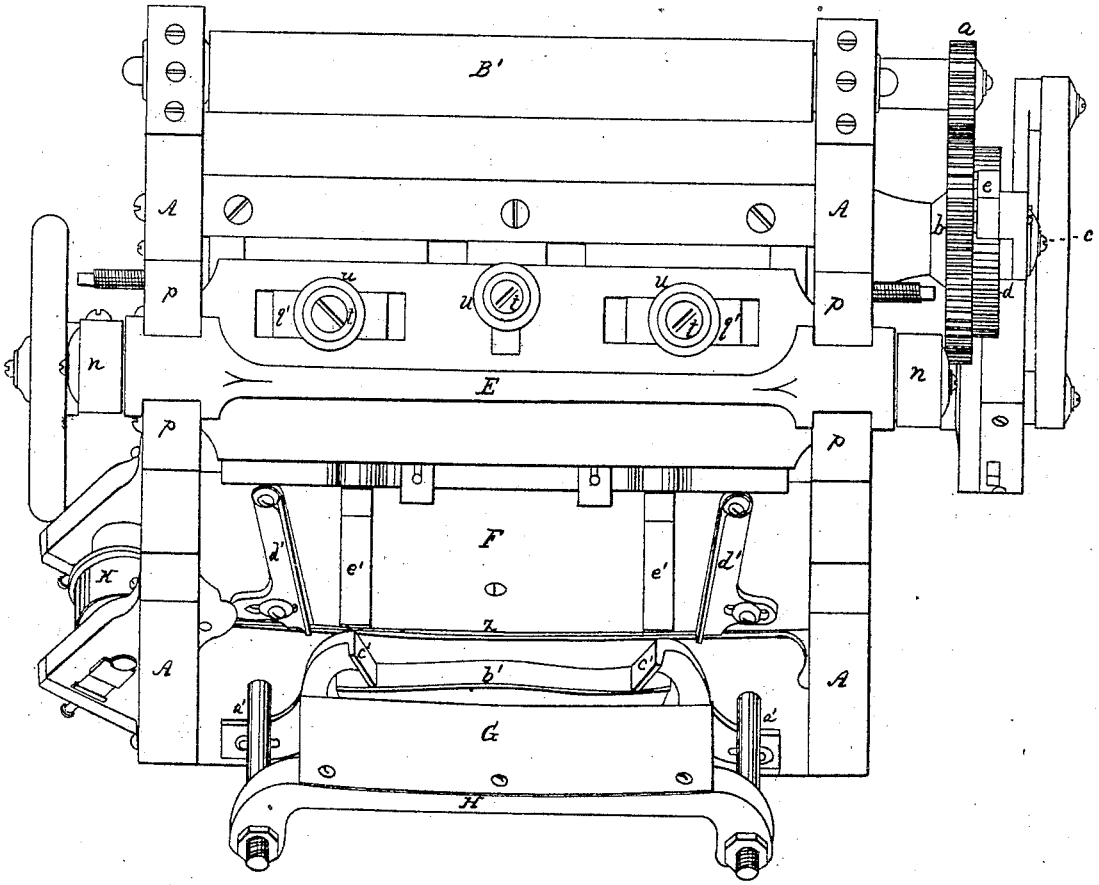
Sheet. 1. 8 Sheets.

# G. K. Snow.

# Collar Mach.

No. 51,234. Patented Nov. 28. 1865.

Fig. 1.

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Sheet 2. 8 Sheets.

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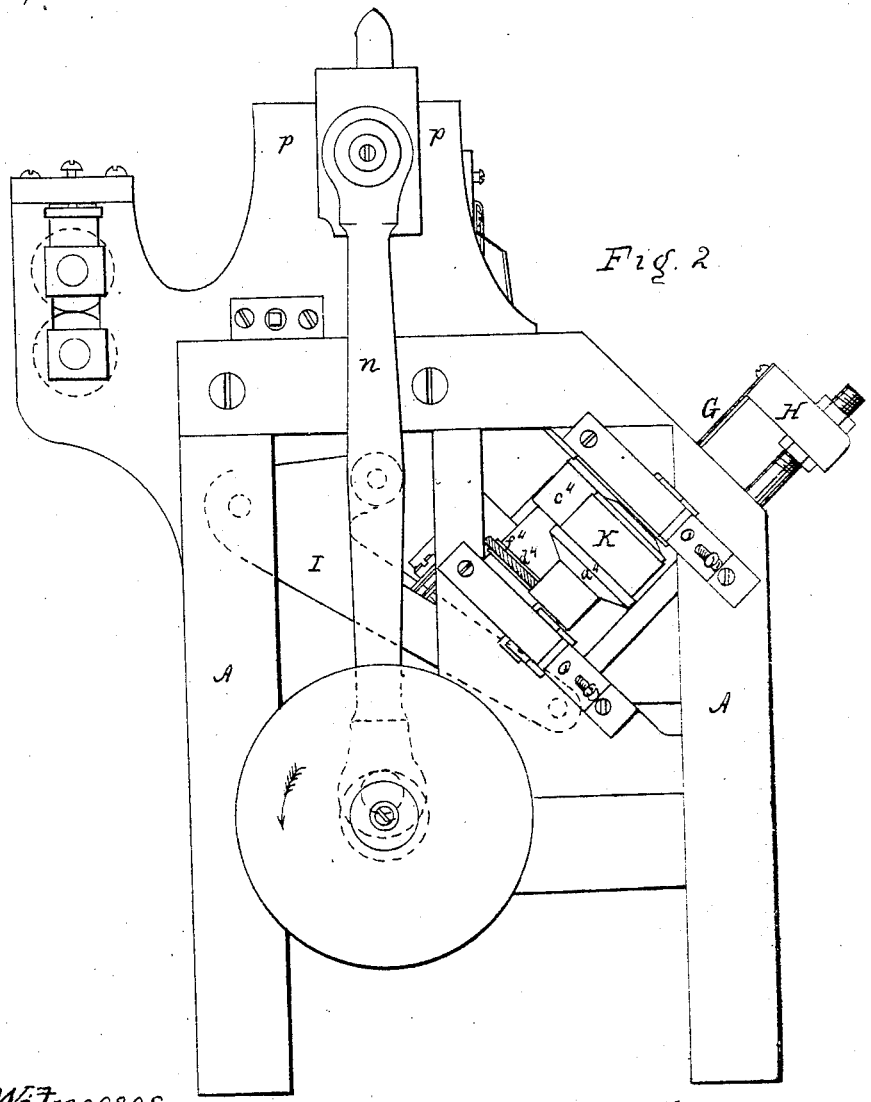
## Collar Mach.

No. 51,234. Patented Nov. 28. 1865.

Fig. 2.

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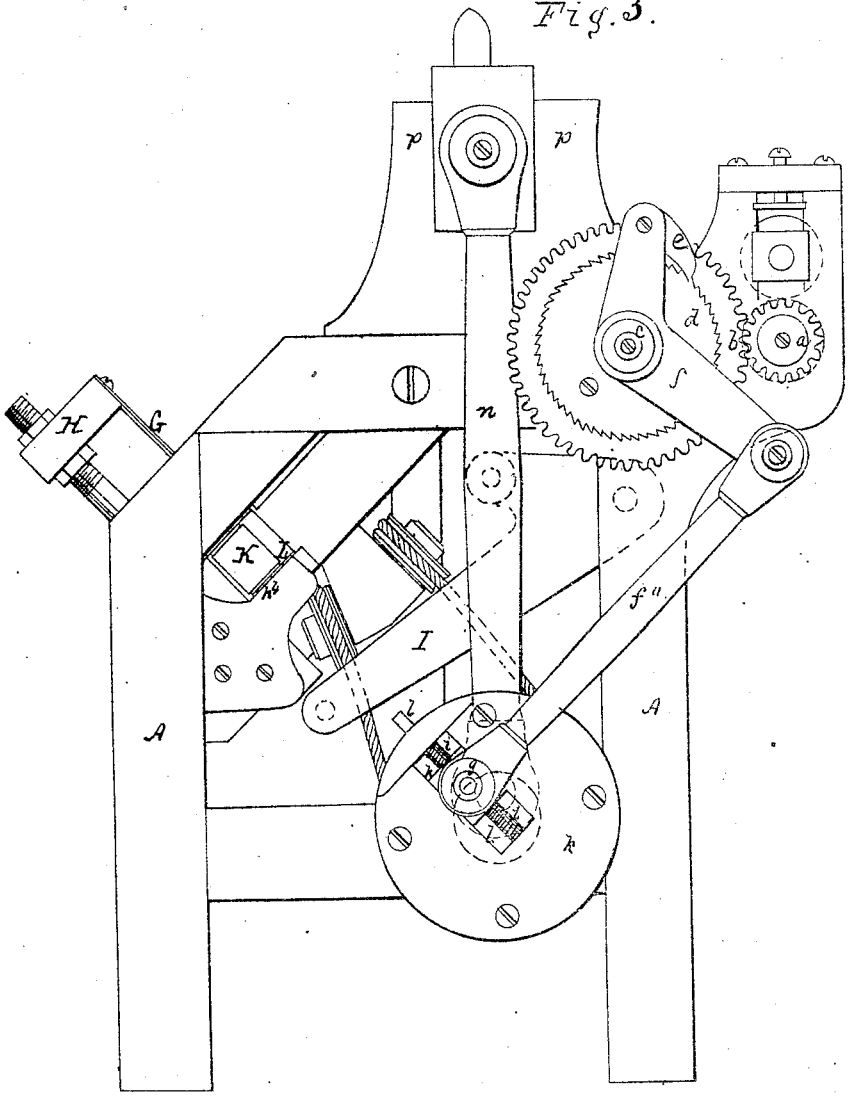
## Collar Mach.

No. 51,234. Patented Nov. 28. 1865.

Fig. 3.

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Collar Mach

No. 51,234.

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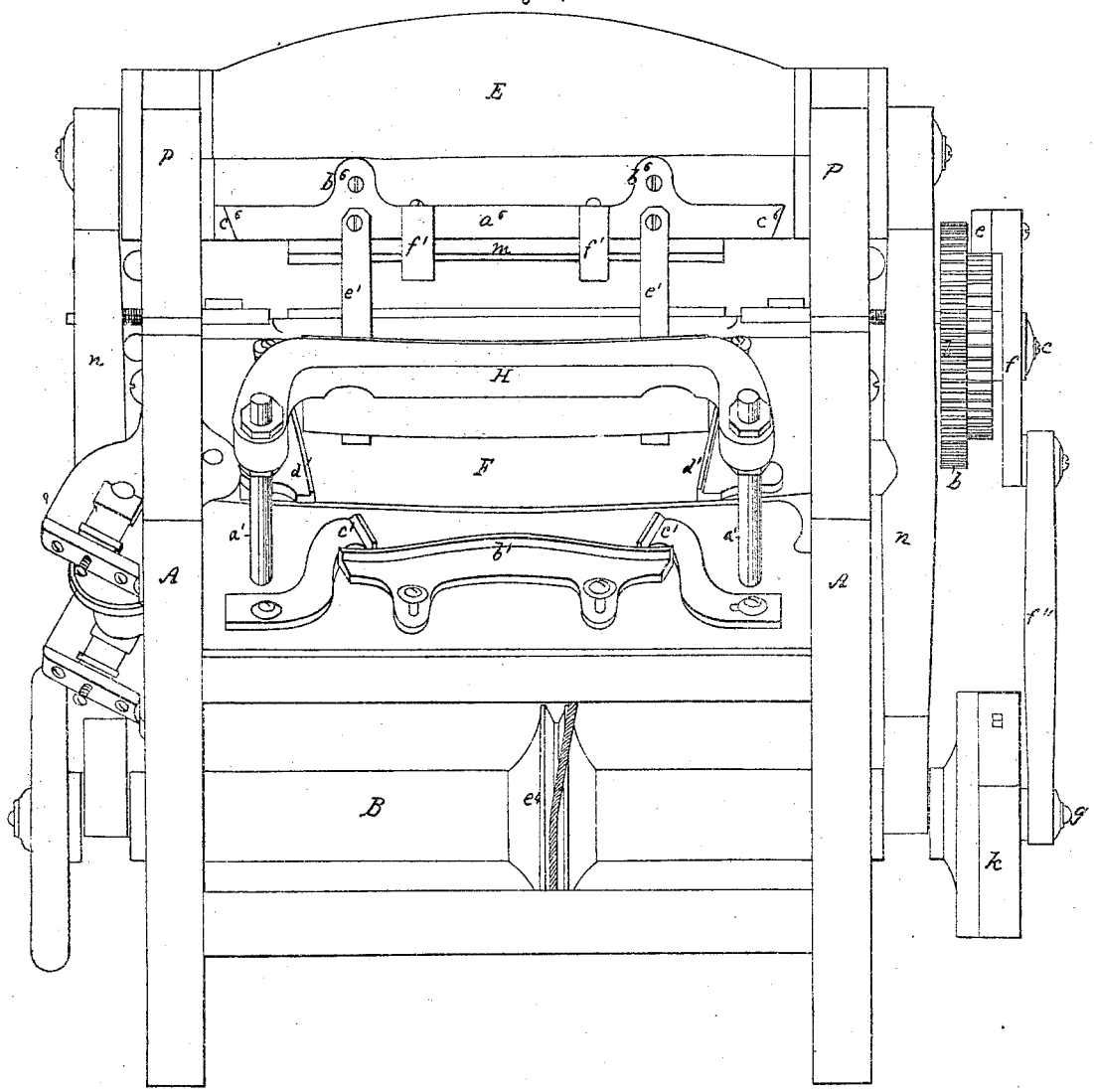
Fig. 4.

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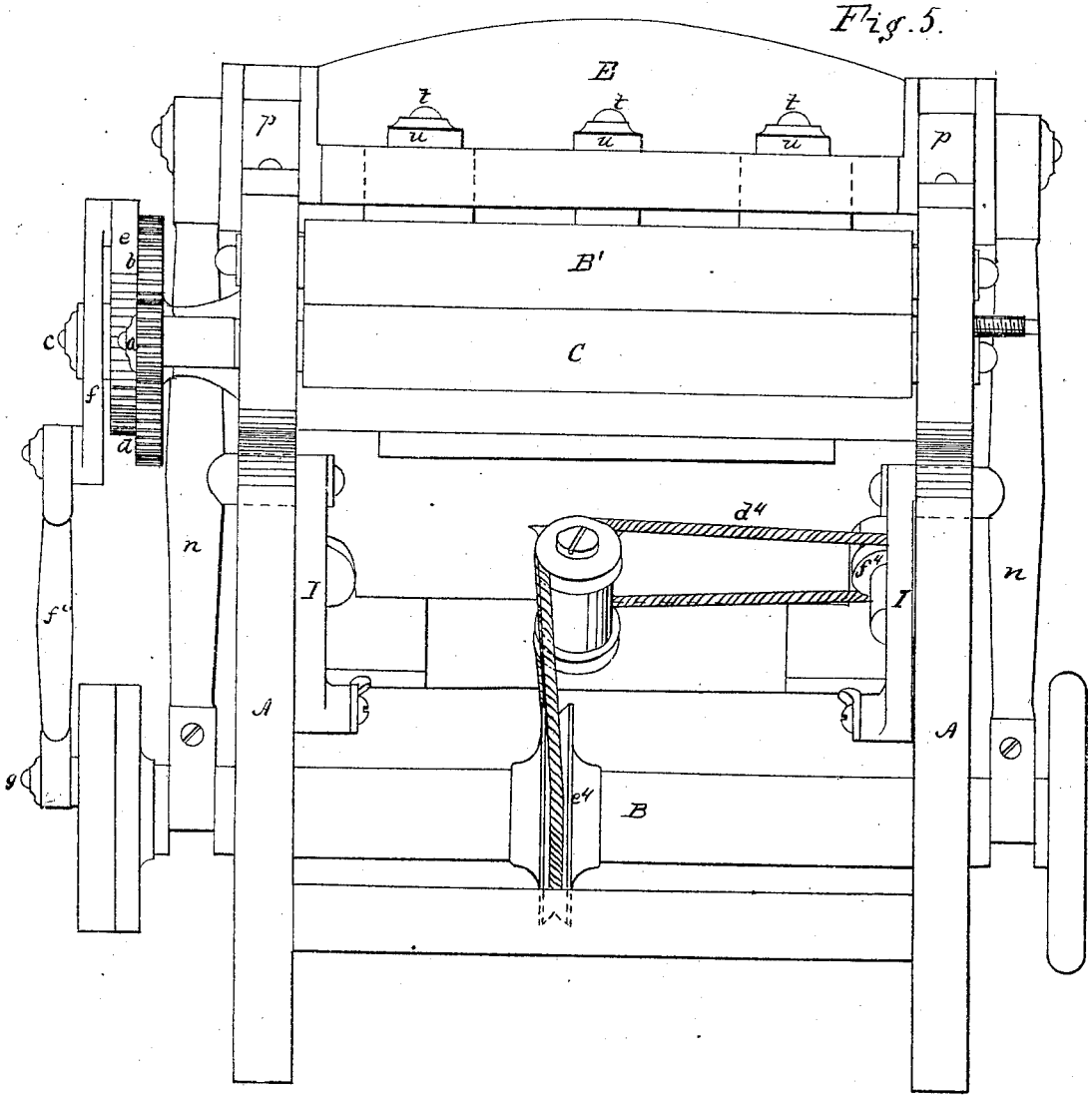
No. 51,234.

Patented Nov. 28, 1865.

Fig. 5.

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Sheet 6. 8 Sheets.

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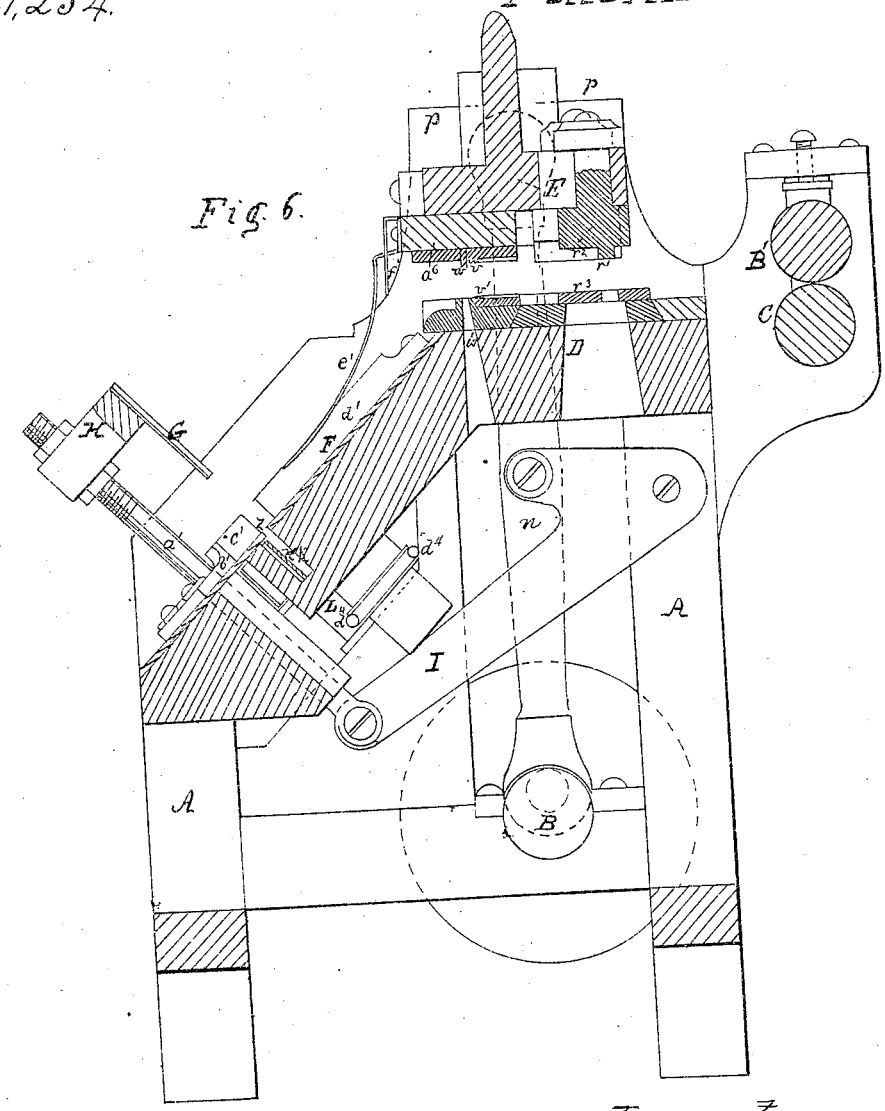
## Collar Mach.

No. 51,234. Patented Nov. 28. 1865.

Fig. 6.

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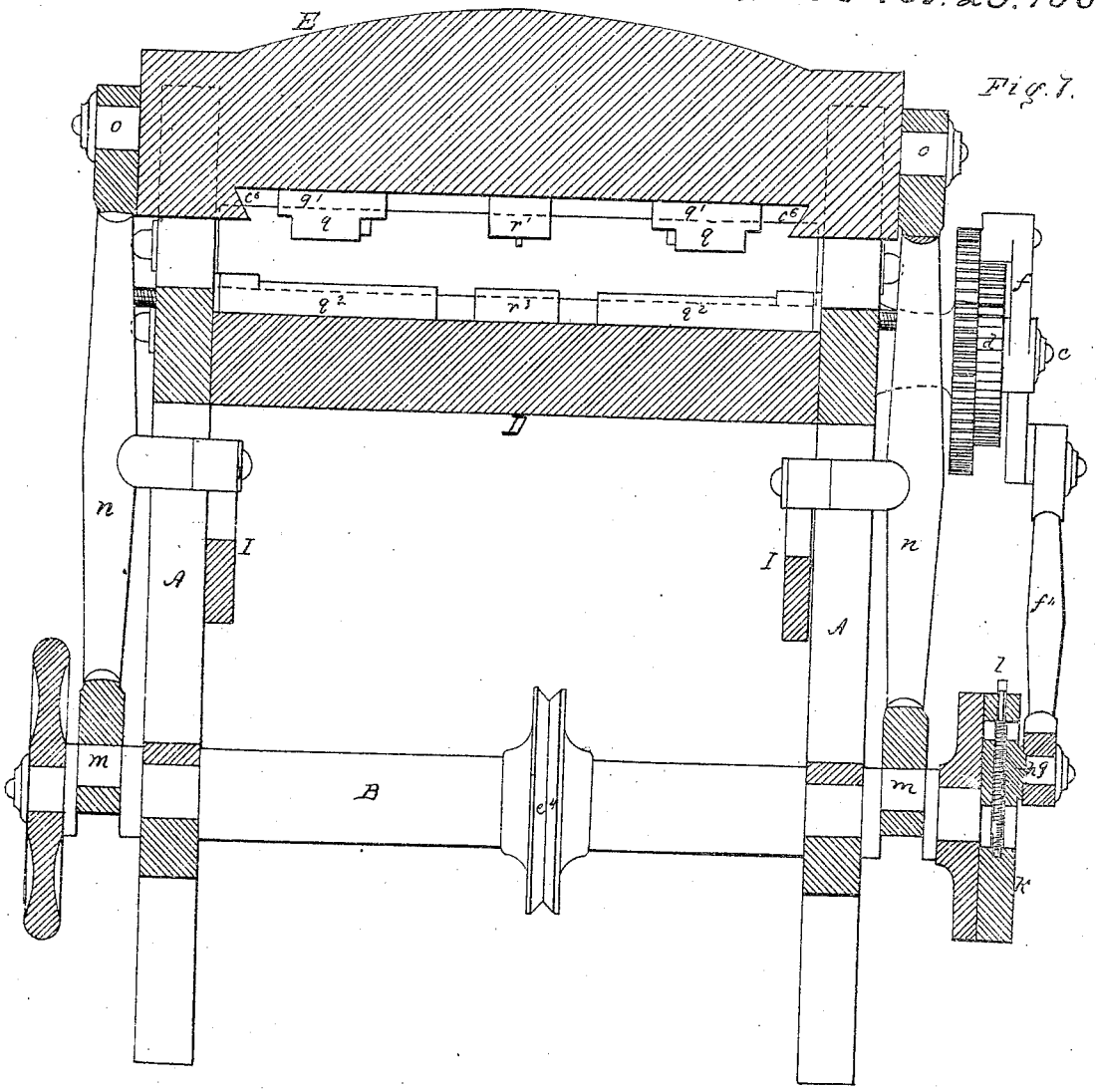
Sheet 1. 8 Sheets.

Collar Mach.

No. 51,234

Patented Nov. 28. 1865

Fig. 1.

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Sheet 8. 8 Sheets.

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## Collar Mach.

No. 51,234. Patented Nov. 28. 1865.

Fig. 8.

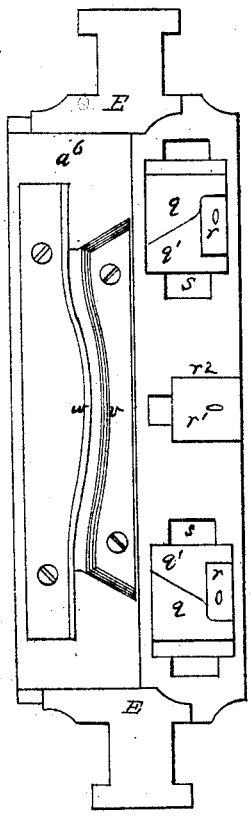



Fig. 9.

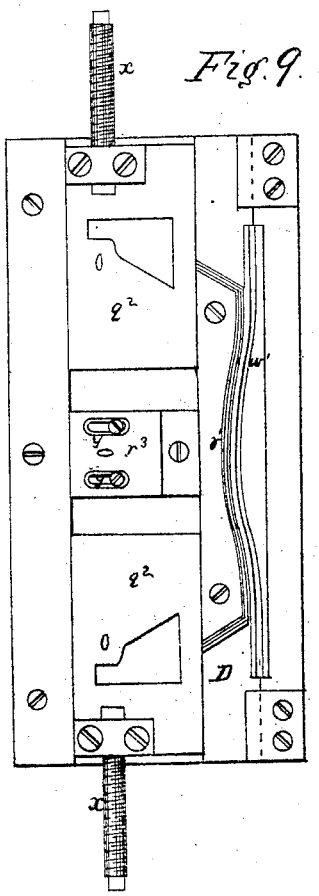
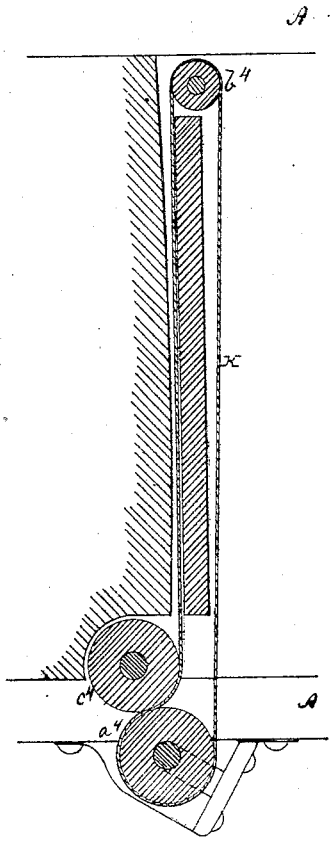



Fig. 10.

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# UNITED STATES PATENT OFFICE.

GEORGE K. SNOW, OF WATERTOWN, MASSACHUSETTS, ASSIGNOR TO HIMSELF, MARCH BROTHERS, AND PIERCE & CO.

## IMPROVEMENT IN PAPER-COLLAR MACHINES.

Specification forming part of Letters Patent No. **51,234**, dated November 28, 1865.

*To all whom it may concern:*

Be it known that I, GEORGE K. SNOW, of Watertown, in the county of Middlesex and State of Massachusetts, have invented a new and useful or improved machine for manufacturing shirt-collars from sheets of paper or other material or composition of materials; and I do hereby declare the same to be fully described in the following specification and represented in the accompanying drawings, of which—

Figure 1 is a top view, Figs. 2 and 3 are end elevations, Figs. 4 and 5 front and rear elevations, and Fig. 6 a central vertical and longitudinal section, of it. Fig. 7 is a vertical section taken transversely of the machine, and through the stamping-platen, its cutters and dies, and the mechanism for operating such platen. Fig. 8 is an under-side view of the platen and its cutting and embossing dies. Fig. 9 is a top view of the bed and its embossing and cutting dies. Fig. 10 is a longitudinal section taken through the mechanism for discharging a collar from the machine after such collar may have been folded by it.

The automatic machine hereinafter described is not only intended to manufacture or stamp shirt-collars from a continuous sheet of paper, but to emboss each collar on both of its opposite sides in imitation of stitching, and finally fold over a portion of the collar on the rest of it and curve and discharge such collar from the machine.

In the drawings, A denotes the frame of the machine, a driving-shaft, B, being located within and across the lower part of such frame.

At the rear part of the frame is a pair of feed-rollers, B′ C, on the shaft of the lower one of which a pinion, *a*, is fixed. The said pinion engages with a gear, *b*, which is arranged on a stationary shaft, *c*, and has a ratchet, *d*, fastened to its side. An impelling-pawl, *e*, carried by the shorter arm of a bent lever, *f*, which has the shaft *c* for a fulcrum, engages with the ratchet. The longer arm of the lever *f* is jointed to a connecting-rod, *f*″, which, at its lower end, receives a crank-pin, *g*, projecting from a slider, *h*, which is arranged within a groove, *i*, made radially in the side of a drum or pulley, *k*. An adjusting-screw, *l*, properly applied to the pulley and slider, serves to move the slider either toward or away from the axis of the pulley, and to hold it in any position within the groove and relatively to such axis. The object of the slider and its adjusting-screw so applied to the pulley and its crank-pin is to enable the movement of the feed-rollers to be adjusted or regulated as may be required, as the collars to be cut may vary in width from time to time.

The drum *k* is fixed on the driving-shaft, and is revolved with and by it, and in so doing it will impart a reciprocating movement to the lever and pawl, whereby by the action of the pawl and ratchet the feed-rollers will have a corresponding intermittent rotary motion imparted to them.

In advance of the feed-rollers are a bed, D, and a platen, E, the bed being stationary and the platen being movable vertically over it within the frame of the machine. The vertical movements of the platen are effected by means of bell-cranks *m m* on the driving-shaft and connecting-rods *n n* extending from such cranks to and so as to turn on journals *o o* projecting from the ends of the platen. The said platen, at or near each of its ends, is arranged between two guides, *p p*, by which it is guided in its vertical movements.

There are applied to the platen, and so as to project from its lower surface, two adjustable male dies, *q q*, for forming the ends of a collar, each of such dies being conjoined with one of two male dies, *r r*, or punches, for the formation of button-holes at or near the ends of the collar. The blocks *q′ q′*, from which the dies *q q* project, are arranged in slots *s s* formed lengthwise in the platen, and so as to enable the dies to be adjusted nearer to or farther from a middle button-hole male die, *r′*, which projects from a block, $r^2$, which may be so applied to the platen as to be capable of being adjusted in position transversely of it. Each die-block has a clamp-screw, *t*, which, by acting on a button, *u*, serves to clamp the block in place. An embossing-die, *v*, and a male severing-die, *w*, are also applied to the platen and arranged as shown in the drawings. The male severing-die *w* is so formed as to cut the desired shape for the bottom of one collar and the top of the next adjacent one, and is attached to an adjustable sliding plate, $a^6$, which

is held in proper position on the platen by screws $b^6$ $b^6$, and also by grooves $c^6$ $c^6$, into which the ends of the plate are inserted.

The embossing-die $v$, which is attached to the plate $a^6$, is for making on one side of a collar indentations or figures in imitation of stitching.

Female die-blocks $q^2$ $q^2$ $r^3$, formed with openings to match the dies $q$ $q$, $r$ $r$, and $r'$, are applied to the upper surface of the bed D, and are provided with adjustments, by which they can be properly arranged in place to co-operate with their respective male dies, such adjustments being shown at $x$ $x$ and $y$ $y$ in Fig. 9. There is also another embossing-die, which is shown at $v'$ as applied to the bed, and arranged directly underneath the front embossing-die $v$, the object of such embossing-dies being to imprint or emboss on opposite sides of each collar and near its edges either imitations of stitching or other ornamental devices.

In advance of the lower embossing-die, $v'$, is an open slot or space, $w'$, into which the knife or severing-die $w$ works in order to separate each collar from the strip of paper after the formation of the ends of such collar. It should be observed that the two edges of the severing-die $w$ need not be parallel, but may be curved or formed so as to give the requisite form both to the bottom edge of one collar and the top edge of the next one in the sheet of paper, in which case the form of the slot or female die $w'$ should be varied accordingly.

Instead of the slot $w'$ to operate with the cutter or die $w$, a single cutting-edge may be employed with the die $w$, in which case the cut through the sheet of paper whereby a collar would be severed from it would give the requisite form both to the upper edge of one collar and the lower edge of the next adjacent collar, in which case there would be no waste of stock, such as would be cut from the sheet by the action of the die $w$ in the slot.

The slot or female severing-die $w'$ is made in two parts, which are held together by screws, the same being in order that the front portion of it may be detached from the other for the purpose of enabling the latter to be used for making the upper edge of one collar and the lower edge of another or the next adjacent one.

In advance of the bed D is an inclined bed or table, F, which has a slot, $z$, formed through it transversely of the machine. With this table and its slot a folding-blade, G, operates—that is to say, the blade moves into and out of the slot. This blade is fastened to a bar or carrier, H, from each end of which a rod, $a'$, extends to and is fastened to the lower end of one of two levers, I I. Each of the said levers is to be so jointed or connected with the next adjacent connecting-rod $n$ of the platen as to be moved thereby during its motions, the movement of the said levers I I being such as to produce the requisite movements of the folding-blade.

In front of the slot of the table F there are three adjustable stops, $b'$ $c'$ $c'$, which are arranged on the table in the manner as shown in the drawings, and are provided with adjustments, by which their positions may be changed, and they may be clamped to the table in manner as circumstances may require. With these stops, and in rear of the slot, two adjustable guides, $d'$ $d'$, are employed, they being arranged on the table, and for the purpose of properly directing a collar between the stops $c'$ $c'$ while such collar may be falling down the chute or inclined table F. There are also springs or top guides, $e'$ $e'$, extending from the platen down over the table F, they being to prevent the collar from falling or being blown off the table. The stop $b'$ is an abutment for the lower edge of the collar to rest against.

Adjustable stops $f'$ $f'$ may project down from the front edge of the platen and be used for the purpose of arresting the sheet of paper or determining its position when fed into the machine by hand without the use of the feed-rollers.

There is an endless belt, K, arranged below the slot of the table in manner as shown in the drawings, such belt having below it a shelf, L, on which the collar rests when against the belt. The said belt works around two carrying-rollers, $a^4$ $b^4$, arranged as shown in Fig. 10, one of such rollers being shown in Fig. 3.

A presser-roller, $c^4$, arranged with the endless belt K and its carrying-roller $a^4$, in manner as shown in Fig. 10, receives rotary motion from an endless band, $d^4$, which works around a pulley, $e^4$, fixed on the driving-shaft, and also goes around another pulley, $f^4$, fixed on the shaft of the roller $c^4$.

By means of the endless belt K each collar, after having been folded, will be driven lengthwise out of the machine, and in passing between such belt and the presser-roller $c^4$ the collar will be curved lengthwise by the action of the said roller, the belt, and its next adjacent carrying-roller, the curve imparted to the collar being to enable it to readily fit around the neck of a person.

The operation of my improved machine to manufacture shirt-collars from a continuous sheet of paper or other suitable material may be thus described: The paper is to be introduced between the feed-rollers, by which it will be moved forward between the dies of the platen and bed until the front edge of it may have advanced far enough for the two cutting-dies $q$ $q$ and the button-hole-making dies to operate upon it. Next these dies will be put in operation, so as to cut away portions of the sheet and leave it with the proper form for the ends of a collar, with button-holes cut near to each end, and also one in the middle of the collar. Next the platen will be raised upward, and while being so elevated the feed-rollers will advance the paper a certain distance—that is, so that the collar partly formed shall be moved into a proper position for the embossing-dies to act upon it. After the collar

has reached its place between the embossing-dies the platen descends and the collar will be embossed on its two opposite sides or surfaces. Next a further movement of the sheets takes place, far enough to carry the collar into a proper position for the severing-dies to complete the shape of the collar by cutting it from the sheet, the platen descending after each movement of the sheet by which the collar is so advanced. Every downward movement of the platen causes the end portions of one collar to be formed, the collar in advance to be embossed, and the collar previously embossed to be severed from the sheet. As the collar so made is farther advanced it will be received upon and will fall down the inclined plane or table and against the stop $b'$, or the stops $c'$ $c'$, or all three of such stops, after which the folding-knife will descend upon the collar and fold it and press it through the slot of the table and deposit it on the discharging-belt and its shelf. After this the belt, continuing to revolve, will force the collar between the curving-rollers and out of the machine.

In carrying out my present invention I have introduced into my machine a folding mechanism substantially like portions of what is described in Letters Patent entitled Reissue No. 941, such reissue having been granted to me on the 3d day of April, A. D. 1860.

My machine, with proper modifications of form of its dies, will answer to manufacture and emboss wristbands or various other articles which may be made from a sheet of paper or other material.

The methods heretofore generally adopted for cutting out or forming paper collars have required the employment of sharp-edged cutting-punches (which are liable to become broken) and male and female dies of the full size of each desired shape or form of the collar.

The great advantages of separate adjustable male and female dies which may be changed to make different sizes of collars or wristbands, or articles of similar nature, are cheapness of construction and of repair in case of injury and readiness of adjustment for making a different size. They also cut away and discharge the waste stock, leaving the collars completely formed by the separate and successive operations of the end forming and the severing dies. Another advantage is that the end button-hole dies are placed in connection with and attached to the end forming-dies, and are adjustable with and always hold the same relative position to such end forming-dies. The last-named feature is one of great importance in forming button-holes at proper determined distances from the ends of a collar, so as to insure uniformity of fit of each collar when its ends are made to meet by being buttoned to the front button of the neckband of the shirt of the wearer.

The adjustable dies also effect a great saving in the cost of dies relatively to the old modes of making them, where a separate set was required for each size or style of collar, or where changes of fashion or style of collars render corresponding changes of the dies necessary.

I claim—

1. An automatic combination consisting not only of mechanism for feeding a sheet along with an intermittent motion and of machinery for stamping shirt-collars or articles from such sheet, but of machinery for embossing such collars or articles on both of the opposite sides thereof.

2. A combination consisting not only of such mechanical elements, but a mechanism for holding each collar.

3. An automatic combination consisting not only of mechanism for manufacturing such collars from a sheet and embossing them on two opposite sides and folding them in manner as described, but mechanism for discharging each collar from the folding element or machinery after the folding of such collar thereby.

4. A combination consisting not only of mechanism for manufacturing or stamping shirt-collars from a sheet and feeding them, as described, but mechanism for curving or bending each of such collars, in manner and for the pupose specified.

5. A combination consisting not only of mechanism for manufacturing or stamping shirt-collars from a sheet and mechanism for embossing them, as described, but mechanism for folding them and mechanism for curving them, in manner and for the purpose as specified.

6. The arrangement of the folding-tablet, inclined relatively to the stamping mechanism, in order that each collar, on being discharged from the latter, may be caused by the action of gravity to slide down the tablet and against its guides and abut against its stop or stops and be carried underneath the folding-blade, substantially as specified.

7. The combination of the edge-guides $d'$ $d'$, or the same and the top surface-guides, $e$ $e'$, and stop $b'$, or such stop $b'$ and the end stops, $c'$ $c'$, with the inclined slotted tablet and its folding-blade, and the combination of the same and mechanism, substantially as described, for making collars from a sheet, or making and embossing collars.

8. The combination and arrangement of the stops $f'$ $f'$ with the mechanism for stamping the collars from a sheet of paper or other material.

9. The improved collar discharging and curving mechanism, consisting of the driving-roller $c^4$ and the endless belt K and its supporting-rollers, or their equivalents, arranged together in manner and so as to operate substantially as described.

10. The combination of the adjustable male and female dies for forming the ends of the collar.

11. The arrangement of the severing-dies

with the male and female dies, for cutting the ends of the collar.

12. The arrangement of the embossing-dies with the end cutting and severing-dies, as specified.

13. The above-described combination of separate adjustable male and female dies for forming the ends with the separate adjustable dies for forming the sides of the collar, as herein described, the said adjustable male and female dies enabling collars of different sizes to be made, as herein described.

14. The dies or cutters, as herein described, for forming the lower edge of one and the upper edge of another collar at the same time.

15. A combination consisting of the mechanism, as described, for forming collars and the mechanism, as described, for folding them.

16. The combination of the end guides, $d'$ $d'$, with the top guides, $e'$ $e'$, for guiding the collar to the proper position to be folded.

17. The combination of dies for embossing both sides of the collar with dies for forming the collar, substantially as described.

18. The adjustable male and female dies for forming the ends of the collar and the end button-holes at the same time, as herein described.

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