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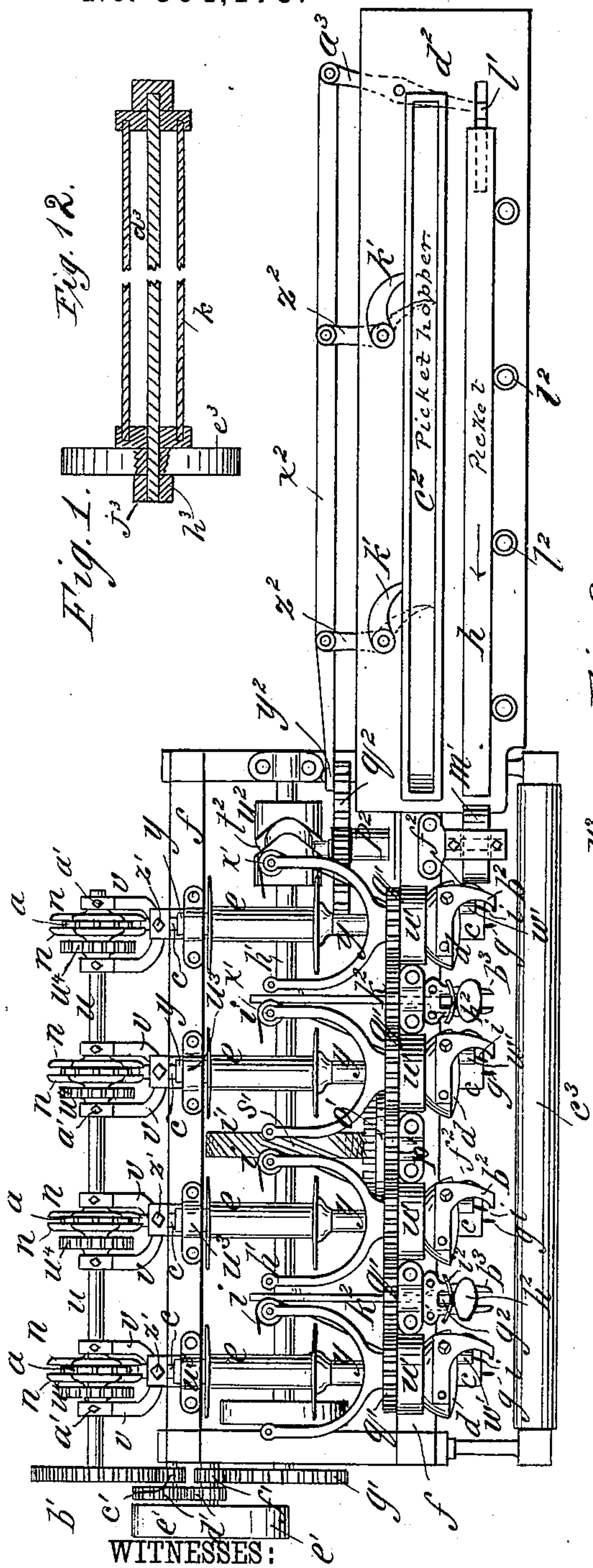
2 Sheets—Sheet 1.

F. M. COMSTOCK.

FENCE MACHINE.

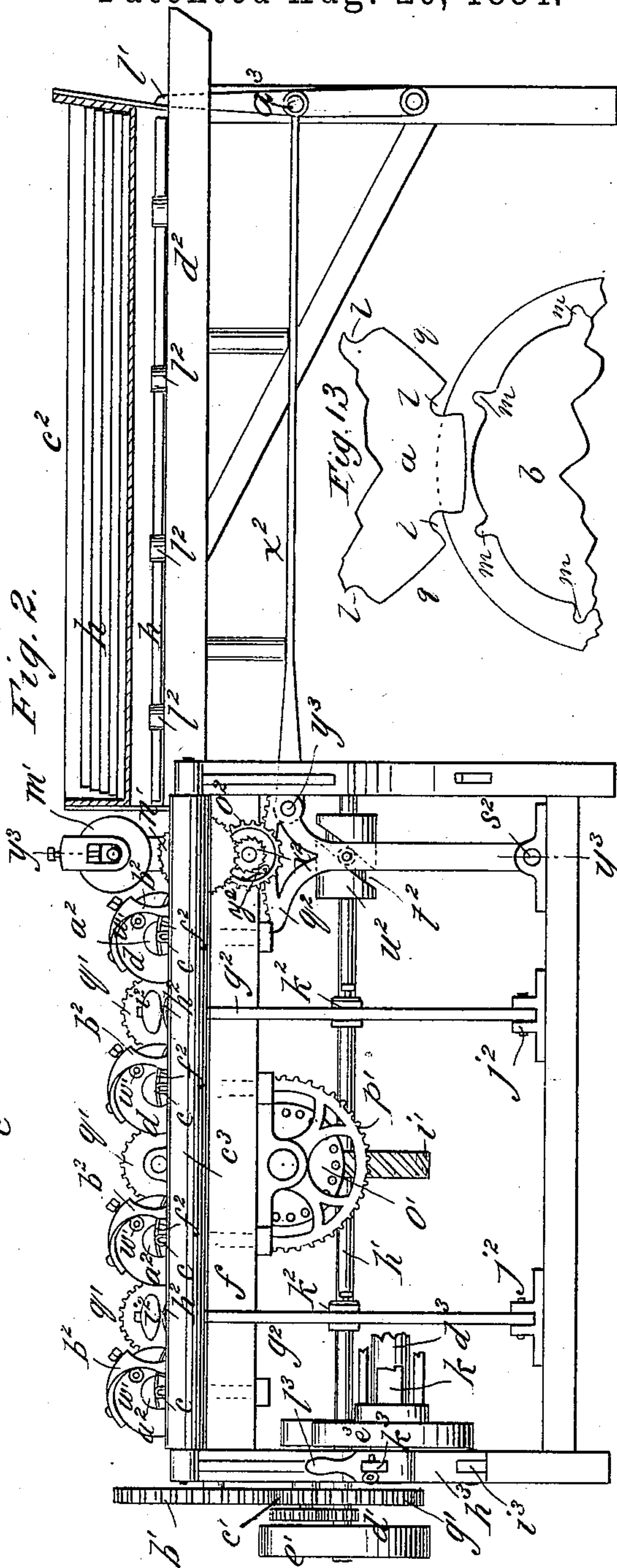
No. 304,175.

Patented Aug. 26, 1884.



WITNESSES:

Donn Twitchell.
Co. Dedgwick



INVENTOR:

BY *Munn & Co*

ATTORNEYS.

(No Model.)

2 Sheets—Sheet 2.

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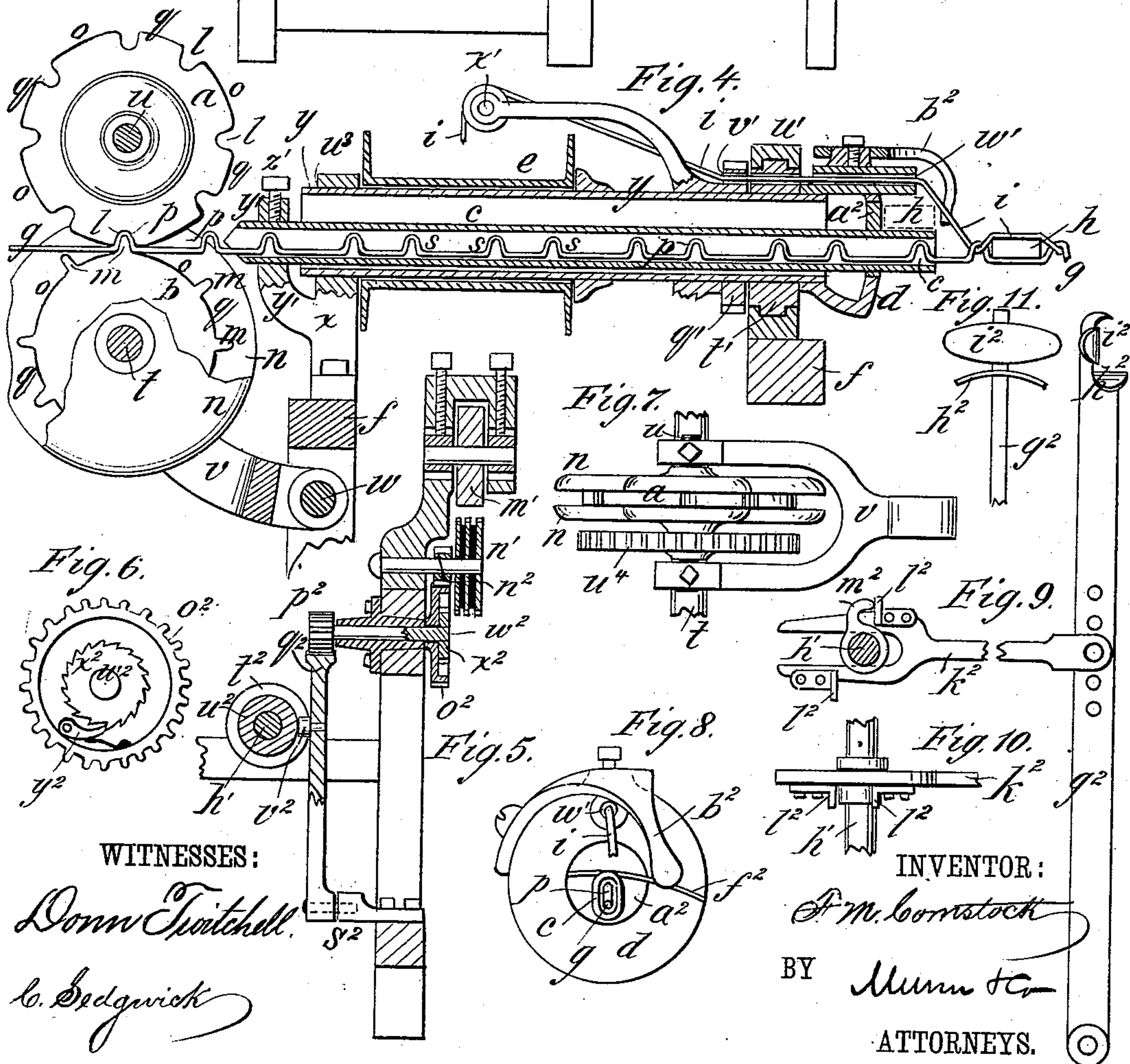
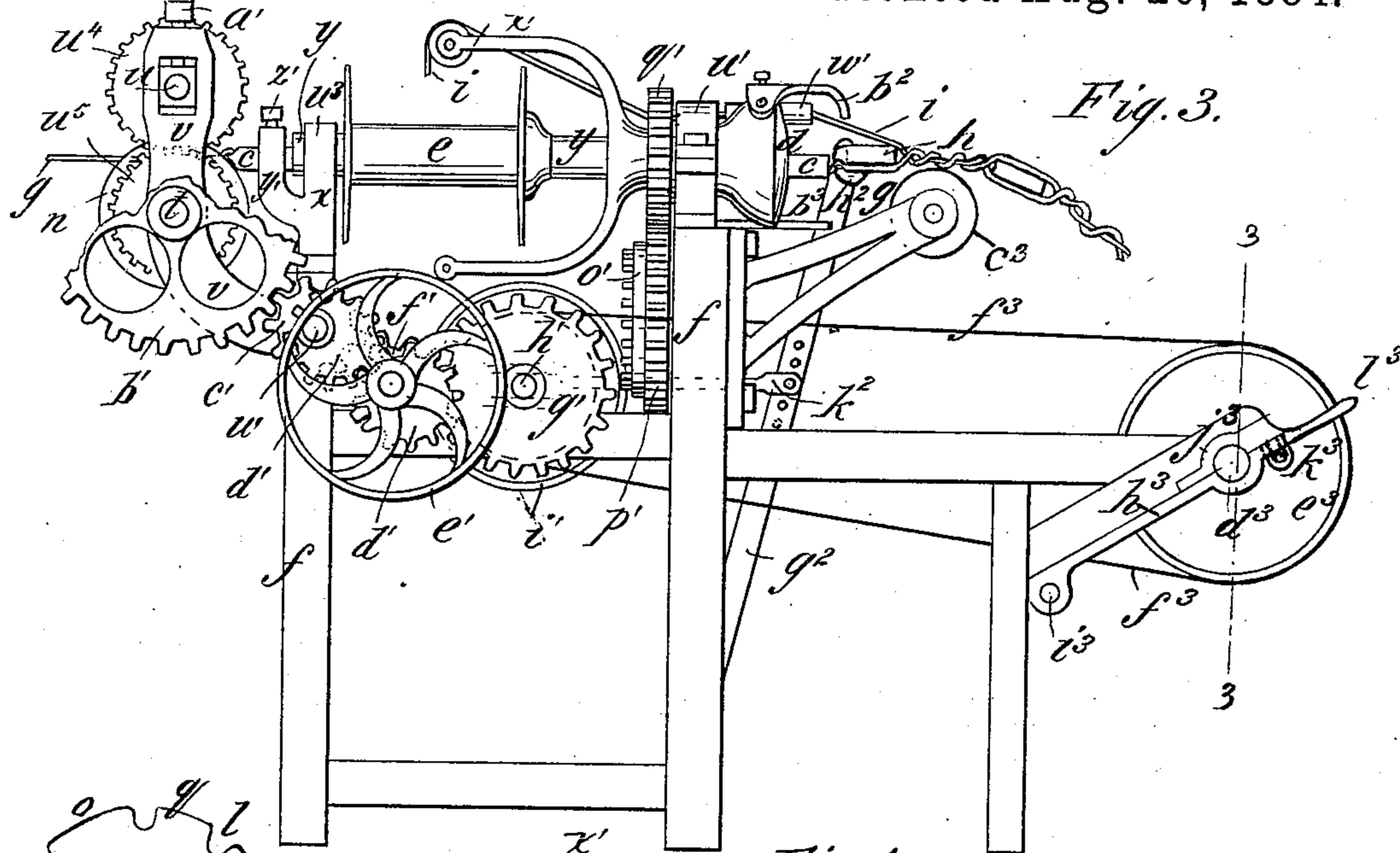
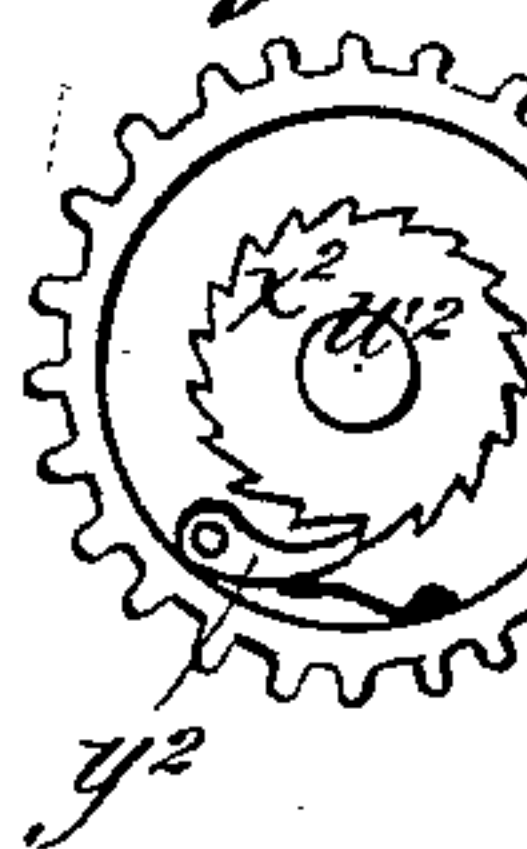


Fig. 6.



WITNESSES:

Donn Twitchell.

C. Sedgwick

Fig. 5.



Fig. 7.

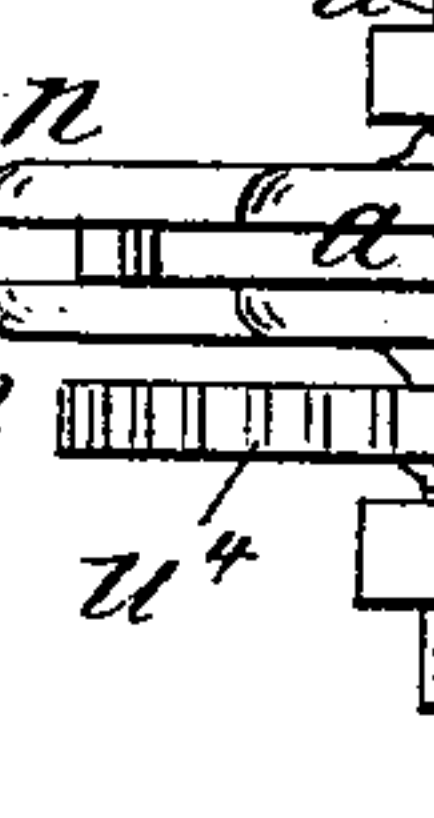


Fig. 8.



Fig. 9.

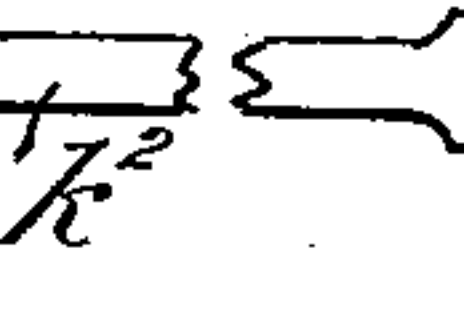
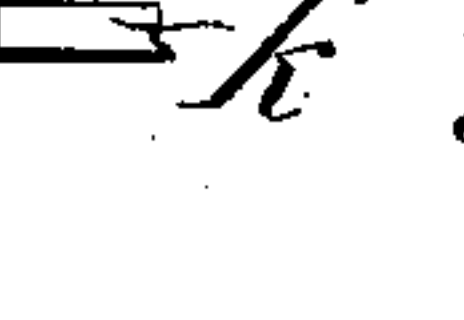


Fig. 10.



INVENTOR:

F. M. Comstock

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Munn & Co.

ATTORNEYS.

UNITED STATES PATENT OFFICE.

FRANCIS M. COMSTOCK, OF KEOKUK, IOWA, ASSIGNOR OF ONE-FOURTH TO
GEORGE Q. ADAMS, OF SAME PLACE.

FENCE-MACHINE.

SPECIFICATION forming part of Letters Patent No. 304,175, dated August 26, 1884.

Application filed February 19, 1884. (No model.)

To all whom it may concern:

Be it known that I, FRANCIS M. COMSTOCK, of Keokuk, in the county of Lee and State of Iowa, have invented a new and Improved Fence-Machine, of which the following is a full, clear, and exact description.

My invention consists of improvements in mechanism for corrugating wires and weaving them together with pickets of wood or iron for making fencing, consisting of wire stringers and pickets, whereof the said stringers consist of one corrugated wire having suitable bends or indentations at intervals along the same, in which the pickets are arranged and bound fast by a binding-wire twisted around the corrugated wires between the pickets and stretched across the pickets on the side opposite to the corrugated wire, the same being a simple, cheap, and substantial fence, that may be rolled up in rolls of several rods in length as it is delivered from the machine, in convenient form for transporting to the place for use, and stretching the same along the posts whereon the fencing is to be set up for use, all as hereinafter fully described.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of my improved fence-machine. Fig. 2 is a side elevation, with the feeding-box for the pickets in section and the reeling device broken out. Fig. 3 is an end elevation of the machine. Fig. 4 is a transverse section. Fig. 5 is a transverse section of the feed mechanism for supplying the pickets to the wires on the line $y^3 y^3 y^3$ of Figs. 1 and 2. Fig. 6 is a detail of the picket-feed mechanism in side elevation. Fig. 7 is a detail of the corrugating apparatus in plan view. Fig. 8 is an end elevation of the twisting device. Fig. 9 is a side elevation of the device for "beating up" the pickets into the "shed" of the wires. Fig. 10 is a detail of the said beating-up apparatus in plan view. Fig. 11 is a front elevation of the head of one of the beating-up arms. Fig. 12 is a sectional view on the line 3 3 of Fig. 3, parts being broken away. Fig. 13 is an enlarged detailed view of portions of the wire-bending rolls, showing

more fully the contours or outlines of their peripheries.

For as many wire stringers as the fence is to contain I arrange as many pairs of corrugating-rolls, $a b$, guide-tubes c , twisting-heads d , and wire-reels e in a series on the top of a suitable frame or bench, f , for corrugating the wires g and weaving them together with pickets h by the binding-wires i , thus making webs of any desired length, and delivering them upon reels k , and winding them up in rolls for convenience in handling them. Previous, however, to the commencement of the aforesaid operation, the wires g are passed, unbent, between the rolls $a b$ —the latter having been adjusted so as to prevent them acting upon the wires—to the reel, and connected to one of the reel peripheral bars. So soon as the first bend of each wire g during the bending operation emerges from the end of the tube the binding-wires i are fastened to said bend by hand, the feeding of the wires g having been arrested sufficiently long to permit of said uniting of wires $g i$, and the slack having been taken up by the action of the reel.

The corrugating-rolls consist of a disk, a , having notches l in the periphery, and the disk b , having corresponding teeth, m , to mesh in the notches and bend the wires, as shown, said rolls being arranged to run together between the flanges n , and adapted to corrugate the wires g , passing between them, and prevented from escaping by the flanges n . The spaces o between the notches l and teeth m are pitched according to the width of the pickets h , which are to be placed in the corresponding spaces of the wires g , between the corrugations p , and the spaces q are pitched according to the required distance between the pickets. I find in practice that it is necessary, in order to bend the wire g at the angles s so that the general line of the wire will be straight, to flatten the periphery of the notched roll a a little between the notches, instead of curving it to the true circle, and to construct the corresponding portions of the toothed roll b between its projections $m m$ more convex than the periphery of the circle of the roll which overbends the angles s , so that the wires come straight by the reaction which takes place af-

ter the action of the rolls. These corrugating-rolls are mounted on shafts t u , that are supported in bearings of the crotched arms v , that are pivoted on a stationary shaft, w , so that said rolls may be swung down readily whenever the empty reels e are to be removed and replaced by full ones, to enable the supporting-brackets x to be removed by pulling off from the tubes c and y , to allow said reels to be pulled off and slipped on said tubes y , said brackets being suitably disconnected by their fastening-bolts. Any suitable means for holding said supporting-arms v up in position, which it is not necessary to show, may be employed. The boxes for the separate shafts u of the upper corrugating-rolls, a , are adjustable in said arms v toward and from the bearings of shaft t , and have set-screws a' to set them, as the size of the wire and the pressure may require, and the shaft u of each roll a gears by a toothed wheel, w^4 , with a wheel, w^5 , fixed on the shaft t . The shaft t gears by a large toothed wheel, b' , on one end, with a pinion, c' , on the projecting end of shaft w , on which the supporting-arms v swing, and pinion c' is turned by a pair of eccentric wheels, d' , one of which is attached to it, and the other is attached to the hub of the driving-pulley e' . The object of the eccentric wheels is to turn the corrugating-rolls swiftly for delivering the corrugated wire swiftly while the binding-wire is being twisted around it along the spaces between the pickets, and to turn said rolls slowly for delivering said wire slower while the pickets are being pushed along in the beating-up process to draw the binding-wire across the pickets. The driving-pulley e' also turns a concentric pinion, f' , which gears with a larger wheel, g' , on a shaft, h' , on which is a driving-wheel, i' , that is for revolving the twisting-heads d , and a cam, w^2 , that is to work the feed-pawls k' , feed-lever l' , and the feeding-rolls m' and n' .

The wheel i' is constructed with spiral or worm flanges on its face, and gears with a crown-wheel, o' , which turns a spur-wheel, p' , that gears with the intermediate wheels, q' , of a train, connecting all the twisting-heads together for turning them together alike. While the beating-up process is going on, to shift along the web as each new picket is twisted in, it is desirable that the twisters shall turn very slowly—or momentarily cease altogether to turn—for which purpose the spiral flanges s' of the wheel i' are pitched with much less angularity to the side of said wheel than its other flanges; or said flanges s' may be parallel thereto.

The twisters each consist of a revolving tube, y , having one of the wheels of the gear-train q' attached, and being fitted with a collar, t' , turning in a bearing, u' , near the head of the twister, while the other end of said tube runs in a box, u^3 , of the bracket x . The driving-wheel q' and collar t' have a wire-guide passage, v' , through them; and along the tube from collar t' , and extending a suitable distance

beyond the end of said tube, there is another guide, w' , coincident with guide v' , by which the binding-wire i is conducted from a flier-guide, x' , that takes the wire from the reel e to the point of twisting around the corrugated wire, which is in front of the end of the tube c , along which the said corrugated wire is conducted from the corrugating-rolls a b . This tube c , which is flattened to correspond with the form of the corrugated wire and hold the corrugations p upright by preventing the wire from twisting, so that the pickets will be properly received in the spaces between the corrugations, is located at the bottom of tube y , which is much larger than said tube c , and said tube c is held in its proper position by the bracket y' and set-screw z' , and the tube c has a bearing in a disk, a^2 , fitted in the head d of the twister, so as to be supported while the twister revolves around it. The tube c projects through and beyond head d about the width of the pickets, and rests sufficiently lower than the projecting end of wire-guide w' to allow the pickets to be fed in between said wire-guide and the top of it when the twister rests with said wire-guide w' above the tube c , as represented in Figs. 3 and 4. Over the wire-guide w' , and attached to it, is a guard-hook, b^2 , which hangs down in suitable proximity to the head d , to prevent the ends of the pickets from striking the wires when the pickets are being fed into the machine. The pickets are piled one on another in a feeding-box, c^2 , located on an extension-table, d^2 , suitably placed in the range of the line of twisters, said box having openings through the sides, enabling the lowest picket to be pushed out onto the table at the side of the line of guide-rolls l' by the pawls k' . The lever l' then swings forward against the outer end of the pickets and pushes them between the feed-rolls m' and n' , which quickly run the pickets along the series of twisters on the projecting ends of the tubes c and between the wires g and i . There is also a little inclined guide-chute, f^2 , attached to the top of the projecting part of tube c , which descends a little toward the feed-table, forming inclines to carry the ends of the pickets safely upon said tubes c and prevent said tubes from being injured by the ends of the pickets. When the pickets have been thus properly fed into position between the wires, which is during the cessation or slowing of the rotation of the twisters, the beating-up arms g^2 swing forward and quickly push the pickets from off the tubes c into the shed of the wires, and aid in shifting the fabric along the distance of the pickets from center to center, the twisters during this operation making two, three, or more turns, according to the number of turns the machine is geared to make between the pickets, and the feeding, twisting, and beating up and shifting along of the fabric continue in succession. The beating-up arms g^2 have a guard, h^2 , located a little lower than the guards f^2 of the tubes c , on which the pickets are to be carried to their lodgment

in the shed of the wires, and above said guards said arms have pusher-plates i^2 , to bear against the edges of the pickets. These arms g^2 are pivoted on one of the lower side beams of the frame at j^2 , and they have a forked connecting-rod, k^2 , straddling the shaft h' , and having toes l^2 , with which a wiper-cam, m^2 , is arranged on shaft h' , so as to effect much quicker movements of the arms than the ordinary cam or eccentric can by so arranging said toes and wiper-cam that the cams strike the toes when moving directly in the line of the movement of the arms, and escape from the toes as soon as the arms have been moved, after which the wipers effect the reverse movements of the arms by taking effect on the reversing-toes, thus effecting the forward movements of the arms in a small part of time of the revolution of the twisters, and while the twisters are so turned that the guards b^2 allow the pickets to be shifted forward. The arms rest in the forward position until the cams m^2 reach the reversing-toes, when they are as quickly returned to the first position before the next picket is fed in.

The connecting-rods k^2 are adjustable upon or down along the arms g^2 , to alter the throw of the arms for wider or narrower pickets.

For working the feed-rolls m' and n' , roll n' is geared by a pinion, n^2 , with a wheel, o^2 , geared by the pinion p^2 with the toothed segment q^2 , fitted on the pivot s^2 , and connected with the cam-groove t^2 in the hub u^2 on the shaft h' by the roller-stud v^2 , so that said segment is made to swing forward and backward to drive said feed-rollers; but, as it is only desirable to turn the feed-rolls forward, the wheel o^2 is fitted loosely on its shaft w^2 , and connected thereto by a ratchet, x^2 , and pawl y^2 , to allow the shaft w^2 to turn backward without turning the wheel o^2 , so that said feed-rolls rest during the back motion of the segment q^2 . The cam-groove t^2 is suitably contrived to swing the segment back ready to begin the forward movement of the feed-rolls at the moment that the twisters begin to rest or slack up in their movements. The segment q^2 is also made to work the pawls k' and the pusher l' by means of the rod x^2 , pivoted to it at y^3 , and having the arms z^2 of the pawls and the lever a^2 of the pusher connected to it, as shown in Figs. 1 and 2.

The beating-up arms g^2 work between forked guides b^3 , attached to the frame to hold said arms laterally. The said beating-up arms deliver the fabric over a guide-roll, c^3 , and upon the reel k , mounted on the shaft d^3 , having a pulley, e^3 , for turning it by a belt, f^3 ; or said reel may be turned by hand. In practice the pulley e^3 will gear with the reel-shaft by friction-wheels, instead of being fitted directly on the shaft, on account of the irregular movement of the fabric in delivering from the machine. The reel-shaft is supported in lever-bearings h^3 , pivoted to the frame at i^3 , and being held to the cap j^3 detachably by a hasp and pin, k^3 , or other suitable device, enabling

said lever-bearings, which have handle-extensions l^3 , to be lowered readily from time to time, to discharge the rolls accumulated on the reels, said reels being fitted to the shaft d^3 , so that it can be readily pulled out of the reels and replaced in its bearings with another reel to be filled.

The wheels i' and o' are geared to turn at the same rate of speed; but the wheels p' and the intermediate wheel, q' , of the twister-train are proportioned suitably for turning the twisters three times to one revolution of wheel i' and one feed motion, so that the binding-wire is twisted three times around the corrugated wire between the pickets; but more or less turns of the binding-wires may be had by proportioning the wheels p' and q' accordingly. The corrugating-wheels a and b are suitably timed to deliver the requisite measure of corrugated wire for each revolution of the driving-wheel i' .

I propose to make the feed-roll n' of pointed metal disks separated by thin layers of leather or other suitable material, said leather disks being smaller in diameter than the metal disks to enable said pointed disks to bite the pickets sufficiently to insure positive feeding of the pickets.

Having thus fully described my invention, I claim as new and desire to secure by Letters Patent—

1. The combination, in a machine having feeding and beating-up mechanism adapted for feeding and beating up fence-pickets, substantially as described, of corrugating-rollers and a guide adapted for delivering corrugated wire to the pickets, also wire-twisting mechanism adapted for twisting a binding-wire around the corrugated wire and for crossing said binding-wire over the pickets, substantially as herein described.

2. In a fence-machine consisting of wire-corrugating rolls, picket feeding and beating-up mechanism, and binding-wire mechanism, organized substantially as herein described, the mechanism to impart a variable speed to said corrugating-rolls to deliver the corrugated wire slowly while the binding-wire is being coiled thereon, and faster when the beating up of the pickets takes place, as set forth.

3. In a fence-machine consisting of wire-corrugating rolls, picket feeding and beating-up mechanism, and binding-wire mechanism, organized substantially as herein described, mechanism to effect periodical cessations or equivalent slow motions of the binding-wire during the feeding and beating up of the pickets, substantially as specified.

4. The combination, in a fence-machine, of a series of corrugating-rolls, $a b$, also a series of corrugated wire-guides, c , and also a series of binding-wire-twisting mechanisms, with picket feeding and beating-up mechanism, substantially as described.

5. In a pair of corrugating-rolls, $a b$, the notched roll a , having the face flattened between the notches l , and the roll b , having its

face convex beyond the circle of the roll, between the teeth m , to set the angles s in order to make the wire straight, substantially as described.

5 6. The combination of the revolving tube y , having the binding-wire reel e , flier-guide x' , and wire-guides v' and w' , with the corrugated rolls a b and wire-guide tube c , said guide-tube c being arranged within said revolving tube y , substantially as described.

10 7. The wire-guide tube c , arranged within the revolving twister-tube y , with one end secured in the bracket y' , and the other end arranged in and extending out of the disk a^2 , fitted in the head d of said revolving tube, in combination with the corrugating-rolls a b and the rotating binding-wire-carrying guides, substantially as described.

20 8. The revolving tube y , having a driving-wheel, q' , reel e , flier-guide x' , collar t' , guide-ways for the wire i , head d , and the disk a^2 , fitted in said head d , and being arranged in the bearings u' and u^3 , in combination with guide c , located in said tube, and with the corrugating-rolls a b , substantially as described.

25 9. In a fence-machine having the corrugating-rolls a b , guide-tube c , and tube y , the bracket x , for the support of the tubes y and c , detachably connected to the supporting-frame, and the pivoted supports v , substantially as described.

30 10. The series of twisting devices geared with the spirally-flanged driving-wheel i' by the gear-wheels q' and p' , the latter carrying the crown-wheel o' , gearing with the wheel i' , and said spirally-flanged wheel having one or more flanges, s' , arranged with less angularity to its side than its other flanges, which flanges s' may be nearly parallel to said side, to periodically slow or altogether stop the twisters while the pickets are fed in and beaten up, substantially as described.

40 11. The guard b^2 , in combination with the revolving tube having the guides for wire i , and with the guide-tube c for the corrugated wire, substantially as described.

12. The feed-rolls m' n' , pusher l' , and the feed-pawls k' , in combination with the wire-guide tube c , wire-twisting mechanism, and the beating-up arms g^2 , substantially as described. 50

13. The beating-up arms g^2 , connected with the shaft h' of the driving-wheel i' by the forked connecting-rods k^2 , wiper-cams m^2 , and toes l^2 , in combination with the wire-twisting mechanism geared with a wheel, p' , carrying a crown-wheel, o' , geared to the driving-shaft by the wheel i' , having differently-pitched peripheral flanges, substantially as described. 55

14. The combination of guards f^2 with the guides c , twisting mechanism, and the picket-feeding rolls m' n' , substantially as described. 60

15. The beating-up arms g^2 , having guards h^2 and pushers e^2 , in combination with wire-guides c , twisting mechanism, and the picket-feeding rolls m' n' , substantially as described. 65

16. The combination of feed-rolls m' and n' , geared with the driving-shaft by the loose wheel o^2 , ratchet x^2 , pawl y^2 , and toothed segment q^2 , with the wire-guide c , twisting mechanism, and beating-up arms, substantially as described. 70

17. The feeding-pawls k' , pusher l' , and the feeding-rolls m' n' , geared with the driving-shaft h' by the vibrating segment q^2 and grooved cam u^2 , substantially as described. 75

18. The guide-roll c^3 and reel k , in combination with the wire-guides c , wire-twisting mechanism, and the beating-up arms g^2 , substantially as described. 80

19. The reel-shaft d^3 , arranged in hinged lever-boxes f^3 , with detachable fastenings k^3 , in combination with the wire-guides c , twisting mechanisms, and the beating-up arms g^2 , substantially as described.

FRANCIS M. COMSTOCK.

Witnesses:

M. A. RUNNER,
J. E. JEWELL.