

Philip. Tompkins & Tompkins,  
Knitting Mach.

No. 104,346.

Patented June 14, 1870.

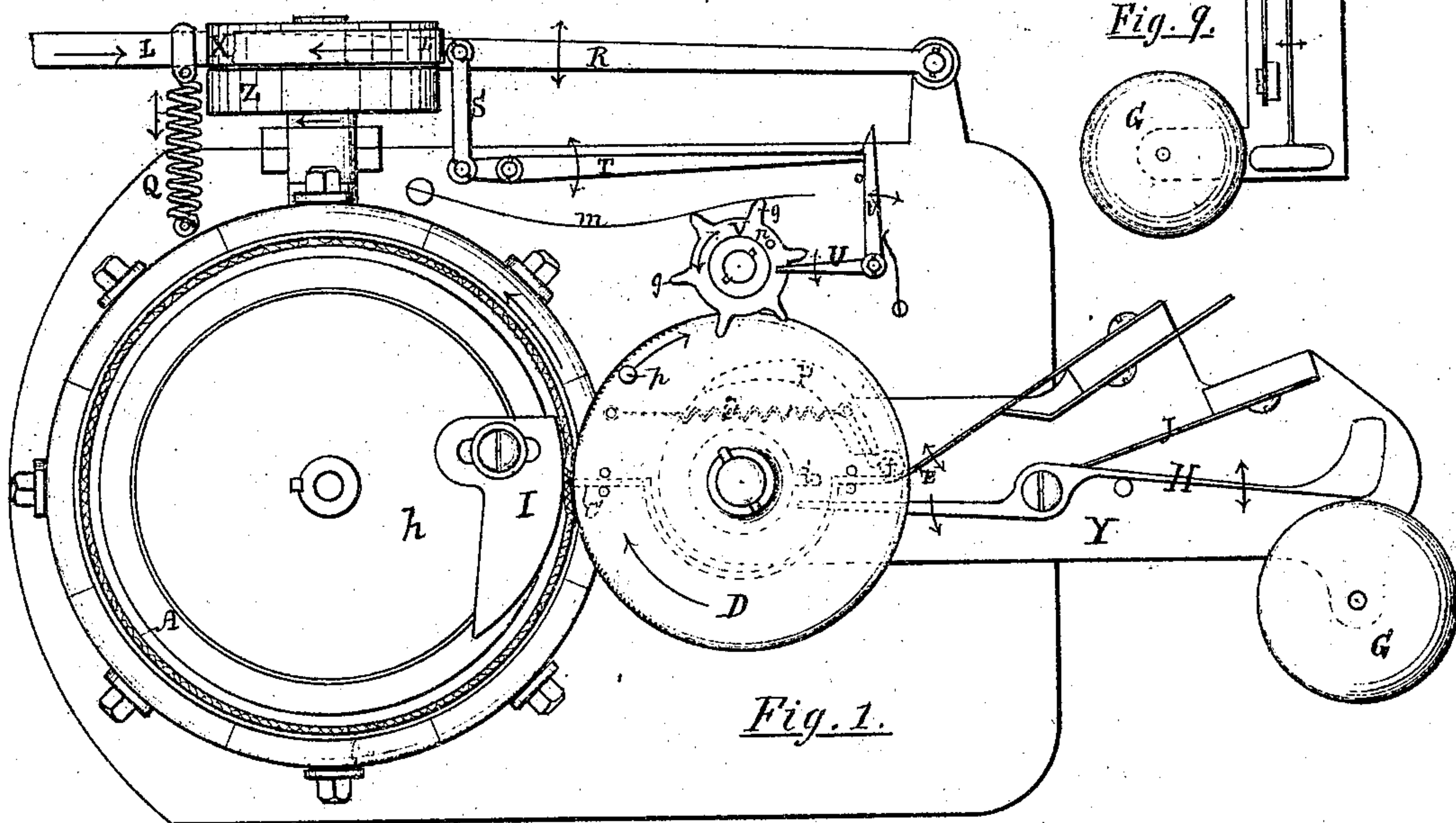
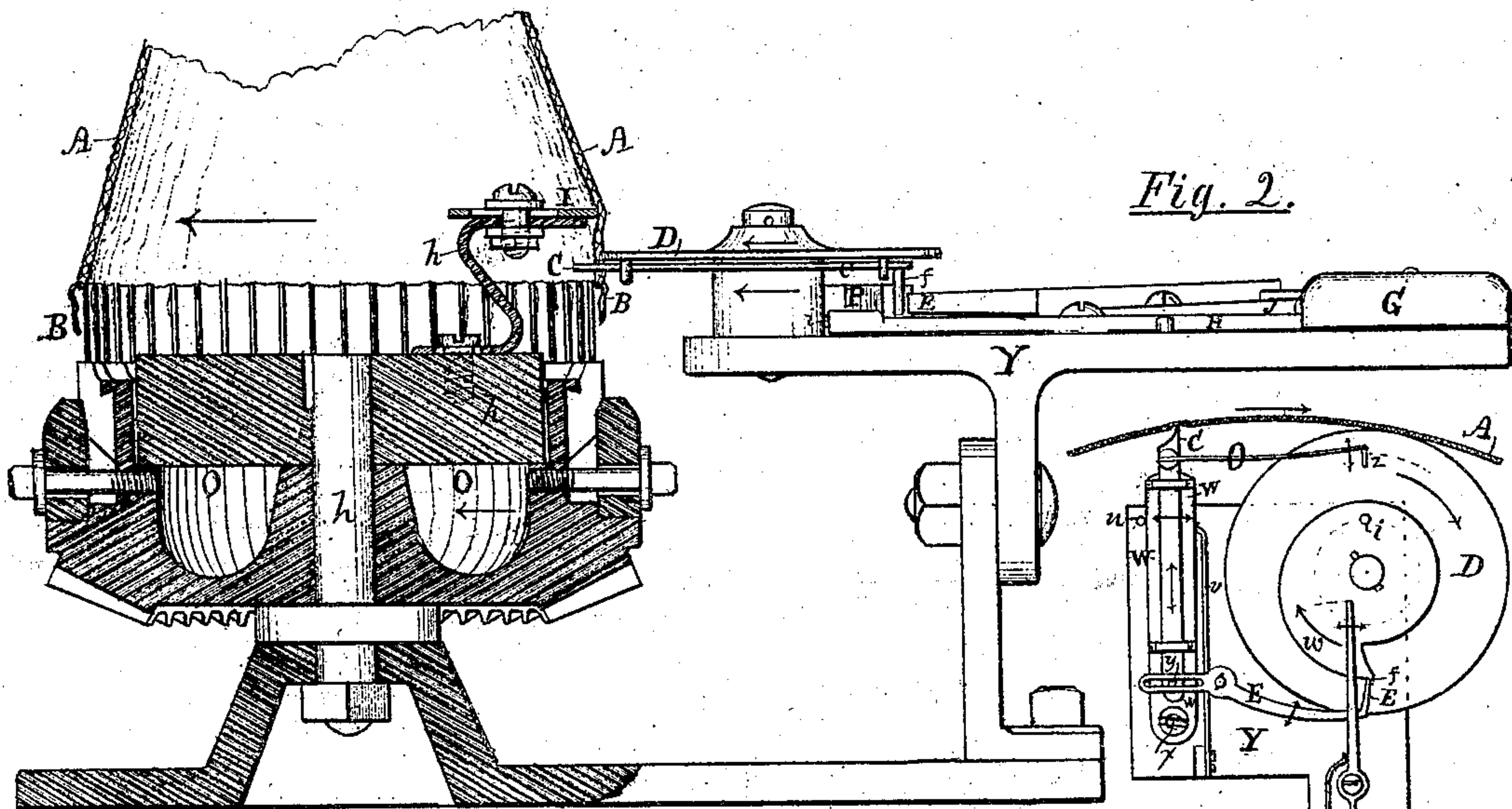


Fig. 9.

Witnesses as to David C. Philip.	Witnesses as to Clark Tompkins & Ira Tompkins.	Inventors:-
Henry P. Watson	Justice Kellogg	David C. Philip
Austin F. Park	Austin F. Park	Clark Tompkins
		Ira Tompkins



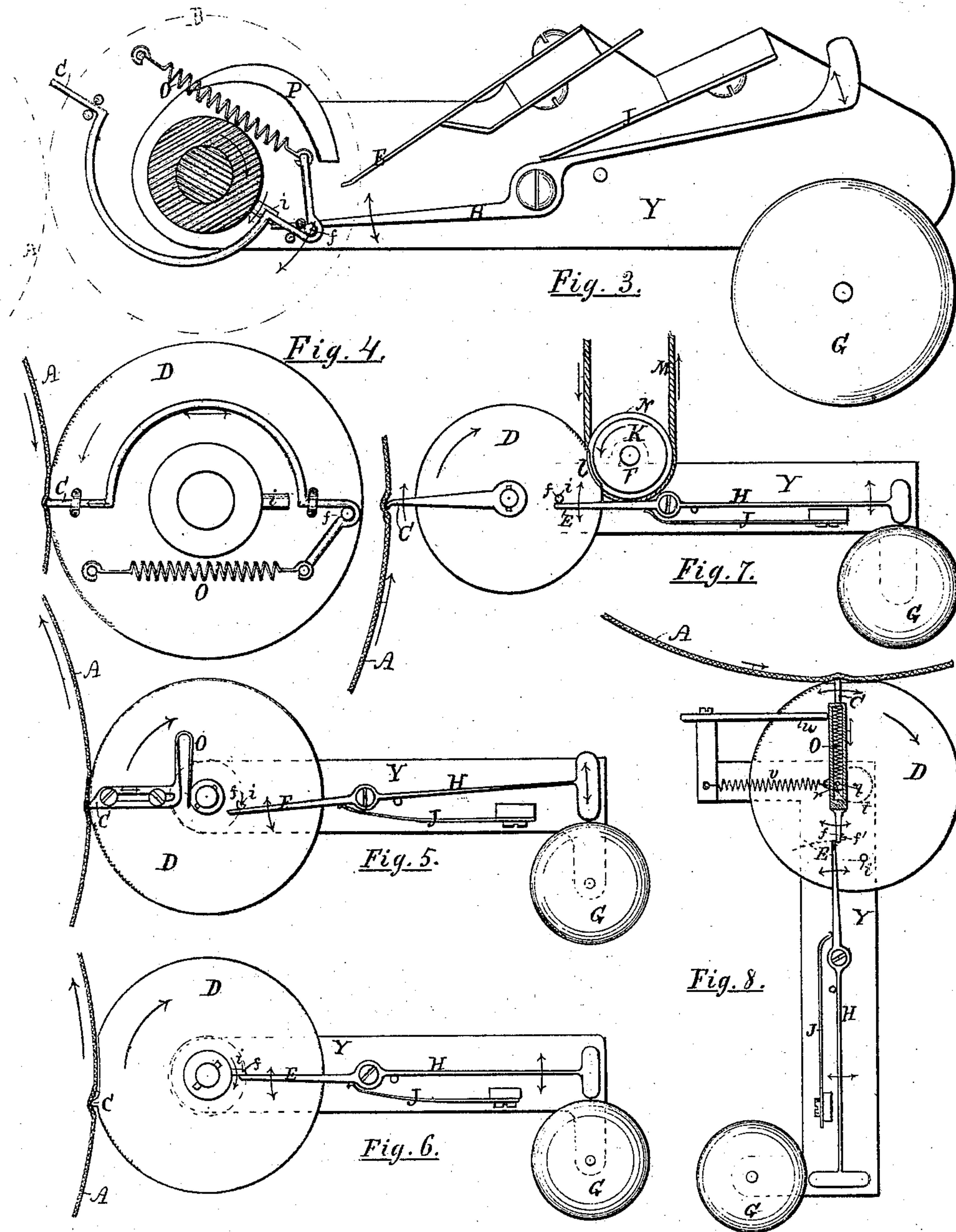
Philip Tompkins & Tompkins,

2 Sheets, Sheet 2.

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Witnesses as to  
David C. Philip.

Witnesses as to  
Clark Tompkins & Ira Tompkins.

Inventors:-

Henry P. Horta  
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# UNITED STATES PATENT OFFICE.

DAVID C. PHILIP, OF PHILMONT, AND CLARK TOMPKINS AND IRA TOMPKINS,  
OF TROY, N. Y., ASSIGNORS TO CLARK TOMPKINS, OF SAME PLACE.

## IMPROVEMENT IN KNITTING-MACHINE.

Specification forming part of Letters Patent No. **104,346**, dated June 14, 1870.

*To all whom it may concern:*

Be it known that we, DAVID C. PHILIP, of Philmont, in the county of Columbia, and CLARK TOMPKINS and IRA TOMPKINS, of Troy, in the county of Rensselaer and State of New York, have jointly invented certain Improvements in Knitting-Machines, of which the following is a specification, reference being had to the accompanying drawing.

This invention relates to devices for use in giving alarms or stopping circular-knitting machines when holes occur in the fabric in knitting by such machines.

In various circular-knitting machines hitherto made a pivoted or sliding finger has been arranged so as to bear or spring against the knitted fabric close to the needles in spiral lines around the tubular web as the latter was produced, and so that the finger would catch or spring into a hole in the fabric, and then turn or move so as to actuate a stopping mechanism, and thereby cause the machine to stop at the very first time that the finger caught or sprung into a hole in the fabric. But we do not know or believe that in any such case the finger was reset against the fabric automatically and without any action by any person.

It is, however, quite unprofitable to have the machine stopped for every hole that occurs in the fabric, or that the finger catches into. Many such holes are caused by the dropping of a stitch or two or the parting of the yarn in the needles, and will at once knit up; and to have the machine stopped for such holes causes a serious deficiency in the quantity of fabric produced by the machine. But whenever a needle becomes bent or broken, so as to leave a line of holes in the fabric or a hole that will not knit up, it is, in such case, of importance that the machine should be stopped and the defect repaired.

We are aware that it has been heretofore proposed to have in a circular-knitting machine a small metallic wheel, held against one side of the fabric by a spring and connected with an electric battery and an electro-magnetic bell-striking apparatus, so that, when a hole occurred in the fabric, the said wheel would enter the hole, and therein come in contact with a metallic surface on the opposite side of the fabric, so as to complete the electric

circuit and cause the bell to sound an alarm, which alarm would be repeated, without any resetting of the wheel by any person, whenever the wheel again entered a hole in the fabric, or at every revolution of the machine when a hole occurred that would not knit up. But we believe such an alarm apparatus requires the employment of an electric battery and an electro-magnetic bell-striking mechanism too expensive and troublesome for common use with an ordinary circular-knitting machine.

The primary object of our invention is to produce a mechanical device which, when applied to a circular-knitting machine, may be made, by strictly mechanical means, to automatically actuate an alarm apparatus or operate an indicator or counting device connected with a mechanism for stopping the machine at every revolution of the latter whenever a hole that will not knit up occurs in the fabric.

One part of our invention consists of a movable finger, suited to bear against the fabric near the needles in a circular-knitting machine and catch into a hole in the fabric, and thereupon move, in combination with a mechanical device, essentially such as any hereinafter described, for automatically resetting the finger against the fabric, so that, when this part of our invention is applied to a circular-knitting machine, substantially as hereinafter set forth, and a hole that does not knit up occurs in the fabric, the said finger then catches into such hole, and thereupon moves and thereby release or actuates the finger-resetting device, and is by the latter automatically reset against the fabric, all at every revolution of the machine, or at every time the finger passes the hole.

Another part of our invention consists in the combination of an alarm-bell or its equivalent with the aforesaid part of our invention in such manner that, with this combination applied to a circular-knitting machine, essentially as hereinafter described, the alarm-bell or its equivalent is thereby struck or sounded at every revolution of the machine whenever a hole that does not knit up occurs in the fabric.

On Sheet I of the accompanying drawing Figure 1 is a plan, and Fig. 2 a sectional ele-



vation, of a portion of a knitting-machine with one form of our invention applied thereto, and Figs. 3 and 4 on Sheet II are plans or parts of the same mechanism. Figs. 5, 6, 7, and 8 on Sheet II and Fig. 9 on Sheet I represent modifications of our invention.

Similar parts are marked by like letters in the different figures, and the arrows therein indicate the directions in which the parts move.

A is a portion of the tubular knitted fabric, which extends from the cylindrical, radial, or other circular series of needles in a knitting-machine, the said series of needles being either rotary, as shown in Figs. 1 and 2, or stationary, and of the common spring-barbed kind, (shown at B in Fig. 2,) or of the well-known "latch" or other suitable variety, and combined with the usual or other suitable knitting appliances and taking-up mechanisms for producing and drawing off the tubular fabric.

C is a movable finger or feeler, which bears against the tubular fabric A and catches into a hole in the fabric, and thereupon moves.

D is an intermittently-revolving wheel or disk, which is so combined with the finger or feeler C that, while the knitting goes on properly, the said wheel or disk is held stationary, and that, when the same finger or feeler catches into a hole in the fabric and thereupon moves, the said wheel or disk D thereupon turns and makes one revolution, and in so doing resets the feeder or finger against the fabric, and is itself stopped and held fast again, all before the knitting-machine makes a revolution or knits once around the tubular web.

The finger C is stopped and retained in its set position against the fabric, and the wheel or disk D is also stopped and prevented from turning at the end of each revolution thereof, by a detent, E, which engages either directly or indirectly with a pin or projection, *f*, on the wheel or disk or finger, but which is temporarily removed or rendered ineffective, so as to permit a revolution of the wheel or disk, by the movement of the finger when the latter catches into a hole in the fabric.

G is a gong or bell, which is sounded by a hammer-headed lever, H, which is forced away from the bell or gong as the wheel or disk D turns by a pin or projection, *i*, on the wheel or disk, and which is struck against the gong or bell by a spring, J, upon being released by the said pin or projection.

In returning and readjusting the outwardly-springing finger against the fabric, we generally prefer to have the finger retracted against or released from the outward pressure of its spring O by the action of mechanical devices. Accordingly, in the mechanism shown by Figs. 1, 2, 3, and 4, the finger C, which is mounted upon and turned around with and by the disk D, and which is shown sprung out in Figs. 2 and 3, is retracted as the disk turns by a pin or projection, *f*, on the finger passing along a fixed cam, P, Fig. 3, which pin *f* leaves the cam P and meets the adjustable yielding de-

tent E, Fig. 3, so as to let the retracted finger be pressed against the fabric by the spring O, as in Figs. 1 and 4, just as the finger and disk complete a revolution. In this case Fig. 3 is a horizontal section just at and plan of parts below the under surface of the disk D in Figs. 1 and 2, and Fig. 4 is a plan of the under side of the same disk with the outwardly-sprung finger attached thereto.

A simple form of our invention is illustrated by Fig. 6 on Sheet II, wherein the finger C is fast on the disk D, which is prevented from turning until the finger catches into a hole or imperfect place in the fabric A, and which is stopped at the end of its every revolution by the same pin or projection *f* and hammer-headed detent-lever E H and spring J that effect the striking of the bell or gong G, and each revolution of the disk, when commenced by the finger catching into a hole or imperfect place in the fabric, is completed by the bearing of the disk directly against the fabric itself.

In Fig. 7 the finger C is fast on the disk D, which, upon being turned a little by the fabric when the finger catches into a hole therein, has its revolution completed by the elastic or frictional circular surface of a constantly revolving wheel or pinion, K, bearing against the circular portion of the edge of the disk, a part of the latter being removed at *l*, so that the driver K does not tend to turn the disk while the finger is held stationary against the fabric by the same devices that serve in striking the gong or bell. The driver K is to be constantly revolved by being connected with the knitting-machine by a band, M, and pulley N or other suitable means.

In case the finger C is fast on the disk D and held against the fabric by means of the bell-striking devices, as shown in Figs. 6 and 7, the knitting-machine should turn slowly, in order that the finger may operate properly; and we generally prefer to have the finger movable independently of the disk, and pressed against the fabric by a spring, O, Figs. 3, 4, 5, 8, and 9, so that the spring will dart the finger into a passing hole in the fabric, and thereby more effectually insure the action of the alarm apparatus when a small hole shall occur in the quickly-passing web.

In Fig. 5 the outwardly-springing finger C is mounted on and revolved by the disk D, and, in being reset against the fabric A, is forced back against the pressure of its spring O by being pressed along the fabric by the disk as the latter completes its revolution.

In Fig. 8 the finger C is pivoted to the disk D by a pin, *q*, on which is a block or box, *r*, which is fitted to slide in a slot in the finger, and which compresses the spring O in the slot, and thereby presses the finger against the fabric, while the finger and disk are held stationary by a pin, *f'*, which is fast on the disk, and bears against the rear part, *f*, of the finger, while the latter bears against the detent-arm E of the bell-striking lever. In this



case, when a hole occurs in the fabric the finger C is thrust into the hole by the compressed spring O, and by such movement of the finger and disk are released from the detent E, so as to permit the finger to be turned on its pivot *q* and the disk to be revolved by contact with the fabric. As the disk makes a revolution the pivot-pin *q* describes a small circle, marked by the dotted line *t*. By the approach of the pivot-pin to that point in its revolutions which is farthest from the fabric, the finger is retracted from the fabric, and is thereupon drawn back against a fixed adjustable stop, *u*, by a spring, *v*; and as the pivot-pin then completes a revolution, it first moves the finger endwise to the fabric, and then presses the finger against the fabric with a yielding force by sliding the box or block *r*, and thereby compressing the spring O in the finger.

In Fig. 9 the finger C is detached from the disk D, which is turned by its contact with the tubular fabric A. The finger is fitted to slide endwise in a stock, *w*, which is pivoted at *x* to a bed, Y, and is ordinarily held stationary thereon against a stop, *u*, by a spring, *v*. The spring O, which presses the finger against the fabric, is fast at one end to the finger, and is at its other end pressed against by a pin, *z*, fast on the disk. The rear end of the finger is connected by a pin, *y*, with the slotted arm of the detent-lever E, which engages with the projection *f* on the disk, and thereby prevents the revolution of the disk while the finger is set; but when a hole occurs in the fabric, the spring O forces the finger into the hole, and that motion of the finger moves the detent-lever E, and thereby lets the disk D turn so as to at once release the spring O and instantly free the finger and let it back out of the hole in the fabric. As the disk continues and completes its revolution a cam, *w*, and projection *f* on the disk reset the finger against the fabric and stop the revolution of the disk by means of the lever E, and the pin *z* on the disk rebends the spring O.

As shown in Fig. 1, a pin, *p*, may be secured fast on the disk D, so as to turn a toothed counting, indicating, or regulating wheel, V, one step at each revolution of the disk. In one of the step-by-step movements of the wheel V in turning once around, a pin, *n*, thereon trips a detent-lever, U, and thereby liberates a lever, T, which is connected by a link, S, to a belt-shifting lever, R, which is operated by a spring, Q, so as to shift a driving-belt, L, from a pulley, X, by which the knitting-machine is driven onto a loose pulley, Z, whenever the lever U is tripped by the pin *n* on the counting-wheel. A spring, *m*, gently holds the indicator-wheel V at the end of each step thereof in proper position for the action of the pin *p* on the disk D, and the wheel V may be turned and adjusted by hand, so that the pin *n* thereon shall trip the detent U, and thereby cause the machine to stop at any de-

sired number of revolutions of the disk D not exceeding the number of teeth *g* on the regulating-wheel.

In Figs. 1 and 2 a support, I, is constantly held against the inner surface of the revolving fabric A, nearly opposite to the place where the finger C and disk D bear against its outer surface, so as to sustain the fabric against the pressure of the finger and disk, and thereby make the finger more surely catch into a hole in the fabric, and thereupon move and at the same time cause the disk to make a complete revolution and reset the finger against the fabric with greater certainty at whatever point in the circumference of the fabric a hole shall occur than if the fabric were not thus supported against the finger and disk.

The part *h*, which holds the web-support I, and the stock Y, which supports the finger device for resetting the finger and bell-striking apparatus, are each stationary, as in Figs. 1 and 2, in case the circular series of needles revolves, and are revolved about the series of needles whenever the latter shall be stationary in knitting.

We apply our aforesaid invention either to the outer surface of the tubular fabric, as shown in Figs. 1, 2, 5, 6, 7, and 8, or to the inner surface thereof, as indicated in Fig. 9; and the finger-resetting disk D may be revolved by a continually-turning friction plate or wheel constantly bearing lightly against the edge or the side of the disk, instead of by the fabric, or as in Fig. 7.

What we claim as our invention, and desire to secure by Letters Patent, is—

1. The combination of a finger suited to bear against the knitted fabric near the needles in a circular-knitting machine and catch into a hole in the fabric, and thereupon move, with means substantially as herein described, or their equivalent, for automatically resetting the finger against the fabric, substantially as herein set forth.

2. The combination of a finger suited to bear against the knitted fabric near the needles in a circular-knitting machine and catch into a hole in the fabric, and thereupon move a bell-striking device or alarm mechanism, and means substantially as herein set forth, or their equivalent, for automatically resetting the finger against the fabric, substantially as herein described.

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