* also has at its opposite end a lateral projection *f<sup>3</sup>*. These yarn-carriers are all made alike, or substantially so, with the 95 exception that the tubular pins may be made of different lengths, for reasons to be hereinafter explained.

Several blocks *e* are rigidly secured to a plate *e'*, which is set in a trough-like support 100



$e^2$ , which is made as a guideway to receive it, and said plate  $e'$  is slotted, as at  $e^{12}$ , (see Fig. 3,) and is secured in position by means of bolts  $e^3$  passing through said slots or otherwise, so that the plate  $e'$ , bearing all of said blocks  $e$ , may be adjusted longitudinally in its support  $e^2$ . The support  $e^2$  is secured to a bracket  $e^{30}$ , which is secured to the machine-frame. The blocks  $e$  are set side by side and close together, and each block has a hole through it, or it may be a socket  $e^4$ , arranged in a horizontal plane, and said holes are adapted to receive the yarn-carriers  $f$ , and as four yarn-carriers are herein shown a corresponding number of blocks  $e$  will be provided. The blocks  $e$  are herein shown as made separate and each secured to the plate  $e'$ , and as a consequence they may be separately detached from said plate  $e'$ ; yet it is obvious that said blocks may all be made integral. The blocks  $e$  each have a slot  $e^5$  at one side—as at the top, for instance—which opens into the horizontal hole  $e^4$  in the block, and the yarn-carriers  $f$  are inserted in the holes  $e^4$ , with the lateral projections  $f^3$  entering and sliding along in said slots  $e^5$ . The yarn-carriers are pushed into the holes  $e^4$  until the tubular pins  $f'$  strike against the ends of the blocks. These blocks  $e$  thus serve as and constitute a repository or receptacle for the yarn-carriers, holding them in a position of rest.

The slots  $e^5$  are herein shown as oblique to the axis of the yarn-carrier or to the length of the holes  $e^4$ , which results in turning the yarn-carriers on their axes as they enter the holes for reasons to be hereinafter explained.

The yarn-carriers  $f$  are held in position in the receptacle or holder by means of a locking device, which, as herein shown, consists of a plate  $i$ , pivoted at  $i'$  to a stud  $i^2$ , projecting upward from the plate  $e'$  at or near the outer end of said plate  $e'$ , and the free end of said plate  $i$  is formed or provided with a hook  $i^3$ , (see Fig. 2,) which is so disposed relative to the receptacle or repository containing the yarn-carriers that it shall engage the upright projections  $f^3$  of said yarn-carriers and by so doing hold them securely in place. It is the intention that said locking device shall allow or permit the release of any one of said yarn-carriers, yet at the same time holding the remaining yarn-carriers, and as four yarn-carriers are herein shown the hooked end of the plate  $i$  is formed with an opening  $i^4$ , substantially midway its width, thereby presenting a hook-shaped portion at each side of said opening  $i^4$  wide enough to engage the projections  $f^3$  of three of the yarn-carriers, and one yarn-carrier, which is opposite or beneath the said opening  $i^4$ , is disengaged or released. The plate  $i$  is moved to and fro on its pivot  $i'$  to bring its opening  $i^4$  into position to release any one of the yarn-carriers, and provision is made for thus moving the plate automatically. The plate  $i$  is held pressed by a spring  $n^2$ , attached to it, continuously against or upon a lever  $n$ , pivoted at  $n'$  to an ear on the

frame, and said lever is held pressed against one end of a sliding bar  $n^3$ , which is supported by a yoke  $n^4$  beneath the draw-bar  $c$ , and said sliding bar  $n^3$  is moved in a direction at right angles to the draw-bar  $c$  to operate the lever  $n$  and thereby move the plate  $i$ . The opposite end of the sliding bar  $n^3$  is beveled, and said beveled end is adapted to be engaged by cams  $n^5$ , formed or provided in one side of a pattern-chain  $n^6$ , which passes over the sprocket-wheel  $n^7$ , secured to a shaft bearing a gear-wheel  $n^8$ , which is engaged and driven by a worm-wheel  $n^9$ , secured to the cam-shaft  $b$ . It will be observed that as the pattern-chain is moved along the sliding bar  $n^3$  will be moved to in turn move the pivoted lever  $n$  and thereby operate the plate  $i$ , which, as above stated, serves as a locking device for the yarn-carriers. The yarn-carriers  $f$  are thus automatically released one at a time at predetermined times by the pattern-chain.

In the drawings, Figs. 3 and 4, it will be seen that the locking device is shown as moved into its outermost position, so that its opening  $i^4$  is opposite the outermost yarn-carrier  $f$  of the set to thereby release said outermost yarn-carrier, and with the parts in this position the sliding bar  $n^3$  will be in its extreme position to the right.

As four yarn-carriers are herein shown, the pattern-chain has three cams  $n^5$ , of different widths, (see Fig. 5,) to thereby move and hold the sliding bar  $n^3$  in three different positions, and as a consequence the locking device  $i$  may be permitted or caused to occupy four different positions, the first one of which is in its normal position of rest, with its stop-pin  $n^{31}$  bearing against one arm of yoke.

On the draw-bar  $c$  an arm  $o$  is rigidly secured, (see Figs. 1, 3, and 6,) which projects therefrom at substantially a right angle, and said arm  $o$  has secured to its under side a block  $o'$ , (see Fig. 6,) having a number of holes  $o^2$  in it, corresponding in size, number, and position with the holes  $e^4$  in the blocks  $e$ . On the top of the arm  $o$  several latches, as  $o^3$ , are pivoted, they each projecting a short distance beyond the front edge or side of said arm, and all of said latches lie in the same horizontal plane, and they are located, respectively, just above the several holes  $o^2$  and are adapted to engage the tubular pins  $f'$  of the yarn-carriers  $f$  to thereby hold said yarn-carriers in their respective holes  $o^2$ . Thus said latches serve as and constitute engaging devices for the yarn-carriers. These latches are held pressed against stop-pins  $o^4$  by springs  $o^5$ .

On the under side of the block  $o^2$  the latch-opener  $o^{10}$  is secured by a screw  $o^{12}$  passing through the shank portion thereof, (see Fig. 6,) and the lower end of the tubular pin  $f'$  of each yarn-carrier must terminate close to said latch-opener to correctly deliver the yarn, and consequently the tubular pins  $f'$  of the several yarn-carriers are made of different lengths, and the latches  $o^3$ , which engage the



upper ends of said tubular pins, turn the yarn-carriers sufficiently to hold the tubular pins in position to correctly deliver the yarn.

As herein shown, three yarn-carriers are contained in the receptacle *e*, and the outermost one is withdrawn therefrom and is held by the arm *o* of the traveler, and each time that said arm *o* approaches the yarn-carriers *f* in the receptacle *e* the latches *o*<sup>3</sup> will engage the tubular pins *f*<sup>1</sup> of all of said yarn-carriers *f*, and as said arm *o* recedes said latches would withdraw all of the yarn-carriers from their sockets if they were not held by the locking device *i*; but being so held said latches will slip off of said pins, and thus disengage said yarn-carriers. Also each time that the arm *o* thus approaches the receptacle *e* and yarn-carriers held by it the outermost yarn-carrier, which is held in engagement with one of the latches *o*<sup>3</sup> on said arm *o*, enters its socket *e*<sup>4</sup> in said receptacle *e*; but being opposite the opening *i*<sup>4</sup> in the locking device *i* it will not be engaged by said locking device, and consequently as the arm *o* recedes it will be again withdrawn. As the outermost yarn-carrier thus repeatedly enters and is withdrawn from its socket its projection *f*<sup>3</sup> will enter and follow along in the oblique slot *e*<sup>5</sup>, and the yarn-carrier will thus be turned on its axis in the hole *o*<sup>2</sup>, and when so turned the lower end of the tubular pin will be moved in a direction away from the latch-opener and far enough so as not to strike the pins of the other yarn-carriers. As the yarn-carrier is thus turned or oscillated the latch *o*<sup>3</sup> engaging it will yield. On the succeeding strokes of the machine this operation is repeated until the locking device or plate *i* is moved by the pattern-chain, and then the next time that the arm *o* approaches the receptacle for the yarn-carriers the yarn-carrier which is being carried back and forth by said arm *o* is thrust into its socket in said receptacle and into engagement with the plate *i*, which yields in an upward direction for the accomplishment of this result, and said yarn-carrier thus becomes engaged and held by the locking device *i*, and as the arm *o* recedes said yarn-carrier will not be withdrawn from its socket because it is thus held, but another one of the yarn-carriers which at such time is opposite the opening *i*<sup>4</sup> of the locking device will be withdrawn from the receptacle. The latches *o*<sup>3</sup> are formed or provided with beveled ends, (see Fig. 3,) so as to pass by and engage the tubular pins *f*<sup>1</sup> of the yarn-carriers at each excursion of the traveler.

I do not desire to limit my invention to the particular construction of traveler for the yarn-carrier which is being moved or operated to deliver the yarns to the needles.

I claim—

1. In a knitting-machine, several yarn-carriers, a receptacle containing them, a traveler and engaging devices borne by it corresponding in number and position to the number and position of the yarn-carriers, said en-

gaging device respectively engaging and holding said yarn-carriers, substantially as described.

2. In a knitting-machine, several yarn-carriers, a receptacle containing them, a locking device for said yarn-carriers and means for operating it to release any one of said yarn-carriers, a traveler, and engaging devices for the yarn-carriers borne by said traveler corresponding in number and position to the number and position of said yarn-carriers, substantially as described.

3. In a knitting-machine, several yarn-carriers, a receptacle containing them, a locking device for said yarn-carriers, automatic means for operating said locking device to release any one of said yarn-carriers, a traveler and engaging devices for the yarn-carriers borne by said traveler, said engaging devices corresponding in number and position to the number and position of the yarn-carriers and operating to respectively engage said yarn-carriers, and withdraw said yarn-carriers from their receptacle when released, substantially as described.

4. In a knitting-machine, several yarn-carriers, a receptacle containing them, a traveler and engaging devices borne by it for said yarn-carriers, corresponding in number and position to the number and position of the yarn-carriers, adapted to withdraw the released yarn-carrier from its receptacle, a locking device and means for operating it to release any one of said yarn-carriers, said locking device also engaging the yarn-carrier borne by the traveler withdrawing it therefrom, substantially as described.

5. In a knitting-machine, several independent yarn-carriers, a receptacle for them, a traveler, and engaging devices borne by it for said yarn-carriers, said engaging devices corresponding in number and position to the number and position of the yarn-carriers and operating to withdraw said yarn-carriers from the receptacle holding them, substantially as described.

6. In a knitting-machine, several independent yarn-carriers, a receptacle for them, a traveler, and engaging devices borne by it for said yarn-carriers, said engaging devices corresponding in number and position to the number and position of the yarn-carriers, and operating to withdraw said yarn-carriers from their receptacle, and means for withdrawing said yarn-carriers from the engaging devices holding them, substantially as described.

7. In a knitting-machine, several independent yarn-carriers, a receptacle containing them, a traveler, and engaging devices borne by it corresponding in number and position to the number and position of the yarn-carriers for withdrawing said yarn-carriers from said receptacle, and means for controlling the withdrawal of said yarn-carriers, substantially as described.

8. In a knitting-machine, several yarn-carriers, a receptacle containing them, a locking



device for said yarn-carriers, having an opening for releasing any one of said yarn-carriers, and a pattern-chain for automatically moving said locking device to bring its opening opposite any one of said yarn-carriers, substantially as described.

9. In a knitting-machine, a traveler, several engaging devices borne by it, and a corresponding number of yarn-carriers adapted to be engaged and oscillated by said engaging devices to bring the delivery end of the yarn-carrier close to the latch-opener and hold said yarn-carriers in such position, substantially as described.

10. In a knitting-machine, a traveler, several engaging devices borne by it and a corresponding number of yarn-carriers adapted to be engaged and oscillated by said engaging devices to bring the delivery ends of the yarn-carriers close to the latch-opener and hold said yarn-carriers in such position, a receptacle for said yarn-carriers and means for oscillating the yarn-carrier borne by the traveler each time it is returned to its receptacle to prevent said yarn-carrier from striking the adjacent yarn-carriers held by said receptacle, substantially as described.

11. In a knitting-machine, a traveler, several engaging devices borne by it and a corresponding number of yarn-carriers adapted to be engaged and oscillated by said engaging device to bring the delivery ends of the yarn-carriers close to the latch-opener and hold said yarn-carriers in such position, said yarn-carriers each consisting of a plug having a tubular pin passing through it transversely, substantially as described.

12. In a knitting-machine, several yarn-carriers each having a lateral projection  $f^3$ , and a receptacle for said yarn-carriers having oblique slots which receive said projections and oscillate the yarn-carriers as they enter the receptacle, substantially as described.

13. In a knitting-machine, a traveler, a latch-opener carried by it, several engaging devices borne by said traveler located side by side for engaging a number of yarn-carriers and for holding them in different relative positions with their yarn-delivering points adjacent said latch-opener, substantially as described.

14. In a knitting-machine, a traveler, a latch-opener and several engaging devices borne by it, a corresponding number of yarn-carriers composed of cylindrical plugs and transversely-disposed tubular pins, said yarn-carriers being adapted to be engaged by said engaging devices and held with the lower ends of the tubular pins adjacent said latch-opener, substantially as described.

15. In a knitting-machine, several yarn-carriers, a receptacle containing them, means for adjusting said receptacle longitudinally, a traveler and engaging devices borne by it corresponding in number and position to the number and position of the yarn-carriers contained in said receptacle, said engaging devices respectively engaging and withdrawing said yarn-carriers from the receptacle and holding them in operative position, substantially as described.

16. In a knitting-machine, the combination of a traveler bearing a latch-opener and having a number of sockets adapted to receive yarn-carriers and means for holding the respective yarn-carriers in their sockets and for oscillating them to bring their yarn-delivery points adjacent the latch-opener, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

WALTER COULT.

Witnesses:

JOHN F. BROOKS,  
B. J. NOYES.