(No Model.) 7 Sheets—Sheet 1.

J. F. KINGWILL.

MACHINE FOR APPLYING SLATS TO WEBS OF CANVAS.

No. 453,176. Patented May 26, 1891.

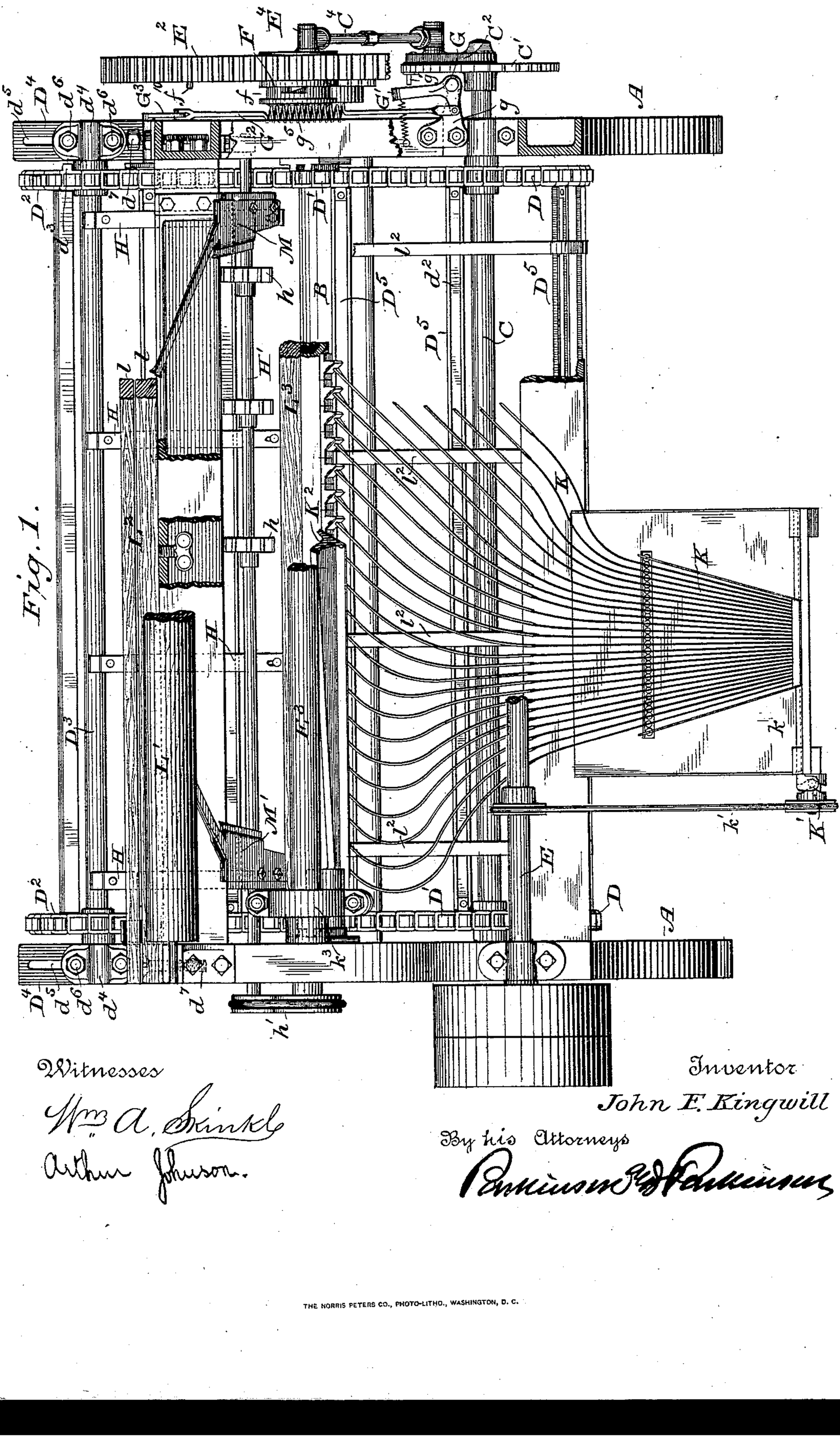

Fig. 1.

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(No Model.)

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J. F. KINGWILL.

MACHINE FOR APPLYING SLATS TO WEBS OF CANVAS.

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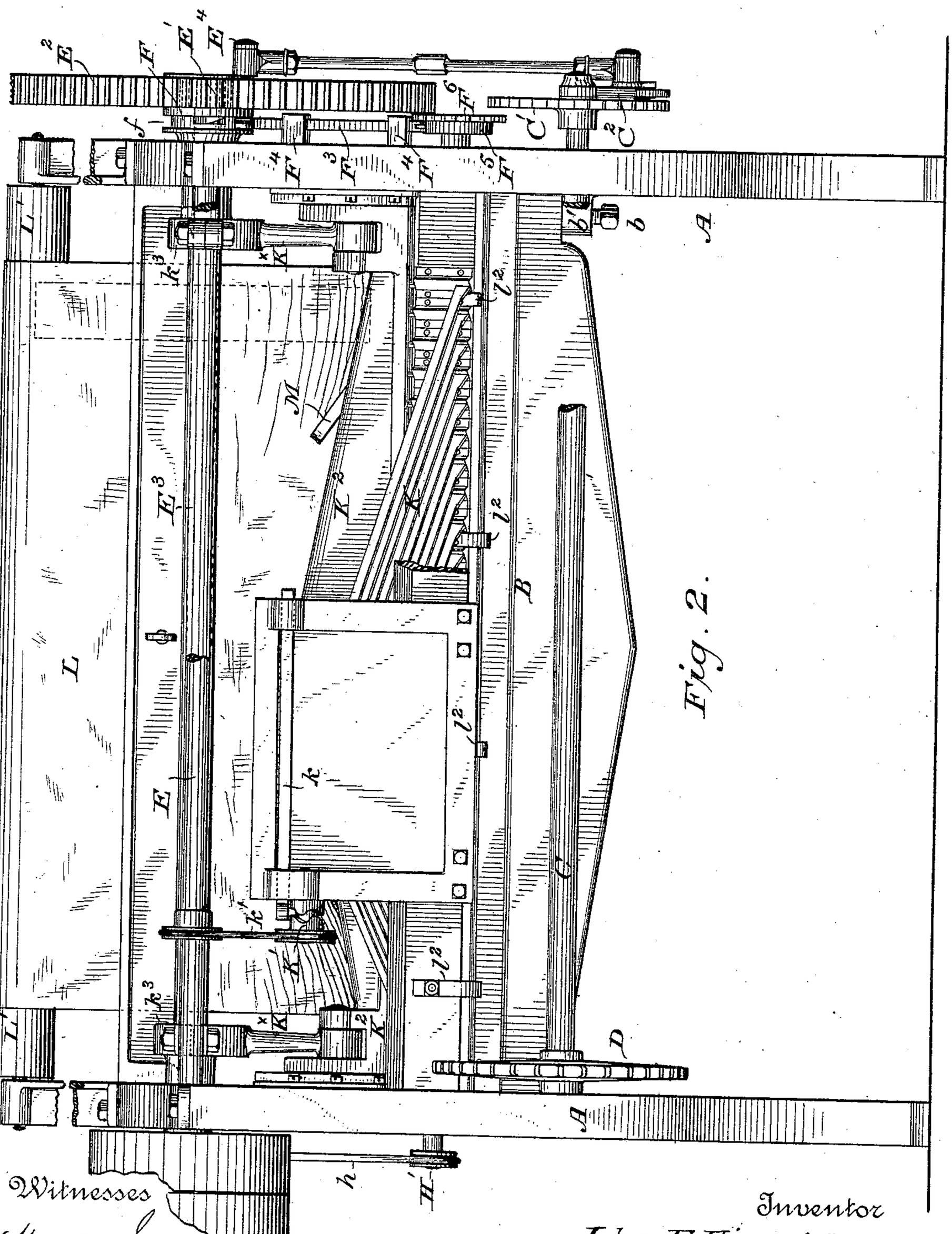

Fig. 2.

Witnesses
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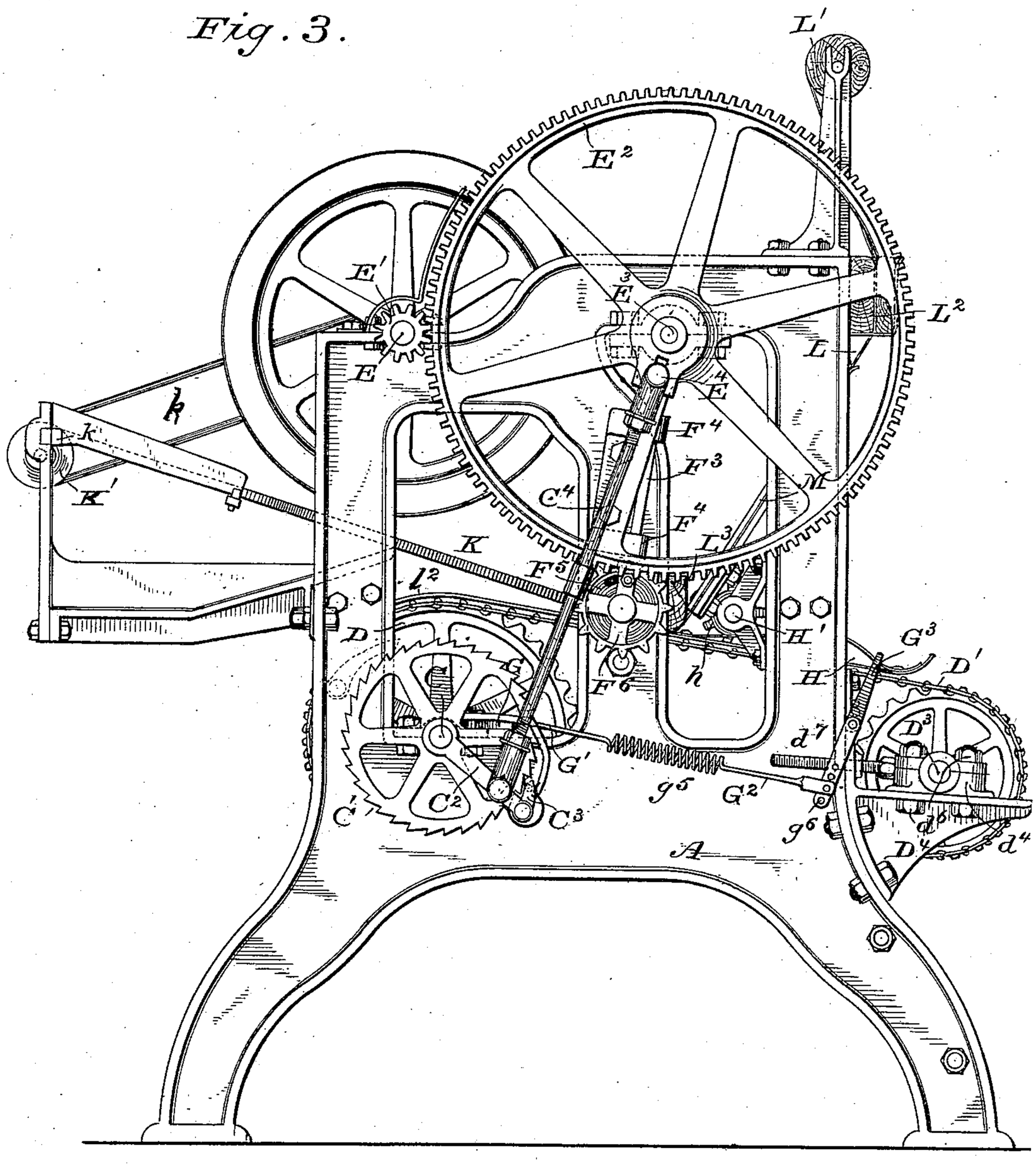
(No Model.) 7 Sheets—Sheet 3.

J. F. KINGWILL.

MACHINE FOR APPLYING SLATS TO WEBS OF CANVAS.

No. 453,176. Patented May 26, 1891.

Fig. 3.



Witnesses

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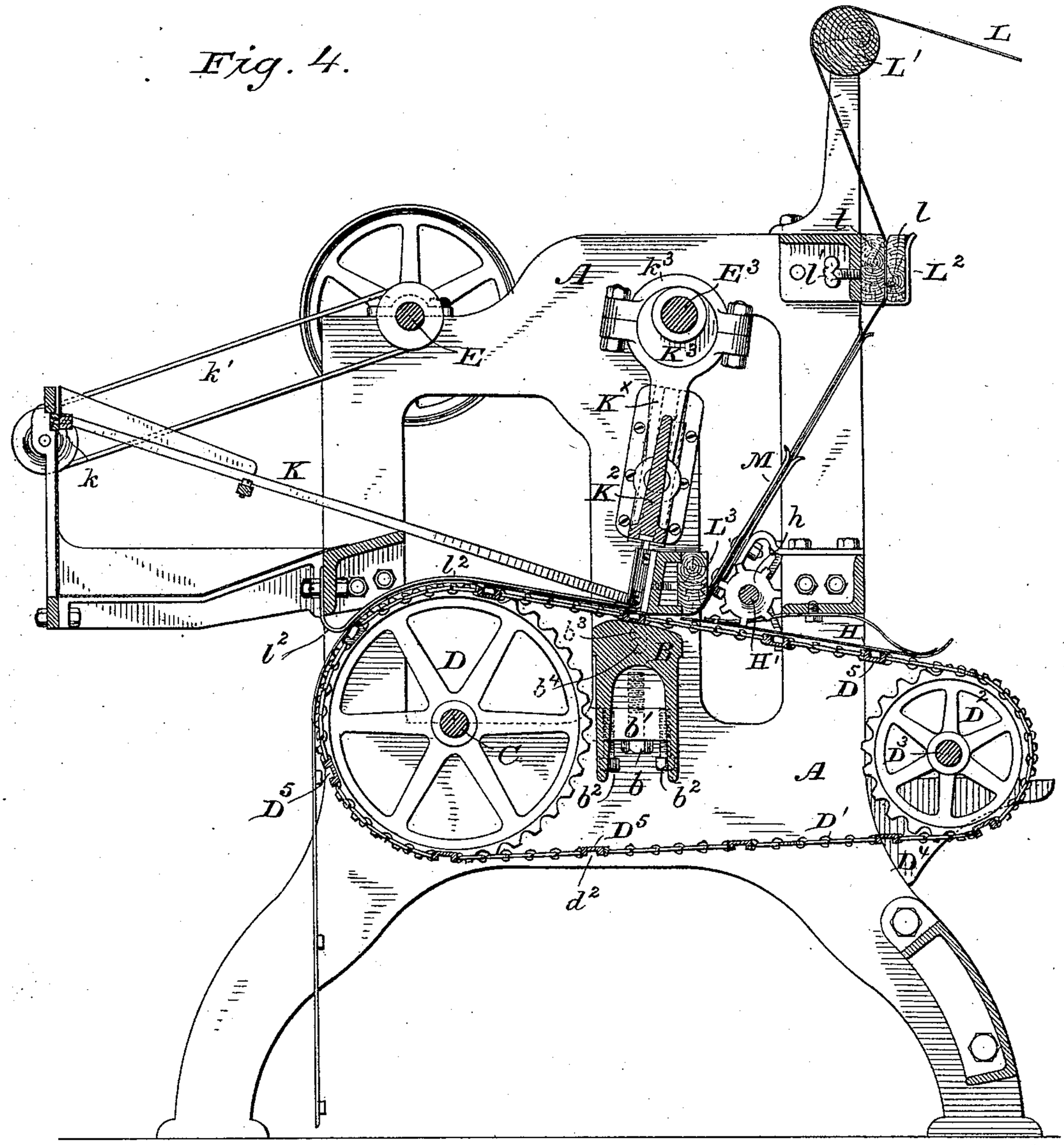
(No Model.) 7 Sheets—Sheet 4.

J. F. KINGWILL.

MACHINE FOR APPLYING SLATS TO WEBS OF CANVAS.

No. 453,176. Patented May 26, 1891.

Fig. 4.



Witnesses

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(No Model.) 7 Sheets—Sheet 5.

J. F. KINGWILL.

MACHINE FOR APPLYING SLATS TO WEBS OF CANVAS.

No. 453,176. Patented May 26, 1891.

Fig. 8.

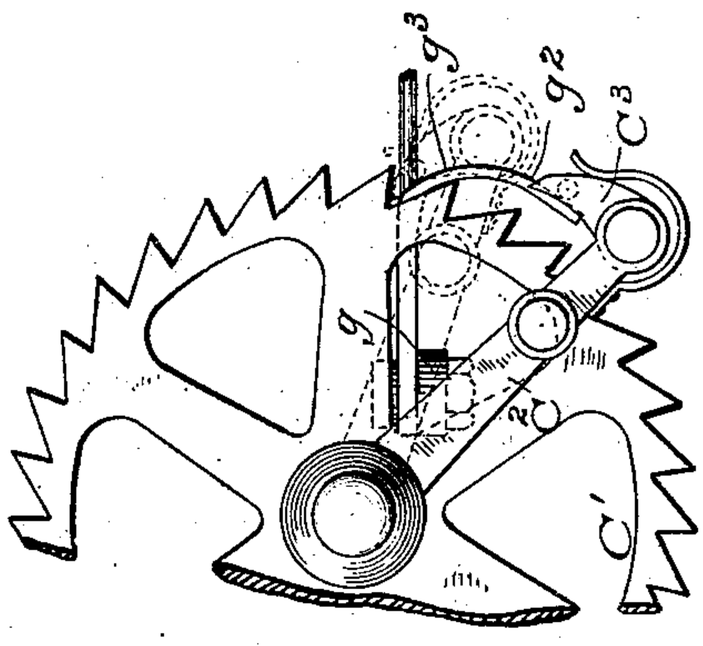


Fig. 7.

Fig. 5.

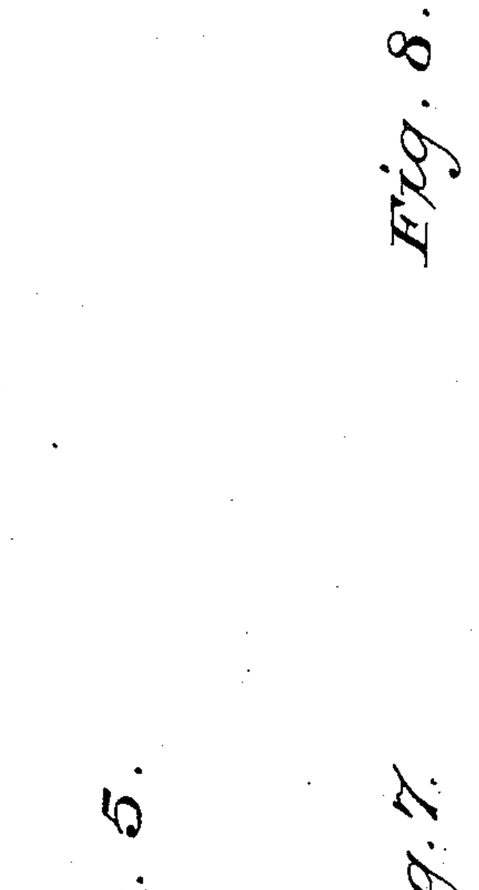


Fig. 6.

Fig. 9.

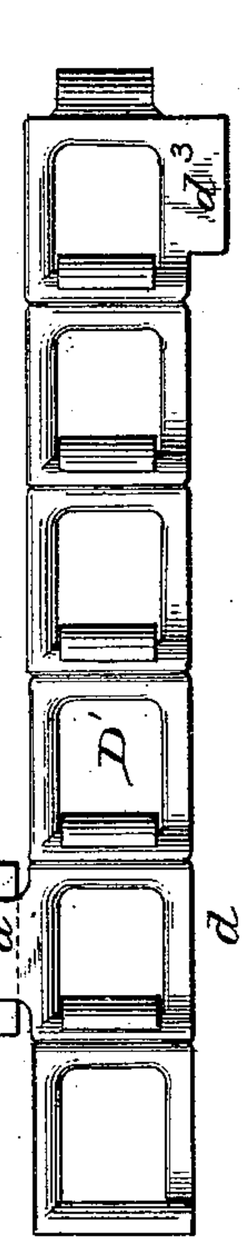
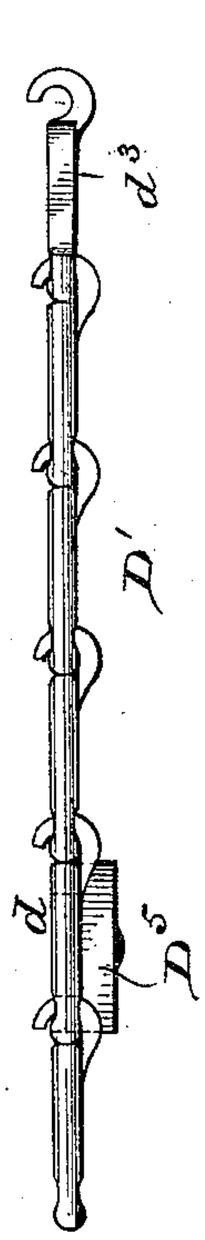


Fig. 10.



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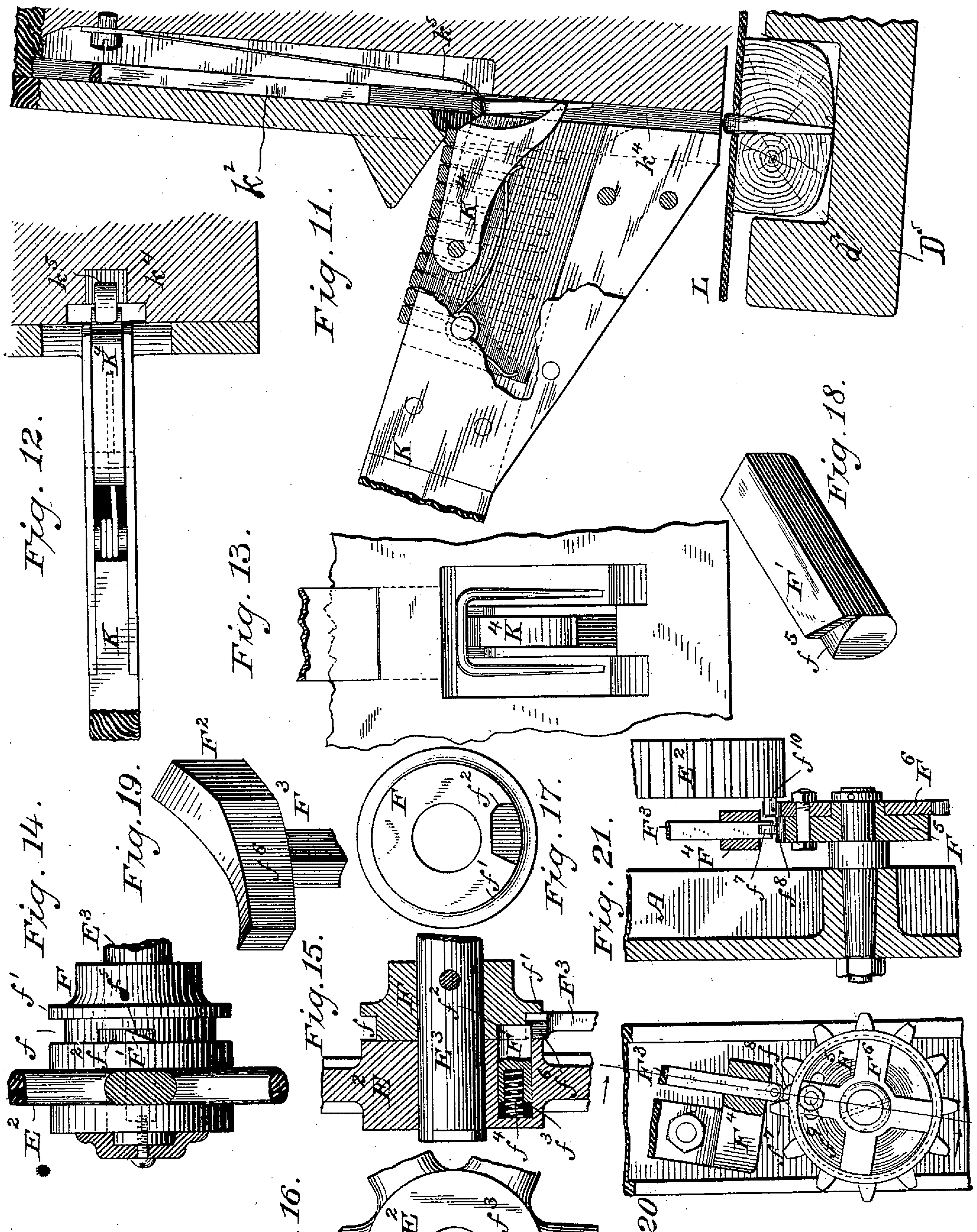
(No Model.) 7 Sheets—Sheet 6.

J. F. KINGWILL.

MACHINE FOR APPLYING SLATS TO WEBS OF CANVAS.

No. 453,176. Patented May 26, 1891.



Witnesses
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(No Model.) 7 Sheets—Sheet 7.

J. F. KINGWILL.

MACHINE FOR APPLYING SLATS TO WEBS OF CANVAS.

No. 453,176. Patented May 26, 1891.

Fig. 22.

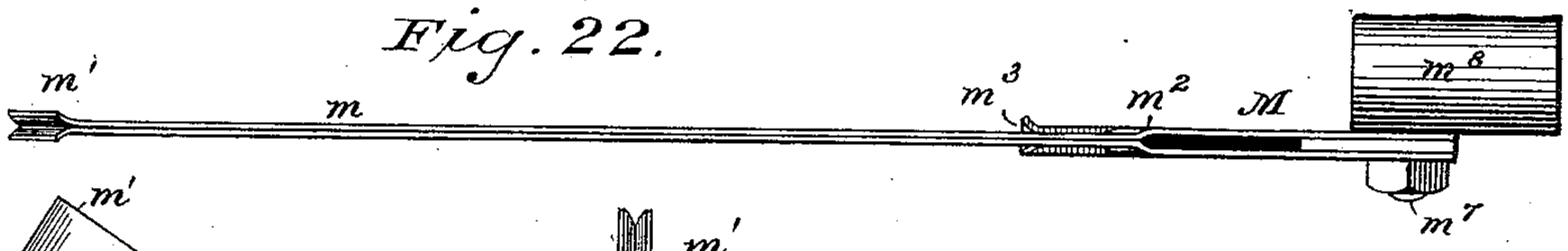

Fig. 24

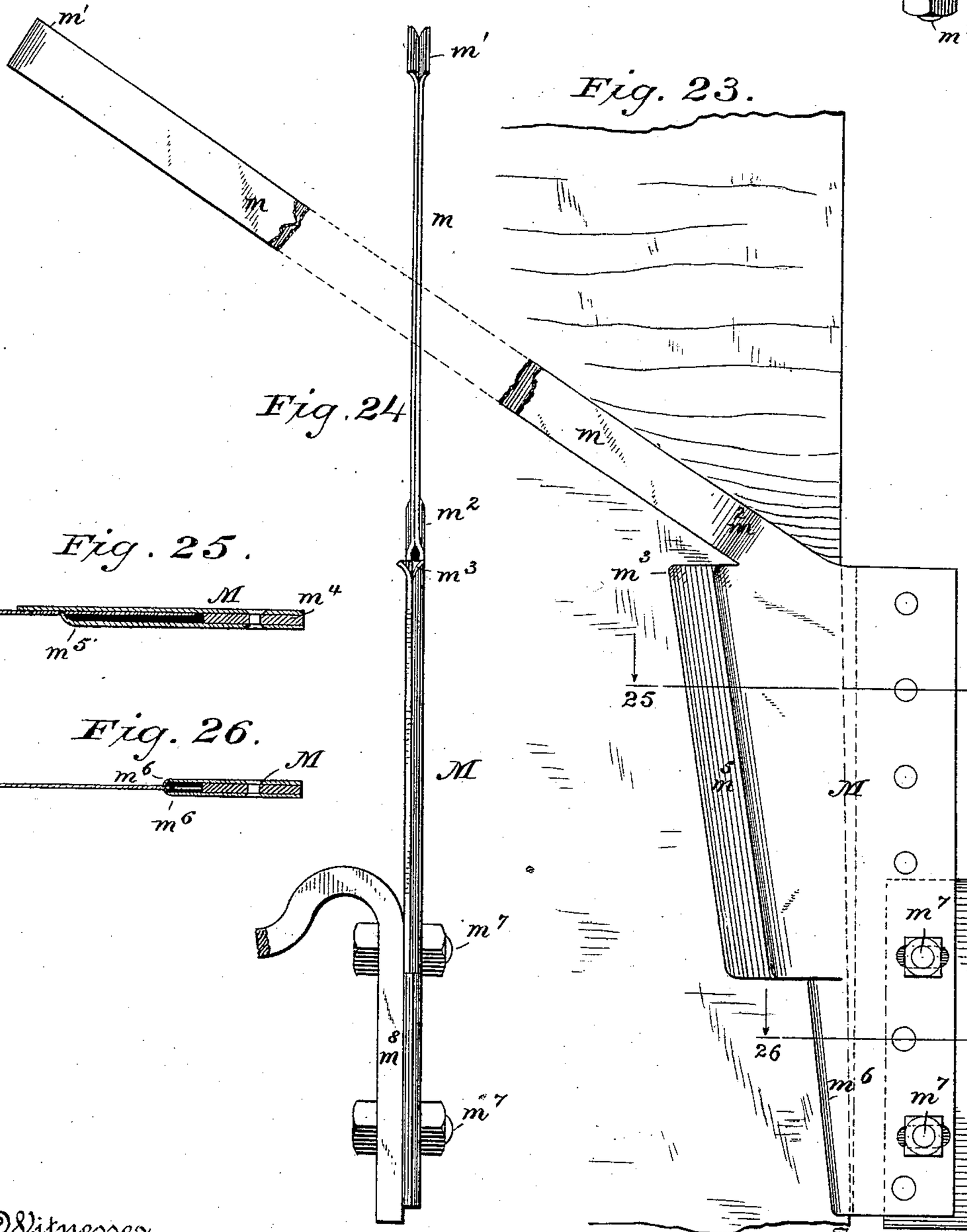

Fig. 23.

Fig. 25.

Fig. 26.

Witnesses

Wm A Skinkle

Arthur Johnson.

Inventor

John F. Kingwill

By his Attorneys

Parkinson & Parkinson

UNITED STATES PATENT OFFICE.

JOHN F. KINGWILL, OF CHICAGO, ILLINOIS, ASSIGNOR TO THE McCORMICK HARVESTING MACHINE COMPANY, OF SAME PLACE.

MACHINE FOR APPLYING SLATS TO WEBS OF CANVAS.

SPECIFICATION forming part of Letters Patent No. 453,176, dated May 26, 1891.

Application filed February 4, 1889. Serial No. 298,585. (No model.)

To all whom it may concern:

Be it known that I, JOHN F. KINGWILL, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Machines for Applying Slats to Webs of Canvas, of which the following is a specification.

In an application heretofore filed by me in the Patent Office of the United States on the 1st day of March, 1886, Serial No. 193,964, I have described a machine for applying slats to canvas belts or carriers, such as used on harvesters, consisting, primarily, of the combination of a conveyer, whereby slats are fed and positioned at suitable intervals, a drum supporting a roll of canvas and from which said canvas is drawn concurrently with the movement of the slat-conveyer, a gang of tack or rivet feeders, and a gang of drivers, whereby said tacks or rivets are forced through the canvas and previously positioned slat.

In the present invention I have introduced novel features whereby the web of canvas is smoothed out and kept tense from edge to edge as it is brought over the slat that is upon the point of being applied. I have also made the anvil or bed-plate vertically adjustable, so that it can be fed up properly against the carrier or slat carried thereby, have made the length of the slat-conveyer adjustable, whereby a belt of shorter or greater length may have slats secured in the same machine, have provided a device intended to align the slats in case they should accidentally fail to settle accurately in their carriers, so that before they are brought beneath the riveting instrumentalities they may have reached their proper seat, have placed the tack-guides at an incline instead of perpendicularly to correct a tendency that I have found in the points of the tacks to swing out and fail to be properly delivered when the guides are vertical, and have placed a tappet upon the slat-conveyer actuating a disengaging trip or trip-latch, whereby the driving dog or pawl for said conveyer may be withheld from the ratchet during the first part of its stroke, that the conveyer may be moved less than the regular distance to place the slats nearer together, certain of the carriers being for this purpose spaced to correspond with the lessened movement. Various other features and details of construction will appear from the ensuing description.

In the drawings, Figure 1 represents a top plan view of a machine embodying my invention, parts of the operating mechanism being removed or broken away in order to more clearly expose the construction of those beneath. Fig. 2 is an elevation from the rear or discharge end; Fig. 3, an elevation from that side on which the main gearing is situated; Fig. 4, a vertical longitudinal section taken centrally of the machine; Fig. 5, an enlarged detail in top plan view of the link-and-pawl movement for driving the slat-conveyer, and of the trip whereby the pawl is withheld from action until the proper moment; Fig. 6, a side elevation of said pawl-and-ratchet movement and trip; Fig. 7, an edge elevation thereof from the front or receiving end of the machine, and Fig. 8 a detail showing the disengaging-trip in position to disconnect the pawl from the ratchet; Figs. 9 and 10, enlarged details in top and edge elevation of one of the chains of the slat-conveyer; Figs. 11 and 12, enlarged details, respectively, in vertical and horizontal section, of one of the tack-guides, with its tack-feeding device, and in the first-named figure representing a slat in position beneath the guide and a tack or staple just driven. Fig. 13 is also an enlarged detail on the same scale as the two preceding. Figs. 14 to 19 are enlarged details of the clutch between the plunger-shaft and main gear and the shipper, whereby said clutch is disengaged from the main shaft at the time that a belt or apron is finished. Figs. 20 and 21 are enlarged details of the tripping devices whereby said shipper is operated at the proper moment. Figs. 22, 23, and 24 are a diagrammatic series showing the spreading or edge-stretching devices for the canvas web from different points of view, as indicated by the relative positions of said figures, looking from the foot of the sheet; and Figs. 25 and 26 are sections through the spreader on the lines indicated by corresponding numerals in Fig. 23.

A represents the side frames of the machine, preferably of metal, and united by suitable

ties or transverse girts, the number of which will vary according to the exigencies of the machine.

B is a bed-plate or anvil supported on the frame transversely thereof by means of set-screws b, passing loosely through lugs b' from the frame, and threaded into said anvil at each end thereof, and of other set-screws b^2, one at each side of the first, threaded into said lugs and bearing against the bottom of the anvil, the first serving to hold the anvil down and the other to press it up, so that it may be moved vertically and brought to perfect horizontality. The upper part of this anvil may have at each end vertical slots b^3, in which dowel-pins b^4 take, that in its adjustment from beneath it may be preserved against any tendency to rock axially. The upper face or surface of the anvil is rounded transversely, as shown, and serves to receive the slat-carriers as they travel, and support them at the moment that the tacks or rivets are inserted through them and the canvas web, as will presently appear.

Journaled in the lower part of the frame, at one end and beneath and to one side of this anvil, is a transverse shaft C, bearing a ratchet-wheel C′ outside of the frame.

C^2 is a radius-arm loose on the just-named shaft, which may hereinafter be termed the "conveyer-shaft." This radius-arm is just outside of the ratchet-wheel, and bears at its free end a spring-pressed driving-pawl C^3, and near this pawl is pivoted to a pitman C^4, by means of which a link-and-pawl motion is obtained. Keyed to the shaft are sprocket-wheels D, near each end and just inside of the lateral members of the frame at the corresponding end.

The slat-conveyer is composed of chains D′, passing over the just-mentioned sprocket-wheels and also over opposing sprocket-wheels D^2, mounted upon a shaft D^3, supported upon brackets D^4 at the opposite end of the frame. At suitable intervals the chains have transverse slat-carriers D^5, extending from one chain to the other, certain of the links d of the chains being provided for that purpose with lateral inwardly-projecting seats d', to which are riveted the ends of the carriers, the latter consisting of metal bars recessed or pocketed longitudinally, as at d^2, to receive each one of the wooden slats, and as they travel with the chains being successively dragged over the top of the anvil, whereby they are held up against the riveting mechanism. The chains themselves are in the present instance of detachable links—such as compose the well-known Ewart drive-chain—so that they may be lengthened or shortened, as will presently appear, and one of them has a lateral outsetting-tappet d^3, whereby the driving dog or pawl of the carrier-ratchet is tripped, as suggested in the preamble.

The sprocket-wheels on the conveyer-shaft may be larger than those on the opposite or counter shaft, but will themselves be of equal diameter and have the same number of teeth, so that as the shaft is intermittently rotated by the pawl-and-link motion the chains may move co-ordinately and therefore preserve the alignment of the slat-carriers.

As in practice it is often necessary to apply slats to webs of different length, owing to the difference in length of the belts demanded, the counter-shaft or the idle-shaft of the conveyer is mounted in adjustable bearings d^4, the supporting-brackets being for this purpose planed and longitudinally slotted, as at d^5, to receive bolts d^6, passing through the boxes, while set-screws d^7 bear at one end against the inner side of each box, and at the other end are threaded and pass into suitably-threaded seats in the frame. Thus whenever a longer belt is demanded the counter-shaft is first moved in sufficiently to slacken the chains that one of the links in each may be uncoupled from its adjacent link. Then a suitable number of additional links, including, if necessary, one or more carrier-links with attached slat-carriers in each chain, will be added, and finally the shaft moved out until the chains are again taut. Additional tappet-links may also be inserted if for any cause desired.

Mounted in bearings near the top of the frame is the main driving-shaft E, having a pinion E′ thereon, which meshes with and drives the gear-wheel E^2, loosely journaled on a shaft E^3, extending across the frame, and hereinafter termed the "plunger-shaft." On the outer hub of the gear-wheel above the carrier-ratchet is keyed a wrist-pin E^4, which receives the upper end of the link or pitman from the radius or pawl arm connected therewith, so that the revolutions of this gear-wheel and its crank shall actuate the ratchet-wheel.

In order to intermittently unlock the gear-wheel from the plunger-shaft and leave said shaft idle with the riveting mechanism which it drives, as presently explained, a collar F is pinned to the plunger-shaft inside of the wheel and turned down below the periphery of the hub, where it adjoins the latter, thus forming an annular groove f, limited on one side by said hub and on the other by the rib f', outsetting from the collar, and at one point along this groove the collar has a recess f^2, while the hub of the wheel has sunk from the face adjacent to the collar and level with the former another recess f^3, in which is set a driving-pin F′, urged forward toward the collar by means of a spring f^4, seated within the recess. The recess for the driving-pin is of such diameter as to extend somewhat above the periphery of the groove upon the collar, and this pin is of full thickness to fill the recess, except at its active end, where it is cut down with a bevel or incline f^5 to form a cam projecting above the recess in the collar. A cam-shipper F^2, curved to enter in the groove in the collar and fill the space between the hub of the gear-wheel, and

the flange on said collar which affords the other side of its groove is formed with an incline f^6, opposed to the incline on the driving-pin, so that when the latter is brought around by the revolution of the plunger-shaft and the shipper is resting against the bottom of the groove it will meet the incline on the driving-pin and urge the latter back against the force of its spring, thus uncoupling the gear-wheel from the collar and from the shaft to which the latter is pinned. Whenever the shipper is withdrawn, the driving-pin will be free to enter the notch in the collar so soon as the revolution of the gear-wheel has carried its end off of the opposing plane surface of the collar and brought it opposite said notch. Thereafter the plunger-shaft will again start.

For the purpose of moving the shipper which actuates the driving-pin, said shipper is mounted upon a bar F^3, playing in keepers F^4 on the side frame of the machine, and at its lower end this bar has a small wheel or anti-friction surface f^7, which rides upon the periphery of a disk F^5, having at one point an outwardly-set jog or cam-lug f^8, that forces the sliding rod up and carries the shipper to the bottom of the groove in the driving-collar. The disk is borne by a star-wheel F^6, and preferably adjustably secured thereto by means of a segmental slot and bolt f^9, so that it may be rotated slightly about the axis of this star-wheel to bring its cam-lug into the exact position necessary to act at the proper time. From the gear-wheel projects a single tappet f^{10}, which once in each revolution strikes a tooth of the star-wheel and moves it forward a single interdental space. In the present instance the star-wheel has twelve teeth. Therefore it will make a complete revolution and operate the plunger-shipper once in each twelve revolutions of the gear-wheel, which will represent the placing of eleven slats upon the canvas, the twelfth interdental space being filled by the cam-lug which actuates the shipper.

The link-and-pawl motion normally carries the ratchet-wheel forward the distance of six teeth, more or less, depending upon the relation between said wheel and the conveyer for every revolution of the gear-wheel and plunger-shaft representing in effect the full distance between each slat tacked upon the canvas. Whenever the carriers are arranged at less than the normal distance corresponding to such movement the ratchet-wheel must move a little less than the full distance, and to accomplish this I employ a trip to hold the pawl out of engagement during the first part of the upward stroke of the link or pitman—for instance, for the space of two ratchet-teeth, so that the movement imparted may correspond to the remaining four teeth of the six. This trip in the present instance I have shown as consisting of a trip-latch in the form of an elbow-lever G, pivoted to an offset g of the frame, and carrying at the end of one arm the disengaging-cam or trip-cam G′, which by the movement of the lever is thrown into the path of a lateral spur or lug g' from the pawl, so that this spur may ride upon the slow face g^2 of the cam and hold the nose of the pawl out of engagement with the ratchet for the space of said two teeth and then drop rapidly over the quick face g^3 and engage. The spring g^4, connecting the lever with the frame or any suitable support, serves to hold it normally out of the path of the lug, and the link G^2, connected at one end to the power-arm of the elbow-lever or trip-latch and at the other to a trip-lever G^3, projecting into the path of the tappet on the carrier-chain, serves to throw the cam into the proper position to withhold the pawl from engagement whenever the tappet comes round, which will correspond to the closer spacing of the carriers, generally those at the end of the belt. The trip rod or link may be elastic or have an elastic section g^5, so as to yield whenever the trip-cam is pressed against the face of the ratchet-wheel and hold it against such face while the pawl is being withheld from engagement, or until the tappet is passing off of the trip-lever. The link may also be adjustable upon the trip-lever, as at g^6, so as to have a longer or shorter stroke. It will be understood, however, that the action of the trip is entirely independent of the action of the shipper that connects the plunger-shaft to its gear and disconnects it therefrom, so that the plunger-shaft will still complete its driving movement at the same time relatively to the conveyer as before, and will therefore drive the appropriate gang of tacks at the proper moment.

The slats immediately after being placed in the carrier enter beneath a spring-presser H, which holds them in the socket until they reach the web of canvas and are about to pass beneath the plunger; but it sometimes happens that these slats are improperly placed and one end or the other is not resting in its socket, but lags behind. One end, however, is always certain to be in the socket of the carrier, and it is necessary that the other end shall be brought up in line and thrust into the socket before the carrier reaches the anvil. To accomplish this is the office of the shaft H′, which carries a series of spur-wheels h, projecting to or through the spring-presser just in advance of the point where the carriers reach the canvas web, but not passing below the line of the carriers. This shaft, by means of the belt h', or other suitable connection with the main driving-shaft, is driven at a greater peripheral speed than the carrier, but in the opposite direction, so that the contiguous surfaces of the two shall move in the same direction. Thus whenever a slat is misplaced so that one end lags behind the other it is caught by the teeth of one or the other of the spur-wheels along the length of the alignment-shaft and is hurried forward so as to catch up with that end which is properly placed, and thus reach its socket on the car-

rier and settle accurately therein along its whole length before passing out from beneath the presser.

K represents inclined tackways flaring from the receiving-point to the individual tack-guides beneath the plungers, given at their head or receiving-point a slight vibratory motion by means of a reciprocating bar k, revolving cam-grooved wheel K′, and belt connection k' with the main driving-shaft, and K^2 is the plunger-head carrying a series of plungers k^2, fitting into the tack-guides, and carried intermittently up and down by means of the eccentrics K^3 on the plunger-shaft, and the collars k^3, encircling said eccentrics from links K^, connected with the plunger-head. As I have already said, the plunger-guides in my former application were vertical, and therefore whenever a tack or staple was dropped from the cut-off K^4 into the guide-way k^4 and caught by the spring-stop k^5 it had a tendency to tip or swing out of the vertical, since the spring-stop necessarily supports the head of the tacks by one edge only, and the legs of the tacks are tapering, and therefore do not fill the guide-way beneath so as to be supported by it, as is the head. To obviate this defect, the guideways are now placed at just such an inclination as to correct this tendency—that is, at such an inclination that when the point of the tack rests against the wall of the guideway and the head of the tack is filling the space between both walls the tack will be vertical, as in Fig. 11. Thus the tacks are always received and driven accurately. The top of the anvil will necessarily be inclined also, so as to be at right angles or perpendicular to the guideways, and the upper surface of the carrier, as shown in Fig. 4, will follow the same inclination, the sprocket-wheels on the idle-shaft being made smaller in diameter than the sprocket-wheels on the carrier-shaft, or else placed in a lower plane.

The canvas web L, which may be either drawn from a drum or else immediately from the bolt as it comes from the mill, is first passed over the guide-roller L′, which stands above the machine at the feed end thereof, and from this guide-roller passes down through a tension L^2, composed of parallel bars l, clamped together by adjustable bolts l', or otherwise suitably constructed, and from this tension device to a second guide L^3, which may be stationary, as shown, and is directly over and in close proximity to the inner end of the spring-presser, which holds the slats in their carriers and leads therefrom to the plunger-gang at a slight inclination toward the carrier. This guide terminates over the anvil, and at that point where it is almost in contact with the carriers is continued by means of spring-holders l^2 to the delivery end of the machine, so that the slats, with the canvas tacked thereon, may be held in the carrier as it travels and serve to draw a fresh supply of canvas for the succeeding slats.

It is important that at the moment the canvas comes in contact with the slats it should be stretched tensely and smoothly from side to side along its length. The tension device and stress of the canvas insure all needed longitudinal but not lateral stretching, and therefore, in order to obtain the transverse stretching and smoothing out, I have devised what may be termed an "edge stretcher" or "spreader," and have applied it between the tension and the lower or stationary guide. This stretcher consists of two pairs of plates M M′—one at each side of the passage-way—for the canvas, and having arms, preferably somewhat elastic, slanting toward each other from the stationary part upward toward the tension and so arranged that the canvas passes between the arms of each pair, and its rumples are gradually guided and drawn and smoothed outward from the point where it first meets them at the center and at their head toward its edges, where it leaves them at their foot. A simple pair of flat plates outwardly snubbed at their upper extremities, where they first meet the canvas, that it may enter easily between them, and lying flat against each other down to near their base, where they should widen away somewhat, so as to allow the selvage to pass, will be effective for this purpose; but I prefer the construction shown in the drawings, and fully explained in Figs. 22 and 26, where a single pair of plates at one side of the machine are depicted in detail. The first reach of these plates is composed of two straight parallel spring-bars m, extending from near the edge of the canvas diagonally upward to near its seat and snubbed outwardly at the ends, as at m', where the canvas first enters between them. Throughout their length they lie flat together unless thrust apart by the passage of the canvas and clamp it between them as it passes out with an elastic pressure, which tends to smooth out all wrinkles toward the edges. At their base these bars spring or rise away from each other, as at m^2, leaving sufficient room for the selvage or wrinkles that have been swept out toward the edges to pass through into the next reach of the plates. This second reach is composed of broader plates than the first reach and with their edges set at a more gradual inclination. These edges are set out somewhat from the base of the first reach and snubbed outwardly at their upper points, as at m^3, to receive canvas from the first reach. The underlying plate on this reach is flat, while the overlying plate is spaced away therefrom by a filling-piece m^4, which may be part of the supporting-bracket, and is snubbed or bent inwardly along its inclined edge m^5 to clamp the canvas or other web against the opposite plate along that edge alone. Finally, the third reach, which is intended to act almost entirely upon the selvage, has its edges set at a still less inclination than the edges of the preceding, and instead of being set out from the base thereof

is set in somewhat, the edges m^6 of both plates in this reach being bent in toward each other, as represented in the sectional view in Fig. 26, so as to more effectually act upon the thickened selvage.

As canvas of different widths may be used in the machine, or as some canvas may need more stretching than others, I prefer to make this presser or stretcher adjustable, which may be done by means of slots and clamping-bolts m^7, that serve to secure them to the bracket m^8, which supports them from the frame of the machine.

I do not intend to limit myself herein to the specific form of edge-stretcher or canvas-stretcher which I have described; nor to the specific tripping device by which the slat-conveyer is moved in less than the normal distance to space the slats closer together; nor yet to the precise construction of the devices by which I am enabled to make a longer or a shorter belt on the same machine by lengthening or shortening the slat-carrier; nor yet to the use of a shaft carrying spur-wheels arranged at intervals along its length and driven at a higher peripheral speed than the slat-conveyer as the sole means for aligning the slats or bringing them properly into the carrier-bars, since each and all of these may be considerably varied with the knowledge furnished by my invention by competent mechanics and those skilled in the art; but

What I do claim, and desire to secure by Letters Patent, is—

1. The combination, substantially as hereinbefore set forth, with the slat-carrier and tack-driving gang, of the edge-stretcher for the canvas web.

2. The combination, substantially as hereinbefore set forth, with the slat-carrier and tack-driving gang, of the edge-stretcher for the canvas web and the tension device preceding said stretcher, whereby the web is stretched both laterally and longitudinally.

3. The combination, substantially as hereinbefore set forth, with the slat-carrier and tack-driving gang, of the vertically-adjustable anvil.

4. The combination, substantially as hereinbefore set forth, with the slat-carrier and its chains composed of detachable links and with their driving sprockets, of the adjustable idle-sprockets whereby the length of the chains may be increased to make longer or shorter belts.

5. The combination, substantially as hereinbefore set forth, with the slat-carrier and tack-driving gang, of the spring-presser preceding said gang and a second presser succeeding said gang, the first to hold the slats to the carrier and the second to hold both canvas and slats on the carrier.

6. The combination, substantially as hereinbefore set forth, with the slat-carrier, of a series of aligning-wheels driven at a speed relatively faster than that of the carrier.

7. The combination, substantially as hereinbefore set forth, of the tackways, tack-guides placed at an incline, the spring-stop in said guides, the series of tack-drivers moving therein, the slat-carrier, and the anvil.

8. The combination, substantially as hereinbefore set forth, with the driving-sprockets of the slat-conveyer, the intermediate wheel by which they are driven, and a driver for said wheel, of the tappet on the conveyer, a trip-lever actuated thereby, and a trip-latch moved by said lever to withhold the driver from engagement with said wheel during its initial movement.

9. The combination, substantially as hereinbefore set forth, with the plunger-shaft, its driving-wheel, and the clutch connecting said driving-wheel to the shaft, of the cam-shipper, its actuating-rod, and the star-wheel and its cam moved by a tappet on said driving-wheel.

10. The combination, substantially as hereinbefore set forth, with the plunger-shaft, its driving-wheel, and the clutch connecting said driving-wheel to the shaft, of the cam-shipper, its actuating-rod, the star-wheel, and the cam-disk adjustable concentrically along the face of said star-wheel.

11. The combination, substantially as hereinbefore set forth, with the carrier-driving sprockets, of the ratchet-wheel by which they are driven, the link-and-pawl motion driving said ratchet-wheel, the plunger-shaft and its driving-wheel, the tappet on the carrier-chain, the trip-lever, the pivoted trip-latch, and the link connecting said lever with the latch.

12. The combination, with the carrier-chains and their driving-sprockets and with the ratchet and pawl by which said sprockets are driven, of the lateral pin upon the pawl, the pivoted trip-latch adapted to be moved into the path of said pin, the trip-lever, and the link connecting said lever with the trip-latch.

13. The combination, substantially as hereinbefore set forth, with the trip-latch and trip-lever, of the spring-link extending from one to the other.

14. The combination, substantially as hereinbefore set forth, with the trip-latch and trip-lever, of the link adjustably connected with said lever.

15. The combination, with the slat-conveyer and the spring-presser by which the slats are held thereto, of the aligning devices for carrying forward the tardy end of a mislaid slat.

16. The combination, substantially as hereinbefore set forth, with the tackways, of the reciprocating bar arranged transversely to their head, the cam-grooved wheel by which said bar is moved, and the driving connection with the main shaft.

JOHN F. KINGWILL.

Witnesses:
LEONARD VASSALL,
A. S. WELLS.