(No Model.) 3 Sheets—Sheet 1.

C. N. DAVIS.

WIRE AND PICKET FENCE MAKING MACHINE.

No. 461,818. Patented Oct. 27, 1891.

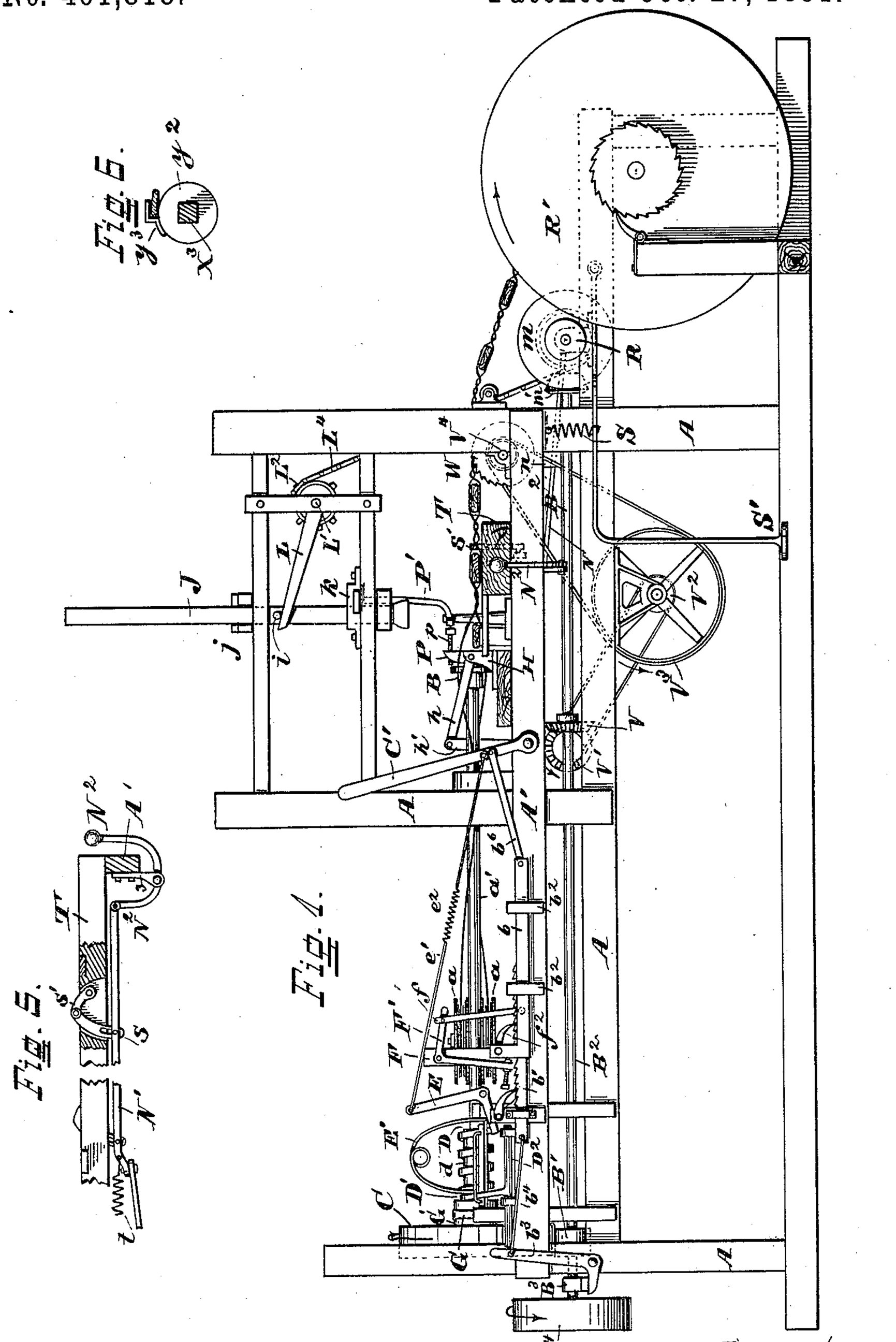

Fig. 1.

Fig. 5.

Fig. 6.

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(No Model.) 3 Sheets—Sheet 2.

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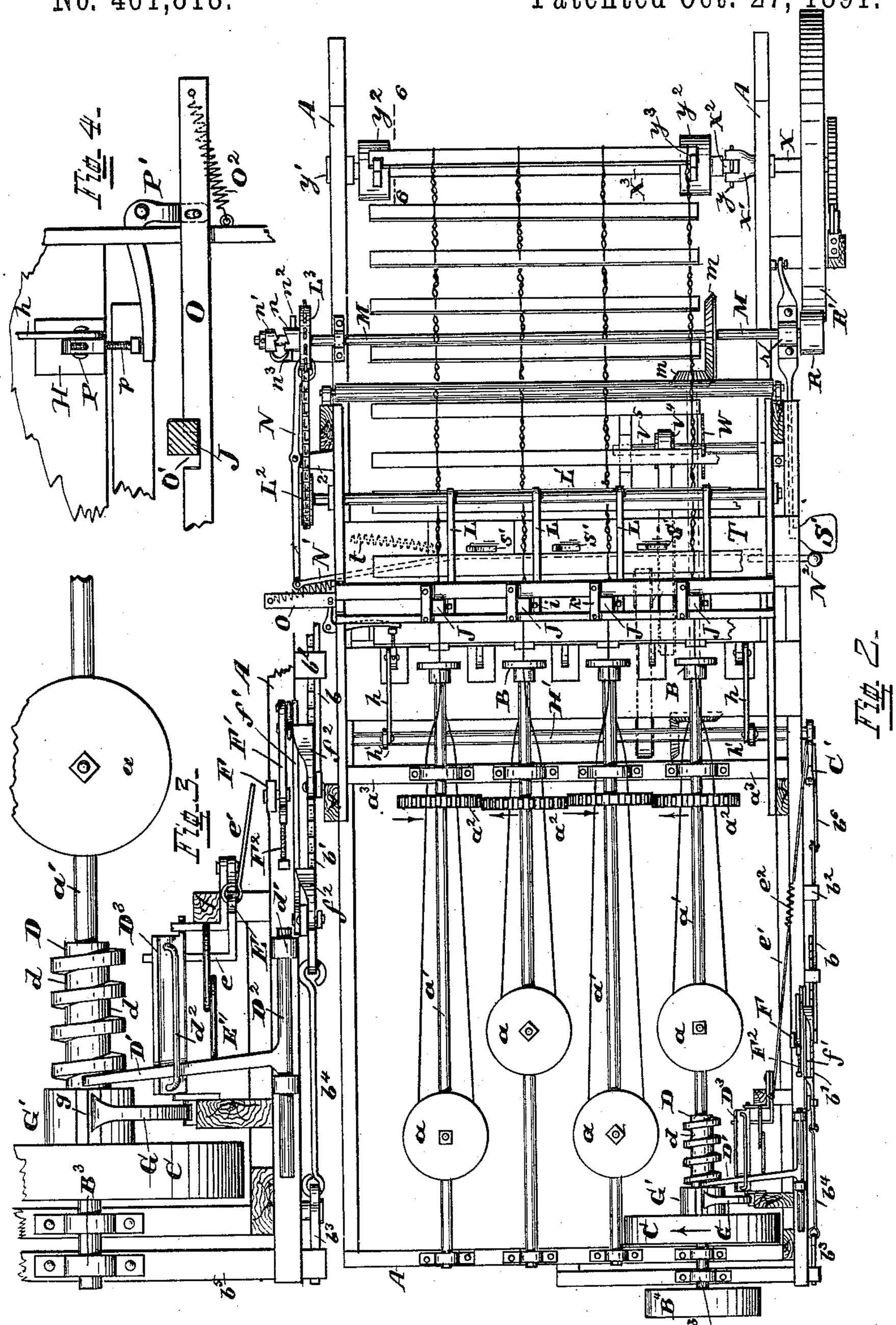

Fig. 2.

Fig. 1.

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Fig. 7.

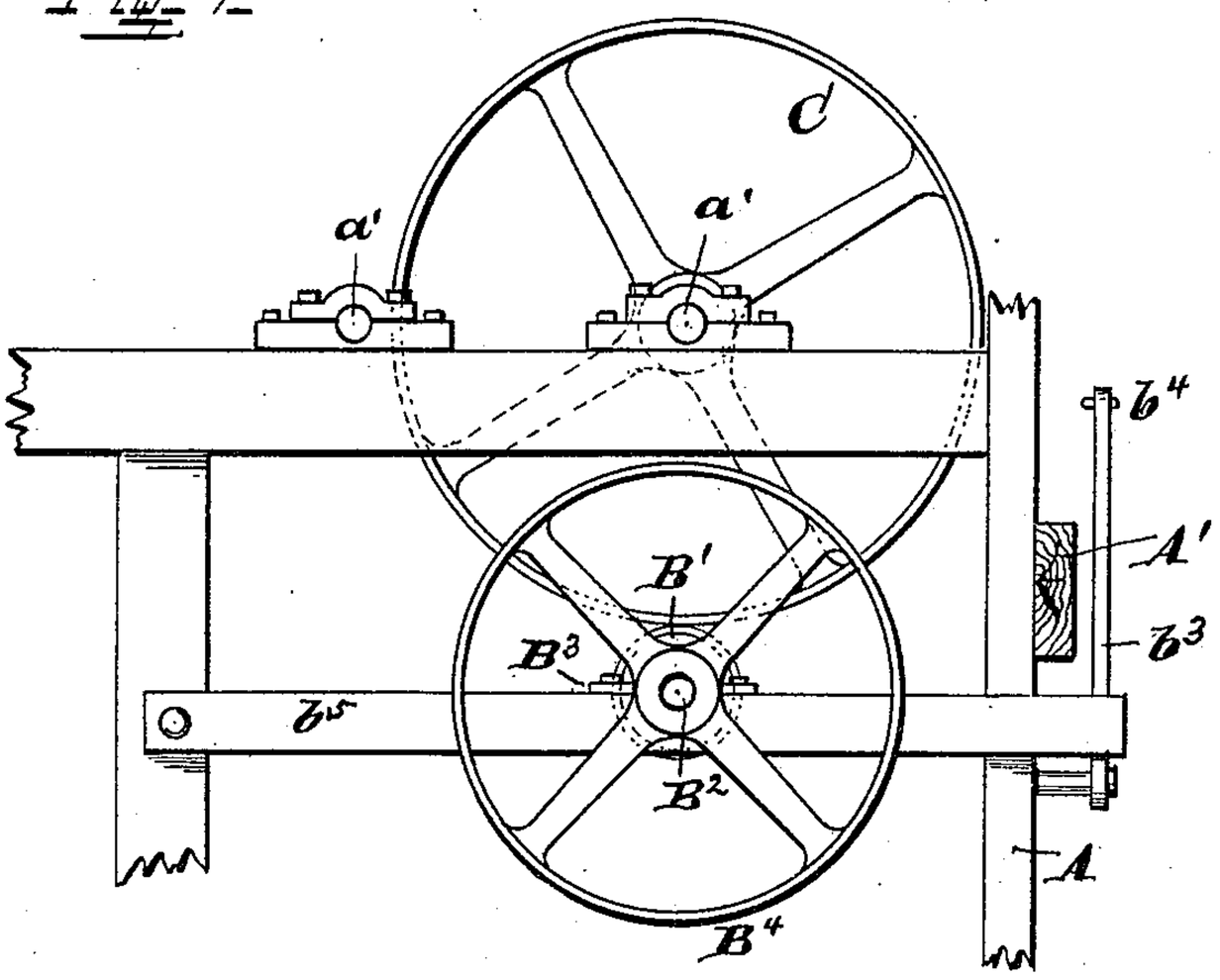
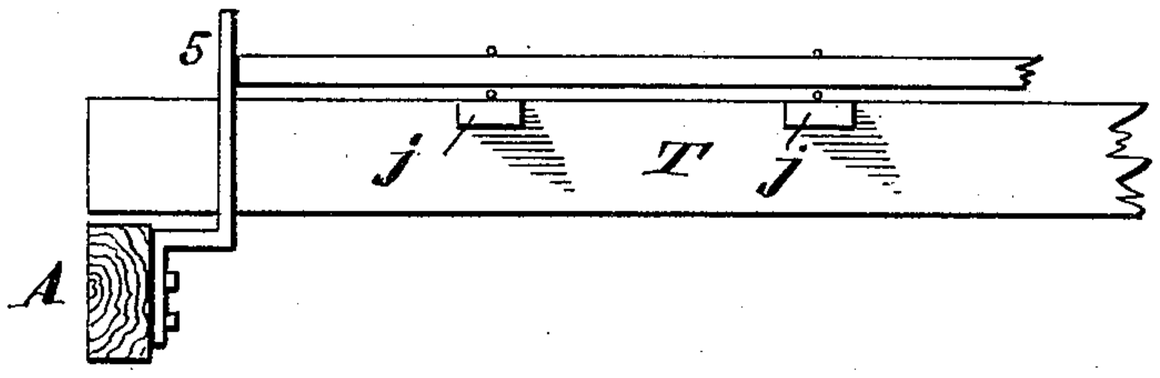


Fig. 8.



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UNITED STATES PATENT OFFICE.

CHARLES NORMAN DAVIS, OF CINCINNATI, OHIO.

WIRE-AND-PICKET-FENCE-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 461,818, dated October 27, 1891.

Application filed October 9, 1890. Serial No. 367,589. (No model.)

To all whom it may concern:

Be it known that I, CHARLES NORMAN DAVIS, a citizen of the United States, residing at Cincinnati, in the county of Hamilton and State of Ohio, have invented certain new and useful Improvements in Wire-and-Picket-Fence-Making Machines, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

My invention relates to that class of machines used in the manufacture of picket-and-wire fencing; and it consists in the means hereinafter set forth for starting and stopping the machine, for clamping the wire to the picket before being twisted, and a saw connection for cutting the pickets of uniform length, all arranged substantially as shown and as will be hereinafter described.

In the accompanying drawings, Figure 1 is a side elevation of my improved machine, taken from the operating side. Fig. 2 is a top view of the machine shown in Fig. 1. Fig. 3 is a top view, on an enlarged scale, of the mechanism shown at left hand in Figs. 1 and 2 for starting the machine and for automatically stopping the same after having made a certain determinate number of twists of the wires. Fig. 4 is a detached view, on an enlarged scale, of the preferred form of mechanism for holding the weights in position over the picket to be woven in the fence and the preferred mechanism for disengaging said lock to permit the said weights to drop on each strand of wire over the picket before the wire is twisted. Fig. 5 shows a section through the cross-piece T, showing the preferred form of device for operating the lever to throw the clutches n and n' in position, also for operating the guard-lugs 3 and s'. Fig. 6 is a cross-section of the picket-reel, taken on the dotted line 6 6, Fig. 2. Fig. 7 is a view in elevation of a portion of the front end of the machine, showing one mode of hinging the bearing B^3 to the frame of the machine. Fig. 8 is a view of the stop lug or gage connected to the rear side frame of the machine, against which gage each picket is placed before being rammed to place, thus evening one end of all the pickets.

My improved machine for making picket-wire fencing is mounted upon suitable frame-supports A, and is provided with the ordinary wire reels or spools a, suitably mounted on the rods a', to which the gears a^2 are rigidly connected, said gears meshing with each other in order to rotate the twisting-heads B, connected to the end of the rods a', as shown. The wires pass through said gears a^2, through the enlarged journals mounted on the cross-piece a^3, and through said twisting-heads B, the latter when rotated causing the wires to become twisted between the pickets in the usual manner.

I will now describe my improved mechanism for starting the machine and for automatically stopping the same at a determinate interval.

Power is applied by means of a friction-wheel B′, mounted on the driving-shaft B^2, the latter at its front end portion resting in a bearing B^3, the latter resting on the hinged piece b^5, as more clearly shown in Fig. 7, thus affording a hinged bearing for said shaft B^2 to operate in. A suitable band-wheel B^4 is secured to the end of said shaft when desired to operate the machine by steam-power. The friction-wheel B′ is brought in contact with the pulley C by elevating the front end of shaft B^2, which operation may be accomplished in various ways, the preferred mechanism for accomplishing this object being that shown, which I will now describe. To the upright frame-supports A is connected the horizontal strip A′, to which is attached the sliding bar b and toothed bar b', said bars being suitably connected and retained on said piece A′ by means of suitable brackets b^2, as more clearly shown in Fig. 1. The toothed bar b' is connected to the lever b^3 by means of rod b^4, (see Figs. 1 and 3,) the outer extension of said lever resting beneath the hinged piece b^5, to which the bearing B^3 is connected. The bar b is connected to the lever C′ by an auxiliary bar b^6, pivoted to said lever and bar b, as shown. The operation of this portion of the mechanism just described for starting the machine is as follows: The operator grasps the lever C′, pulls it toward the rear of the machine, which causes the bar b and toothed bar b' to travel rearward, and through the medium of rod b^4 the lever b^3 is operated, causing the extension of said lever to elevate

the hinged bearing-piece b^5 and with it the friction-wheel B′. The shaft B^2 being in continuous motion, it is evident that so soon as said friction-wheel B′ is elevated in contact with the pulley C that motion will be imparted thereto, and said pulley being mounted on one of the rods a' motion will be imparted to all of said rods and their twisting-heads through the medium of gears a^2.

Having described the construction and operation of the preferred mechanism for starting the machine I will now describe the preferred mechanism for automatically stopping the machine and also for determining the number of twists to be given the wires between each picket.

The rod a', to which the pulley C is connected, has a sleeve D rigidly connected to said rod, said sleeve having the helical grooves d therein. The arm D′ is adapted to rest in the grooves d at its outer free end when in operation. Said arm is centrally connected to its rod D^2, which is loosely supported in the bearings d', as more clearly shown in Fig. 3. The outer end portion of this arm D′ rests upon the pivoted or hinged plate D^3 and is held in position thereon by means of the bent wire or rod d^2. (See Fig. 3.) The hinged plate D^3 rests upon the extension e of lever E, which latter is connected to lever C′ by means of rod e', as shown in Fig. 1, said rod being separated near its center and joined by an elastic or spring connection, as shown at e^2. The arm D′ is provided with a spring E′, one end of which is connected to any suitable stationary point, the other end of said spring being connected to said arm in order to force the latter back into proper position when the machine is stopped, as will appear from the operation about to be described. To the upright piece F is pivoted the crank-lever F′, one end of which swings free and the other end is pivoted to the bar f, the latter being pivoted to the horizontal bar f', which lies adjacent to the toothed bar b', as shown in Fig. 3. To the free end of lever F′ is secured the set-screw F^2, against which one end of the arm-rod D^2 strikes in order to automatically stop the machine, as will more fully appear. The operation of this feature of my invention just described is as follows: The machine having been started in the manner aforedescribed, the free end of arm D′ rests in the helical groove d of sleeve D, and as said sleeve is rotated said arm is carried rearward in said groove until its connecting-rod D^2 strikes the set-screw F^2, (see Fig. 3,) which causes the crank-lever F′ to be elevated at rear and with it the bars f and f'. The bar f' is about on a plane with the toothed bar b', and as soon as bar f' is elevated it throws the pawls f^2 out of the toothed bar. As soon as the pawls are thus disengaged from said toothed bar the weight of the shaft B^2 and its friction-wheel B′ will cause said friction-wheel to drop away from its pulley C, thus stopping its operation. It will be seen that the number of twists to be given the wires between each picket is governed by the number of times the arm D′ travels around the sleeve D in its helical groove d before the rod D^2 comes in contact with the set-screw F^2. When the lever C′ is operated to start the machine, the pull on said lever causes the extension e on lever E to elevate the hinged plate D^3 at one side, thus lifting the arm D′ out of the groove, and as soon as thus lifted the spring E′ forces said arm forward into position, as shown, ready to again travel rearward in said groove d, as before described. To facilitate in retaining the reels a in proper position, I have provided the pawl G to engage with the grooves g in sleeve G′. By this means any reverse movement of said reels is prevented on stopping the machine.

To even one end of the pickets I have provided the gage 5, which consists of an angular-shaped piece of metal bolted to the rear longitudinal frame A, against which gage each picket is placed before being rammed to place, (in the manner about to be described,) as shown in Fig. 8.

After the wires are twisted the desired number of times it is very desirable that the next picket to be woven in the product should be rammed up tight between the two wires composing each strand, in order that said picket may be firmly woven in place. To accomplish this I have provided the sliding rammer H, extending across the machine and connected to the operating-lever C′ by means of the pivoted bars h and h', as shown in Fig. 1. This rammer is located just in front of the point where the picket is fed between the wires, as shown in Fig. 1, and after having been put to place the picket is driven home by the same movement that starts the machine—viz., by means of lever C′. By reference to Fig. 2 it will be seen that the bars h' are connected to a cross-rod H′, which is rigidly connected to the operating-lever C′.

If the picket to be woven is of a rectangular configuration, as shown, it is desirable that the wires should be tightly compressed against the top and bottom sides of said picket (in addition to its being tightly rammed in between said wires) before the wires are twisted. To accomplish this object I have provided the drop-bars J, suitably retained in a vertical position. In the present illustrative instance said drop-bars are retained in a vertical position by means of the cross-pieces j and brackets k, suitably connected to the upright frame-support. These drop-bars J are located directly above the point where the wires encircle the picket. To each drop-bar is connected a pin or lug i, against which the levers L impinge, the latter being rigidly connected to the cross-rod L′, to which is connected a suitable sprocket-wheel L^2. The sprocket-wheel L^2 is connected to a similar wheel L^3 by the link-band L^4, said latter wheel being connected to the cross-shaft M, which latter is rotated by means of the beveled

gears m and m', the latter m' being connected to one end of the main shaft B^2, as more clearly shown in Fig. 1. This link-band L^4 is connected at its upper end to one of the sprockets of wheel L^2 and only partially surrounds the latter, as a partial rotation of said wheel is sufficient to elevate the drop-bars J. To the shaft M is connected a tight and loose clutch, the loose portion of said clutch being operated by the lever N, the latter being pivoted centrally to the extension 2, as shown in Fig. 2. To the opposite end of the lever N is pivoted the rod or bar N′, which extends across the machine, and is also pivoted to the bent lever N^2, as more clearly shown in Fig. 5, said lever N^2 being pivoted between the lugs 3, connected to the cross-piece A′, as shown in said figure. The loose portion n of the clutch is thrown in contact with the rigid portion n' thereof by pulling the lever N^2 outward toward the operator through the medium of bar N′ and lever N. When the bent and U-shaped lever N^2 is pulled outward, it swings about its pivotal points in the lugs 3, and the inner end of this lever draws the end of the bar N′ toward the operator, thus causing the lever N to swing about its axis on the extension 2. To the portion n of the clutch is connected a pin n^2, which is adapted to slide over the beveled face n^3 and disengage the clutch at a determinate period, as will more fully appear in the operation of same.

Motion being continuously applied to the main shaft B^2, all that is required in order to elevate the drop-bars J is to grasp the lever N^2 and pull it outward, which will cause the clutches n and n' to engage and rotate the sprocket-wheel L^3 on shaft M. The rotary motion imparted to wheel L^3 is imparted to wheel L^2 and its shaft L′, to which latter the levers L are connected. Any rotary motion imparted to shaft L′ causes said levers L to be elevated at their free end portions and with them said drop-bars J, said levers impinging against the pins i, connected to said bars. Having elevated the drop-bars the desired height, it is necessary that suitable means be employed for retaining them in a locked position, and also means for unlocking said mechanism when desired to have said bars drop on the wire around the picket. This feature I accomplish by the following preferred means, viz: In the brackets k is secured the sliding bar O, which is cut away at O′ to permit the drop-bars J to operate up or down therein. In one corner of each drop-bar is formed a recess, (see Fig. 4,) in which one side of the cut-away portion of the sliding bar O enters when said bars have been elevated the desired height—that is, when the recess is brought up to a plane with said bar. The cut-away portion O′ in the sliding bar O is held firmly against one side of the drop-bars J by means of a suitable spring O^2 or other elastic connection, and as soon as said bars are elevated a sufficient height the resiliency of spring O^2 causes one corner of the sliding bar at its cut-away portion to enter the recess formed in one corner of said drop-bars, thus securely locking them in an elevated position.

After the drop-bars J have been elevated and locked in position in the manner described, and after the picket to be woven has been put in place between the wires, I have arranged the following preferable form of mechanism for unlocking said drop-bars and permitting them to descend with the same movement or operation which drives the picket to place, as before described, viz: To the cross-rammer H is secured an upright extension P, to which the set-screw p is attached, (see Fig. 4,) and as said rammer is forced against the picket by means of lever C′ and so soon as said picket has been driven to place the set-screw p strikes against the crank-lever P′, (which latter is connected to the sliding bar O by a slot-and-pin connection,) causing the bar to be withdrawn from the recess in each drop-bar J, permitting them to drop instantly upon the wire over the top side of the picket and firmly incase said wires therein.

The pickets as fast as woven are rolled in a compact form in the following preferable manner: To the front end portion of shaft M is secured a friction pulley or wheel R, the said shaft being mounted in a bearing r, said bearing being mounted on the foot-lever s', which latter is upheld by a suitable spring S, which tends to keep said wheel away from the large friction-wheel R′, except when desired. To wind on a picket, the operator puts his foot on the treadle S′, which causes the friction-wheel R to be lowered in contact with the friction-wheel R′, causing it to rotate a sufficient distance to wind on one picket.

To prevent winding the pickets too far and to act as a safeguard, I have provided the following device, viz: To the bar N′, which throws the clutch for elevating the drop-bars J is pivoted the short bar s, which in turn is pivoted to an auxiliary bar s', the top of said bars projecting through the cross-piece T (see Fig. 5) between the pickets, so that only the distance between two pickets can be wound without lowering said projecting bars. To lower said projecting bars the operator pulls the lever N^2 outward until the picket has partially passed over said bars, when he may release his hold on said lever, the tension of spring t tending to pull the bar N′ back to place and with it the projecting bars s and s' so soon as the picket has been wound off said projections. It will thus be seen that the same movement which causes the drop-bars to be elevated causes the projecting bars to descend out of the way of winding on the picket.

It is desirable in a picket-and-wire fence to have all the pickets of a uniform length, and to accomplish that object I have arranged a circular saw adapted to be operated in the following preferable manner: To the main shaft B^2 is keyed a beveled pinion V, which

meshes with another pinion V′, to which latter is connected a band-wheel. To a suitable bracket on the frame-support is journaled a small band-pulley V^2, which operates the larger pulley V^3, the band from pulley V^2 passing over the pulley V^4 on rod V^5, which in turn operates the saw W, connected thereto, as shown in Figs. 1 and 2. By reason of this arrangement the saw is kept in motion at all times after power is once applied, and as the pickets are drawn back in the manner aforedescribed to be rolled in a compact form each picket is sawed off of uniform length.

The reel on which the pickets are wound is preferably constructed as follows: The pulley R′ is connected to a shaft X, to which latter is connected the journal X′, having therein a square socket X^2, in which the square rod X^3 rests, and is retained therein by the pin *y*, as shown in Fig. 2. This rod X^3 extends across the machine and fits in a square recess in journal *y′*. To this rod X^3, near its end portions, is secured the collars y^2, the latter being adapted to slide on said rod. To each collar y^2 is connected the hook y^3, which hooks engage and catch the first picket, causing the succeeding pickets to be wound on the reel as the latter is rotated through the medium of friction-pulleys R and R′. As soon as a sufficient number of pickets have been wound on the reel the latter is removed by driving the pin *y* from place, removing the square rod X^3 from the socket X^2, when said rod will drop out of the recess in journal *y′*. The hooks y^3 are then disengaged from the first picket, leaving the roll of pickets intact and free from said reel.

Having described the operation of each separate feature of my invention in connection with its construction, I will now describe briefly its operation as a whole.

The operator puts the picket to place between the wires, as shown in Fig. 1, and then grasps the lever C′, pulling it rearward, which operation starts the machinery, rams the picket into place between the wires, and causes the drop-bars J to descend and strike the wires directly over the picket, all of which is accomplished simultaneously. The bars J rest upon the wires on the picket until the twisting-heads have given the wires a sufficient number of twists, when the operation of said heads is stopped by reason of the rod D^2 on arm D′ coming in contact with the set-screw F^2 in the manner before described. The number of twists to be given the wires may be regulated by this set-screw by screwing it in or out on the lever F′. Having woven the picket to place, the operator grasps the lever N^2 and pulls it toward him, which operation causes the drop-bars to be again elevated in the manner before described and at the same time depresses the stop-bars *s′*, so that the picket may be wound back by putting pressure on the treadle S′, as hereinbefore fully set forth. As the pickets are drawn back on the reel the circular saw W cuts them of uniform length before bundling.

The advantages of my improved fence-machine are many and obvious, combining as it does all the requisites for economically and quickly manufacturing picket-and-wire fencing. The machine is under complete control of the operator and is readily operated by the levers C′ and N^2 and foot-treadle S′. The operation of the machine is stopped automatically and is readily adjusted to give the required number of twists to each strand of wire.

While it is preferred to employ all the several features of my invention in the connection shown and described, one or more of said features may be used in connection with fence-machines differing in construction from that herein set forth. If desired, the drop-bars need not be operated by simply disengaging the clutch *n*, as is the case when it is desired to weave cane or bamboo.

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

1. In a fence-making machine, the main shaft B^2, mounted in bearing B^3, the latter resting on the hinged piece b^5, pulley B′, mounted on said shaft, crank-lever b^3 for upholding and lifting the free end of said hinged piece, rod b^4, connected to lever b^3 and to the toothed bar *b′*, bar *b*, and lever C′, connected by bar b^6, in combination with pulley C and geared rods *a′*, twister-heads B, mounted on said rods, and pawls f^2, the latter being located directly over the toothed bar *b′*, substantially as set forth.

2. In a fence-making machine, the rods *a′*, carrying the reels *a*, gears a^2, and twisting-heads B, one of said rods having a sleeve D connected thereto with a helical groove *d* therein, and a pulley C, mounted on said rod, in combination with arm D′, resting in said helical groove and adapted to slide horizontally, the crank-lever F′, having a set-screw F^2, horizontal bar *f′*, connected to said lever by the bar *f*, and pawls f^2, pivoted directly over the bar *f′*, and suitable means for rotating said pulley C, for the purposes set forth.

3. In a fence-making machine, the sleeve D and pulley C, mounted on one of the gear-rods *a′*, and twisting-heads B, connected to said rods, said sleeve having a helical groove *d* therein, in combination with arm D′, resting in said groove, said arm having an extension D^2, set-screw F^2, connected to one end of crank-lever F′, the other end of said lever being connected to the horizontal pivoted bar *f′* by means of bar *f*, said horizontal bar being located adjacent to the toothed bar *b′* and beneath the pawls f^2, and suitable means for rotating said pulley, for the purposes set forth.

4. In a fence-making machine, in combination with the twister-carrying shaft supporting the sleeve, having a helical grocve therein, with an arm resting in said groove, the means herein set forth for lifting said arm

out of said groove and forcing it back to place again, consisting of hinged plate D^3, supporting said arm, spring E′, connected to said arm, lever E, having an extension *e* beneath said hinged plate, rod *e′*, connected at one end to said lever and at the other end connected to lever C′, said rod having an elastic connection e^2, and suitable means for rotating said sleeve, for the purposes specified.

5. In a fence-making machine, the drop-bars J, located directly over the points where the wires cross the pickets and adapted to be held and locked in an elevated position by a sliding bar, in combination with rammer H, suitable connecting mechanism between said rammer and sliding bar for operating the latter, and means, substantially as set forth, for operating said rammer and for elevating said drop-bars, for the purposes specified.

6. In a fence-making machine, the drop-bars J, located directly above the points where the wires cross the picket, said bars having a suitable recess in one corner thereof, sliding bar O, partially encircling said bars J at the cut-away portion O′, and spring O^2, all arranged substantially as set forth, in combination with lever P′, set-screw *p*, and rammer H, and suitable means for operating said rammer and for elevating said drop-bars, for the purposes set forth.

7. In a fence-making machine having the vertically-movable drop-bars J adapted to be locked in an elevated position, the means herein set forth for elevating said bars, consisting of lever N^2, rod N′, lever N, clutch mechanism *n n′*, mounted on shaft M, sprocket-wheels L^2 L^3 and chain connection, rod L′, levers L, and pins *i*, and suitable means for operating the shaft M, as set forth.

8. In a fence-making machine, the means herein set forth for rotating the picket-reel, consisting of pulley R, mounted on shaft M, the front end of said shaft resting in a hinged bearing *r*, spring S for keeping said pulley R away from the pulley R′, the pulley R′, and the treadle S′, as set forth.

9. In a fence-machine, the stop mechanism herein set forth, consisting of lever N^2, pivoted rod N′, pivoted bars *s s′*, the latter operating in a recess in cross-piece T, and spring *t*, all arranged substantially as set forth.

10. In a fence-machine, the picket-reel made up of the bar X^3, resting at one end in a recess in journal *y′* and at the other end in socket X^2, the latter being open at one side, pin *y*, collars y^2, encircling the bar X^3, and hooks y^3, connected to said collars, as and for the purposes specified.

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