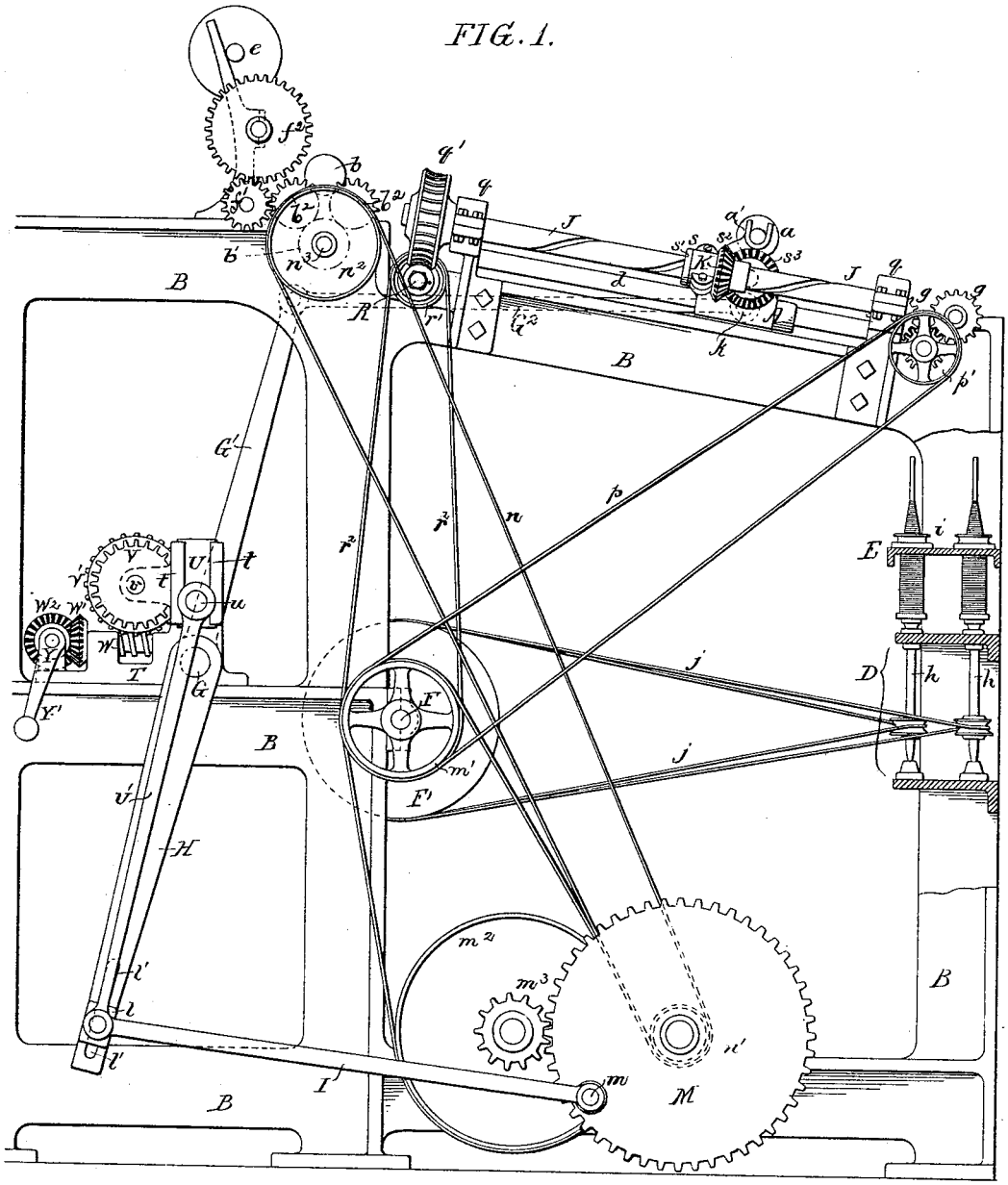
(No Model.) 3 Sheets—Sheet 1.

G. W. SHOEMAKER.

SPINNING MACHINE.

No. 386,900. Patented July 31, 1888.

FIG. 1.



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David S. Williams.

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Howson & Sons

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FIG. 2.

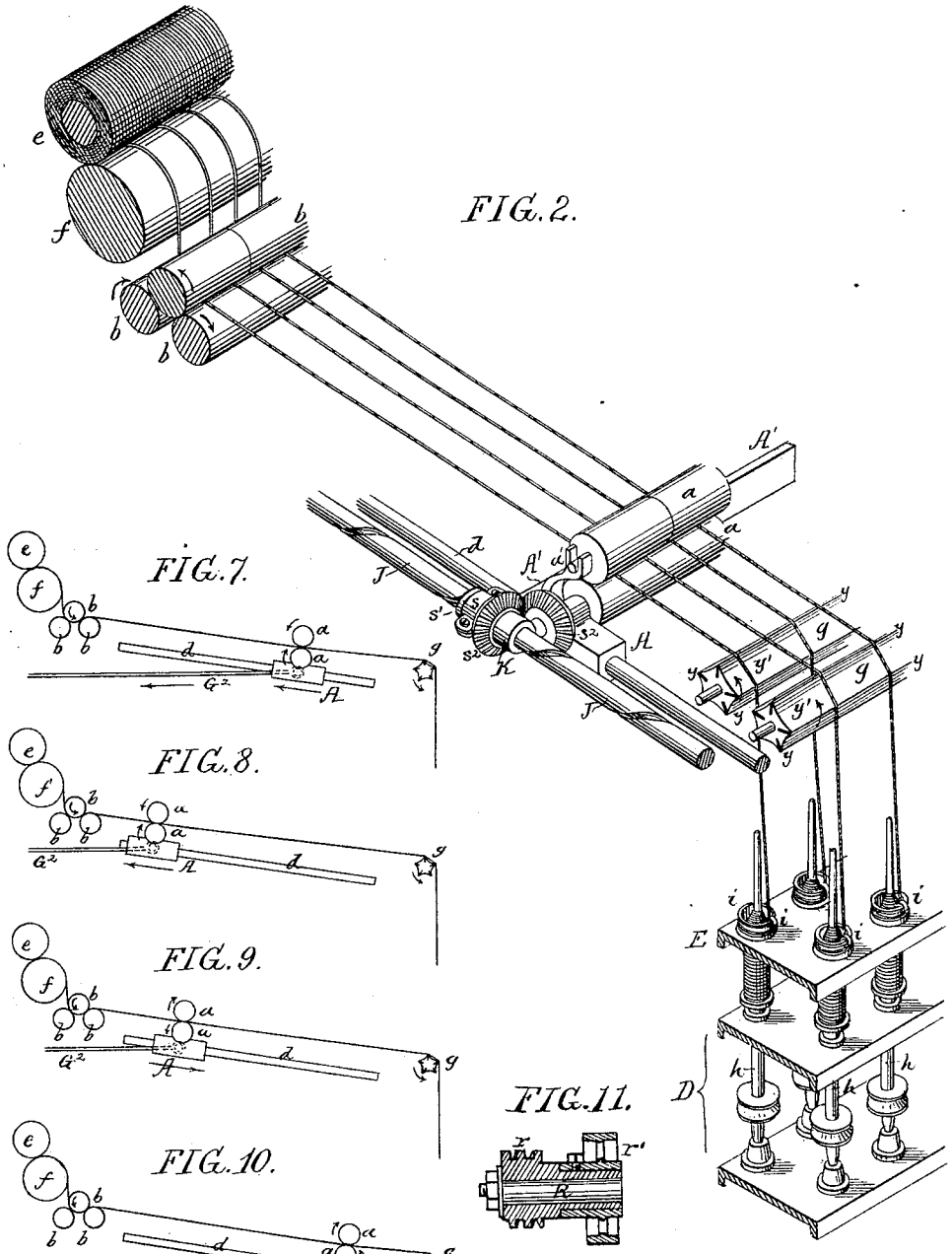

FIG. 7.

FIG. 8.

FIG. 9.

FIG. 10.

FIG. 11.

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FIG. 3.

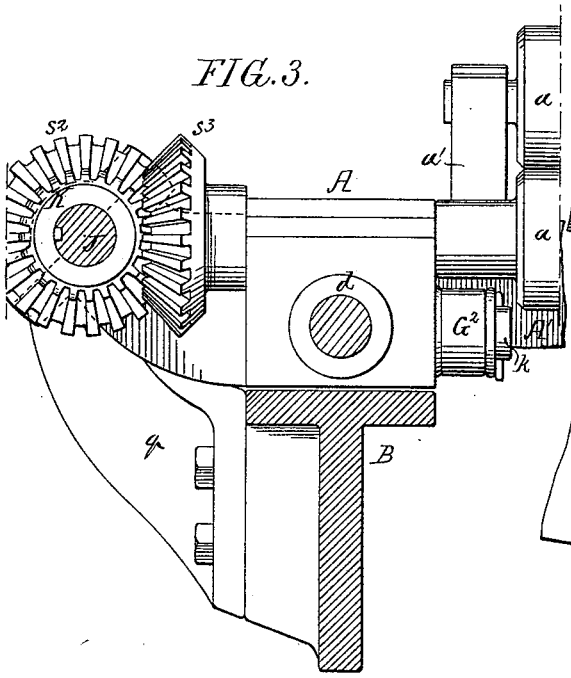


FIG. 4.

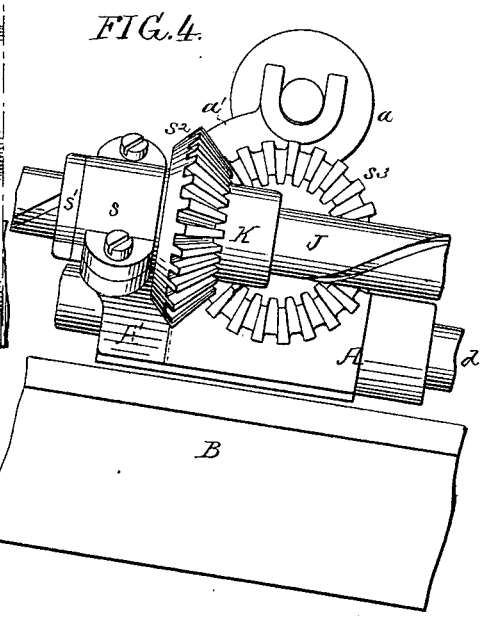


FIG. 5.

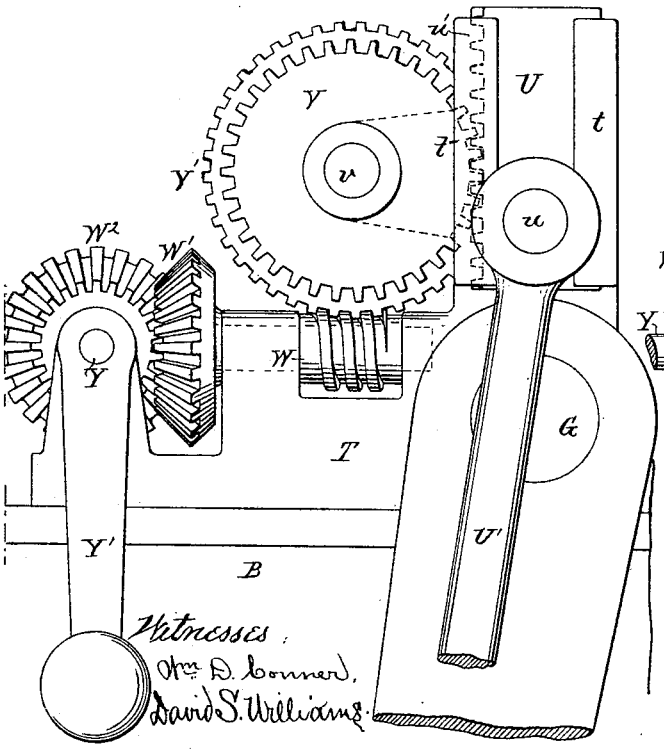
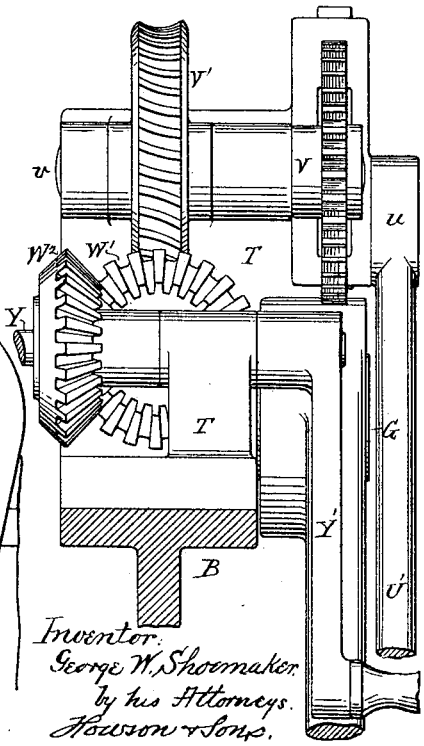


FIG. 6.



Witnesses:
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Inventor:
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UNITED STATES PATENT OFFICE.

GEORGE WASHINGTON SHOEMAKER, OF DALTON, PENNSYLVANIA, ASSIGNOR OF TWO-THIRDS TO EDWARD MILES, OF SAME PLACE, AND ALFRED HARVEY, OF SCRANTON, PENNSYLVANIA.

SPINNING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 386,900, dated July 31, 1888.

Application filed April 4, 1887. Serial No. 233,619. (No model.)

To all whom it may concern:

Be it known that I, GEORGE WASHINGTON SHOEMAKER, a citizen of the United States, and a resident of Dalton, Lackawanna county, Pennsylvania, have invented certain Improvements in Spinning-Machines, of which the following is a specification.

My invention consists of certain improvements, fully described hereinafter, in the machine for which Letters Patent were granted to me on the 15th day of February, 1887, and numbered 357,864.

My improvements relate more particularly to the mechanism for driving the drawing-rolls and for regulating the travel of the drawing-carriage, as will be fully described hereinafter.

In the accompanying drawings, Figure 1 is a side view of my improved continuous-spinning machine with part of the frame broken away. Fig. 2 is a perspective diagram showing the drawing, spinning, and winding devices. Figs. 3 and 4 are views drawn to an enlarged scale of the driving-gear for the drawing-rolls. Figs. 5 and 6 are enlarged views of the devices for regulating the travel of the drawing-carriage. Figs. 7, 8, 9, and 10 are diagrams illustrating the movements of the drawing-rolls. Fig. 11 is a detached sectional view of a detail of my invention.

Referring in the first instance to Figs. 7, 8, 9, and 10, the action of the machine on the roving is similar to that mentioned in the above patent, and the same object is attained—that is, allowing the twist that is given to the roving to extend up past the drawing-rolls *a* to the feed-rolls *b*, in order that there will be a certain amount of twist in the roving during the drawing.

Referring to Fig. 7, *a a* are the drawing-rolls, mounted on a suitable carriage, A, guided on rods *d*.

b are the feed-rolls, adapted to suitable bearings in the frame of the machine.

e is the spool from which the roving is taken, and passes over a feed-drum, *f*.

g is a grooved guide-roller over which the roving passes to the spinning-ring.

The feed-rolls *b* and feed-drum *f* have a positive motion in the direction of their arrows at all times. The drawing-rolls *a*, on the upward movement of the carriage, as shown in Fig. 7, move in the direction of their arrows, (shown in that figure and also in Fig. 8,) revolving at a speed faster than the carriage travels, the speed depending upon the fineness of yarn desired. When the carriage arrives at the position shown in Fig. 8, the twist given to the yarn by the spinning devices naturally follows the drawing-rolls to this point, and when the carriage recedes, as shown in Fig. 9, the rolls, which were driven in the direction of the arrow, Fig. 7, are reversed by mechanism described hereinafter, so that the drawing-rolls, as they move out to the position shown in Fig. 10, roll over a portion of the thread, allowing the twist to pass through the drawing-rolls and up to the feed-rolls *b*, thus giving the necessary twist to the roving while it is being drawn. When the drawing-rolls have reached the position shown in Fig. 10, the carriage returns on its forward movement, as in Fig. 7.

I have thought it best to describe the feeding, drawing, and twisting operations first, before proceeding with the description of the general construction of the machine.

It will be understood that precisely the same movements take place as in the machine described in the above patent; but I have found by the devices which I will now describe that a more accurate machine can be constructed and a more even yarn obtained.

Referring to Figs. 1, 2, 3, 4, 5, and 6, B is the frame of the machine, which can be of any length desired, the length depending upon the number of spindles. D is a spindle-frame having the usual bearings for the spindles *h h*, which are of the ordinary pattern, and over which travels the frame E, carrying the spinning-rings *i*. The spindles are driven from the main shaft F by a belt, *j*, which passes around the whirls on the spindles and the driving-drum F′ on the shaft.

The mechanism for raising and lowering the frame E, on which the spinning-rings are mounted, can be of the same construction as that shown in the above-mentioned patent,

or the ordinary motion may be used. The rod *d*, on which the carriage A slides, is mounted in suitable bearings in the frame of the machine, as will be readily seen in Fig. 1.

It will be understood that there is a carriage and rod at each end of the machine for supporting the drawing-rolls *a*, and where a very long machine is used intermediate carriages and rods are supplied; but all the carriages are tied together by bars A′, Figs. 2, 3, and 4.

The carriages A have suitable bearings for the lower roller, *a*, and brackets *a′*, attached at intervals to the connecting-bar A′, to support the upper drawing-rolls.

Reciprocating motion is imparted to the carriage A by means of arms G′, each secured to a shaft, G, extending the length of the machine, and having its bearings on the frame of the machine. The arm is connected to the carriage by a rod, G^2, which is pivoted at *k* to the carriage. The shaft G has an arm, H, at one end, on which is an adjustable block, *l*, adapted to slide in a slot, *l′*, in the arm. This block is connected to a crank-pin, *m*, on a wheel, M, by a rod, I, Fig. 1. As the wheel revolves a reciprocating motion is imparted to the carriage A. The wheel M is driven from the main shaft F through the medium of the belt-wheels m' m^2 and the pinion m^3. The feed-rolls *b* and the drum *f* are driven by a belt, *n*, from a wheel, *n′*, on the same shaft as the wheel M, the belt passing over a belt-wheel, n^2, on a stud, n^3, projecting from the side of the machine.

On the hub of the wheel n^2 is a pinion, *b′*, which gears with wheels b^2 on each of the lower feed-rolls, *b*, and one of these wheels meshes with an intermediate, *f′*, which gears with a wheel, f^2, on the shaft of the drum *f*. I have shown in the present instance, in Figs. 1 and 2, two rows of spindles and two grooved guide-rollers, *g g*. These rollers revolve at a high speed in the reverse direction to that of the travel of the roving, and are driven from the main shaft F by a belt, *p*, which passes over the pulley m' and over a pulley, *p′*, on a stud on the frame of the machine, and on this stud, and turning with the belt-pulley, is a gear-wheel, which gears with pinions on the spindles of each of the rollers *g g*.

Situated at one side of the rod *d* and having its bearings in brackets *q q* is a screw-shaft, J, and having a steep screw-thread cut on it. On one end of this shaft is a worm-wheel, *q′*, which gears with a worm-wheel, *r*, on the stud R, projecting from the frame of the machine. On the hub of the worm *r* is a belt-wheel, *r′*, over which passes a belt, r^2, which also passes around a belt wheel on the main shaft F.

The belt-wheel *r′* can be removed and wheels of different diameters can be secured to the worm to alter its speed, as will be readily understood by referring to Fig. 11.

It will be seen that through the above-described mechanism the screw-shaft J is driven very slowly. On this shaft J slides a nut, K, a projection on the nut entering the spiral groove in the shaft. This nut rests in a bracket, *s*, projecting from the carriage A. A flange, *s′*, on the nut projects beyond the bearing *s*, and thus it will be seen that the nut travels with the carriage and has an independent turning movement dictated by the screw-shaft J. The nut K has a bevel gear-wheel, s^2, which meshes with a bevel-gear, s^3, secured to the end of the spindle of the lower drawing-roll, *a*. Thus positive movement is given to the roller *a* through the medium of the gears and screw-shaft.

As described in the fore part of the specification, the drawing-rollers *a a* must have a speed greater than the movement of the carriage as it travels toward the feed-rolls, and a speed in the reverse direction less than the movement of the carriage when it is going in an opposite direction, in order to draw the roving to the required fineness. Thus it will be seen by referring to Figs. 1, 2, and 7 that the drawing-rollers are geared to the nut K on the screw J, and, say, for instance, if the drawing-rolls were six inches in circumference and the pitch of the screw was one turn to six inches, and if the carriage were moved six inches in the direction of its arrow, Fig. 7, the rollers would be given precisely the same speed as the carriage, and no drawing of the roving would take place; but if the screw-shaft G were driven at such a speed through the medium of the worm and worm-wheel that as the carriage traveled six inches the rollers would turn one revolution and a half, or equal to nine inches of surface movement, they would draw the roving exactly three inches, so when the movement of the carriage is six inches toward the feed-rollers *b* there would be three inches draw on the roving. The length of the reciprocation of the carriage is regulated by mechanism described hereinafter.

If the carriage on its return movement, as indicated by its arrow in Fig. 9, travels six inches, and as the screw-shaft J is only driven one-half revolution in these six inches, and the pitch of the screw is one turn in six inches in the opposite direction to that in which the screw-shaft is driven, the rolls would revolve three inches in the reverse direction, and consequently draw three inches, the same amount of drawing taking place on the return movement as on the forward movement. A continuous drawing would thus take place; and, furthermore, the roving being twisted up to the drawing-rolls, the three-inch revolution of the rolls on their return would allow three inches of twisted roving to pass the rolls; consequently the twist would extend to all the roving between the feed-rolls and the drawing-rolls, giving sufficient twist to the roving to withstand the necessary drawing operation.

I will now describe the mechanism for regulating the travel of the carriage, reference being had to Figs. 1, 5, and 6.

On the same brackets on which the shaft G

has its bearings are two guideways, *t t*, in which a block, U, is adapted to slide, having a pin, *u*, which is connected to the block *l* by a rod, U′, and by raising and lowering the block U the block *l* will consequently be raised and lowered, altering the length of travel of the carriage A.

The block U has a rack, *u′*, formed on one side, which meshes with a pinion, V, on a shaft, *v*. This shaft is adapted to suitable bearings on the bracket T, and secured thereto is a worm-wheel, V′, which gears with a worm, W, on a shaft, which has at its outer end a bevel gear-wheel, W′, which meshes with a bevel-wheel, W^2, on a shaft, Y, which may extend the full length of the machine. To one end of this shaft is secured a suitable handle, Y′, by which the shaft is turned.

By revolving the shaft Y in one direction the block U is raised, and reversing the movement the block U is lowered, the block being locked by the worm in any position in which it is put.

As shown in Fig. 2, the guide-rollers *g g* are many-sided and have points *y y* and spaces *y′*. The object of this peculiar construction is that as the yarn is spun, there being very little surface friction on the grooved rollers, and as the rollers revolve in a direction opposite to that of the travel of the yarn and at a higher rate of speed, the twist will pass up past the rollers to the drawing-rolls *a a*.

The edges of the projections *y* may be formed of glass, porcelain, or other material capable of withstanding the wear of the thread, as shown in Fig. 2.

I claim as my invention—

1. The combination of the frame of a spinning-machine, the feed-rolls thereon, a carriage adapted to suitable ways on the frame, drawing-rolls mounted on said carriage, mechanism for reciprocating the carriage toward and from the feed-rolls, a screw-shaft situated at one side of the carriage, a nut adapted thereto, and gearing connecting the nut with the drawing-rolls, substantially as specified.

2. The combination of the frame of a spinning-machine, the feed-rolls thereon, a carriage adapted to suitable ways on the frame, drawing-rolls mounted on said carriage, mechanism for receiprocating the carriage toward and from the feed-rolls, a screw-shaft situated at one side of the carriage, and having a nut adapted to travel with the carriage, and gearing connecting the nut with the drawing-rolls, substantially as specified.

3. The combination of the carriage A, mechanism for reciprocating the same, drawing-rolls mounted on said carriage, a bevel-wheel on the end of the lower drawing-roll, the screw-shaft J, a nut, K, thereon, an l a bevel-wheel on the nut gearing into the bevel-wheel on the lower drawing-roll, the nut K mounted in bearings on the carriage A and adapted both to slide and to turn on the shaft J, through which motion is imparted to the drawing-rolls, substantially as described.

4. The combination of the carriage A, the feed-rolls thereon, mechanism for reciprocating the carriage, a screw-shaft, J, a nut, K, thereon, gearing connecting the nut and feed-rolls, a worm and worm-wheel, a detachable pulley, *r′*, the main shaft, and a belt adapted to pass around the pulley *r′* and around the pulley on the main shaft, substantially in the manner and for the purpose set forth.

5. The combination of the carriage A, carrying the drawing-rolls, shaft G, arm G′, connecting-rod G^2, and arm H, carried by said shaft, a block, *l*, on the arm H, and mechanism for moving the block *l* toward or from the fulcrum of the lever, and mechanism connected to the block by which the arm H is vibrated to reciprocate the carriage, substantially as described.

6. The combination of the shaft G, levers G′ and H thereon, driving mechanism for vibrating the lever H, the feed-roll carriage, devices connecting the same to the lever G′, block *l*, adapted to ways on the lever H and connected to the driving-rod for said lever, a block, U, and an arm, U′, connected to the block *l*, a worm and worm-wheel, intervening gearing between the worm-wheel and the block U, and mechanism for turning the worm by which the block is raised or lowered and locked in position, substantially as described.

7. The combination of the shaft G, levers G′ and H thereon, driving mechanism for vibrating the lever H, and a carriage connected to the lever G′, through the medium of which the carriage is vibrated, block *l*, adapted to ways on the lever H and connected to the driving-rod therefor, a block, U, connected to the block *l*, and a handled shaft, Y, and gearing through the medium of which the block U can be raised or lowered by turning the handled shaft Y while the machine is in motion, substantially as set forth.

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

GEORGE WASHINGTON SHOEMAKER.

Witnesses:

WM. A. WILCOX,

H. M. STREETER.