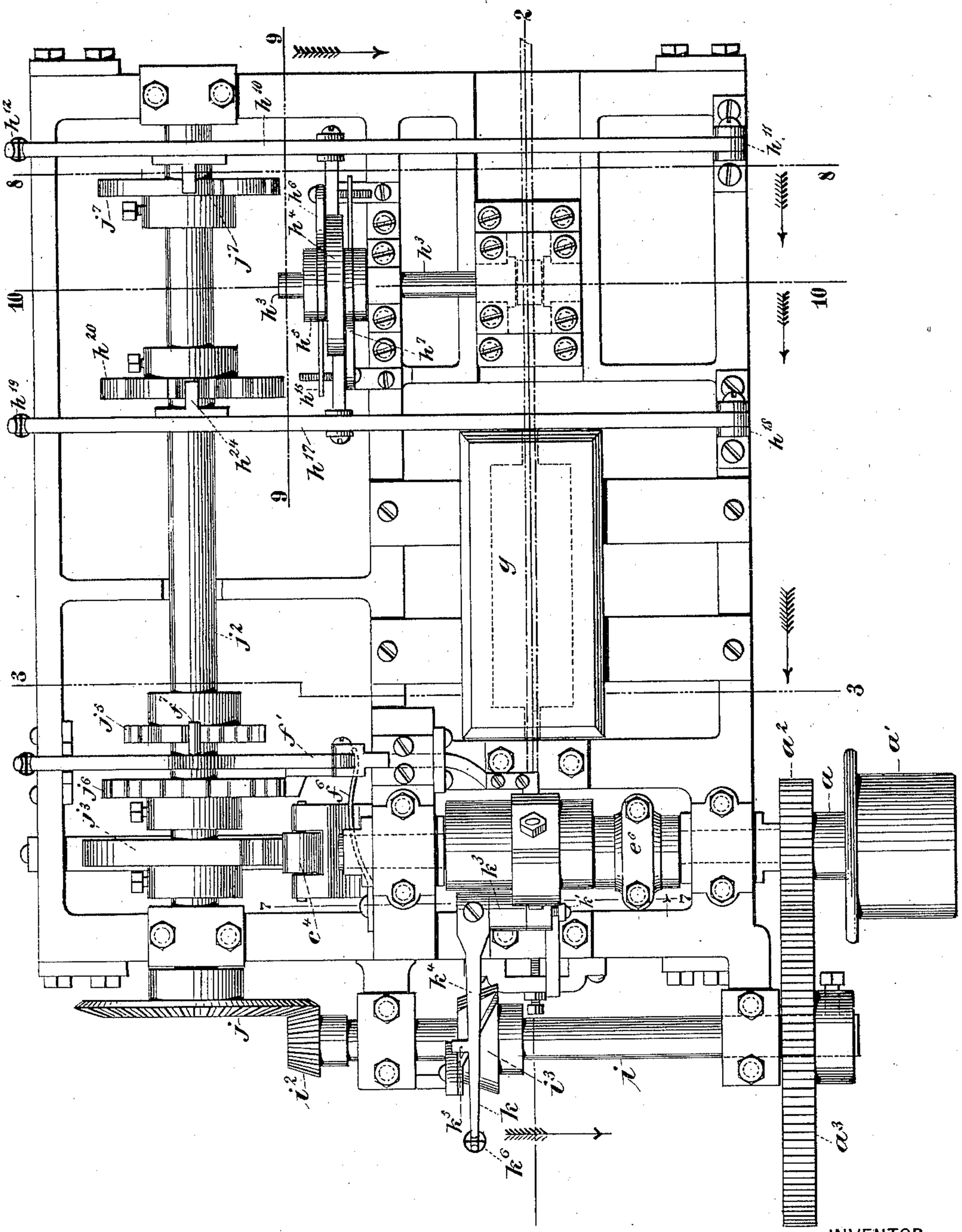
No. 652,468. Patented June 26, 1900.

C. W. WOODFORD.

HORSESHOE NAIL FORGING MACHINE.

(Application filed Oct. 17, 1899.)

(No Model.) 6 Sheets—Sheet 1.



WITNESSES:

Gustave Dieterich

Fred. E. Mouse

INVENTOR

Charles W. Woodford

BY Briesen & Knauth

ATTORNEYS

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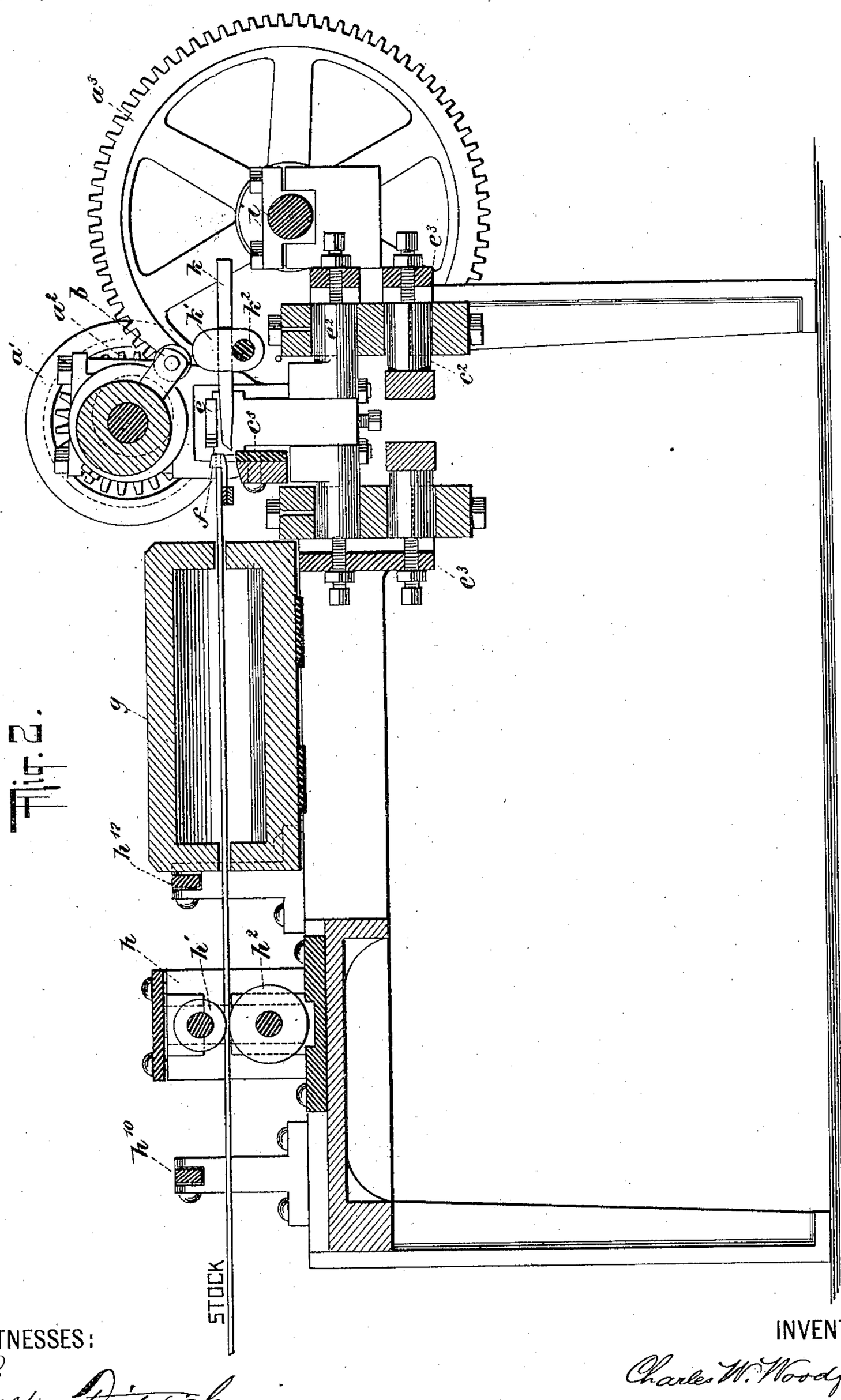

Fig. 2.

WITNESSES:

Gustave Dieterich

Fred. E. Noyes

INVENTOR

Charles W. Woodford

BY Briesen & Knauth

ATTORNEYS

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C. W. WOODFORD.

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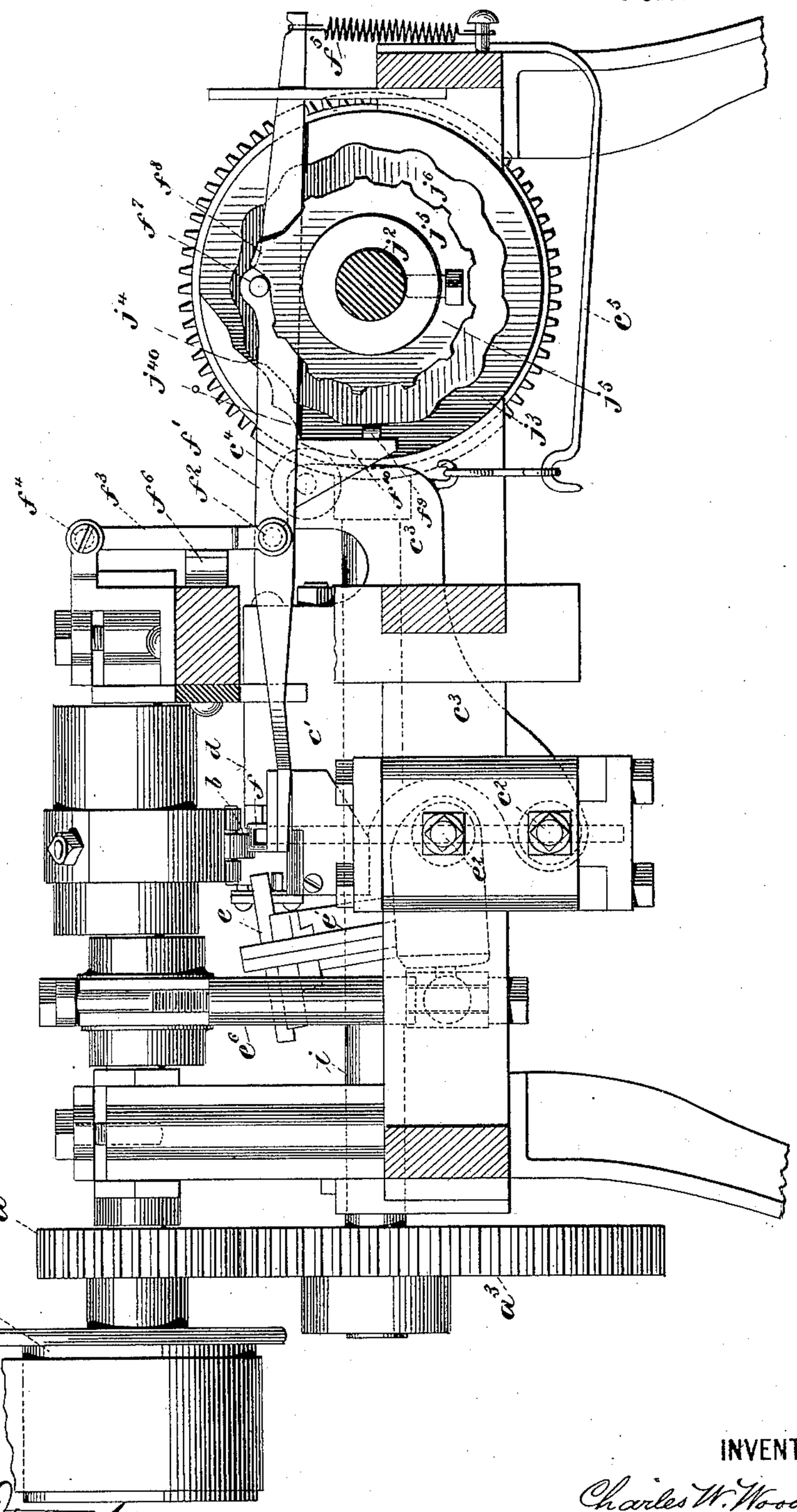
(No Model.) 6 Sheets—Sheet 3.

Fig. 3.



WITNESSES:

Gustave Dieterich.

Fred. E. Krause.

INVENTOR

Charles W. Woodford

BY Briesen & Knauth

ATTORNEYS

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(No Model.) 6 Sheets—Sheet 4.

Fig. 4.

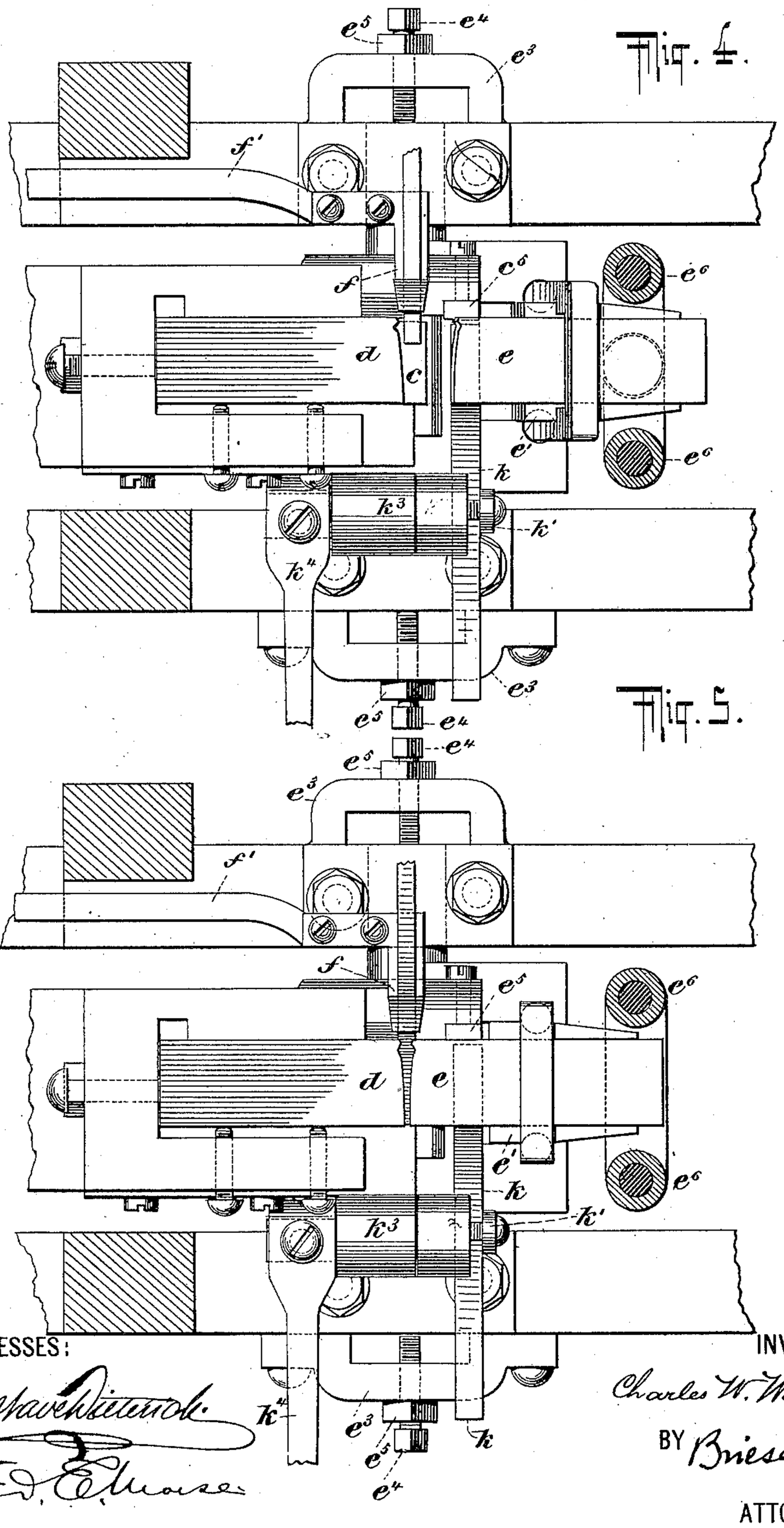

Fig. 5.

WITNESSES:

Gustave Dieterich.

Fred. E. Mouse.

INVENTOR

Charles W. Woodford

BY Briesen & Knauth

ATTORNEYS

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C. W. WOODFORD.

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(No Model.) 6 Sheets—Sheet 5.

Fig. 6.

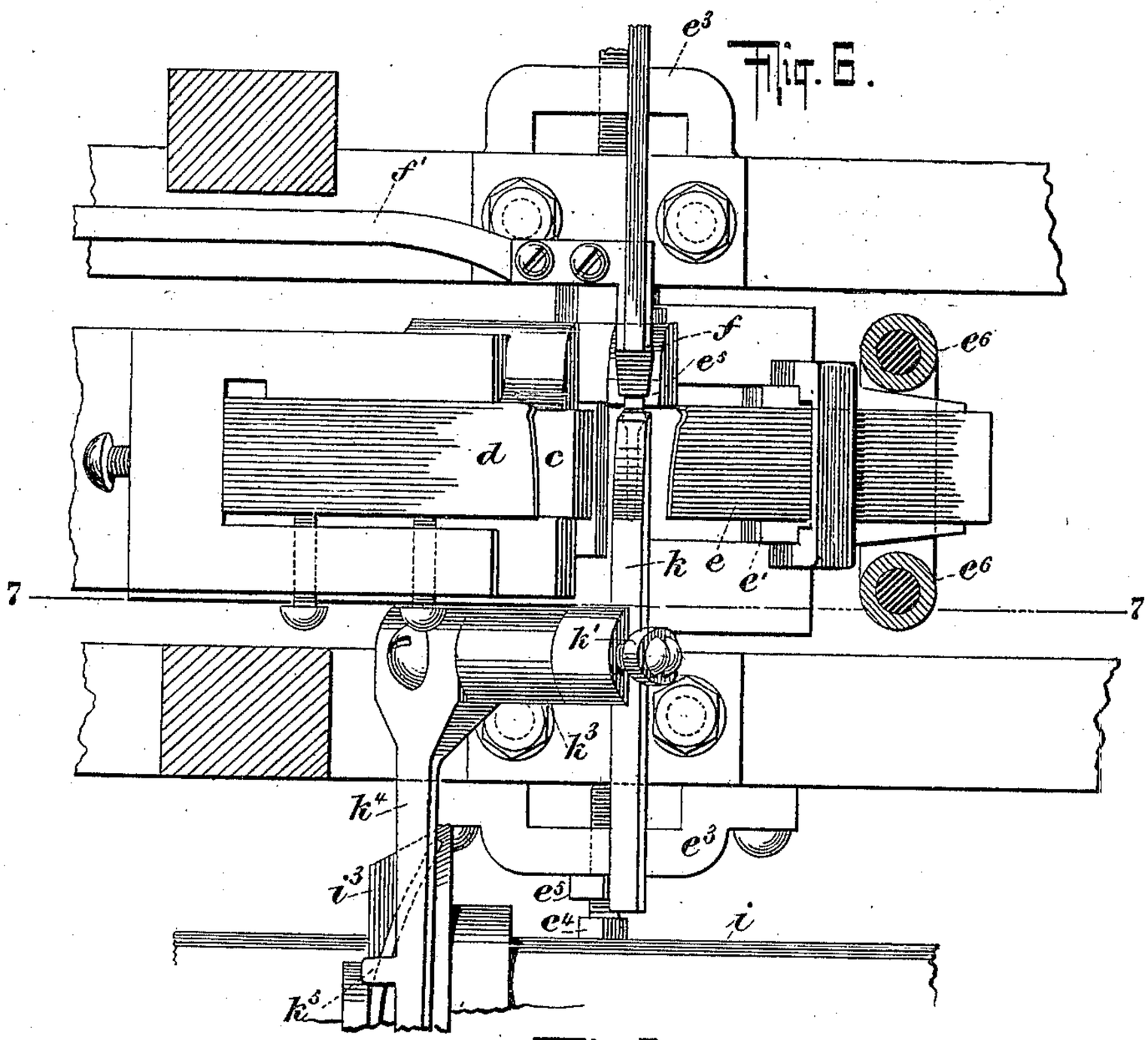
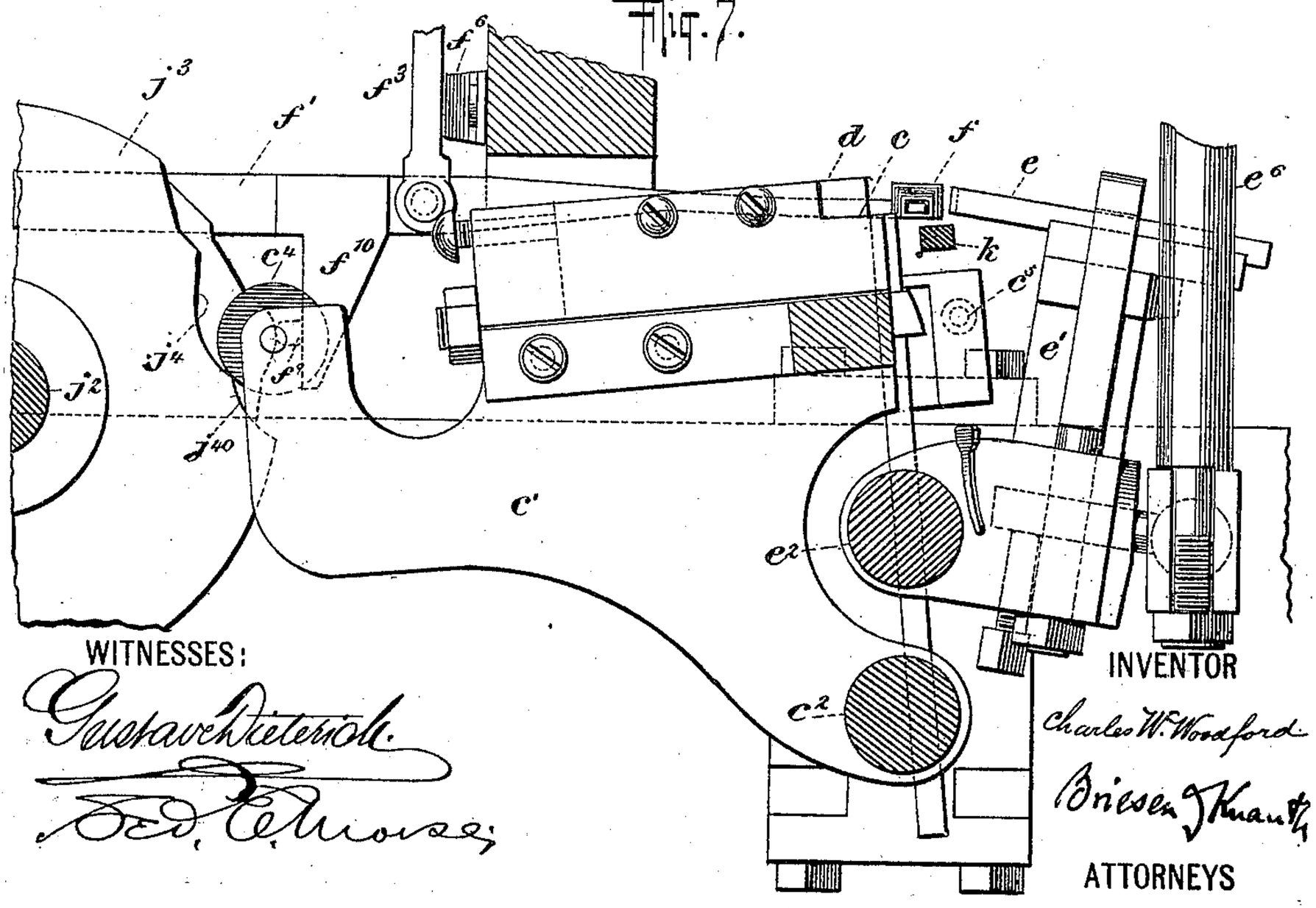


Fig. 7.



WITNESSES:

Gustave Dieterich.

Ed. E. Knox.

INVENTOR

Charles W. Woodford

Briesen & Knauth

ATTORNEYS

No. 652,468. Patented June 26, 1900.

C. W. WOODFORD.

HORSESHOE NAIL FORGING MACHINE.

(Application filed Oct. 17, 1899.)

(No Model.) 6 Sheets—Sheet 6.

Fig. 8.

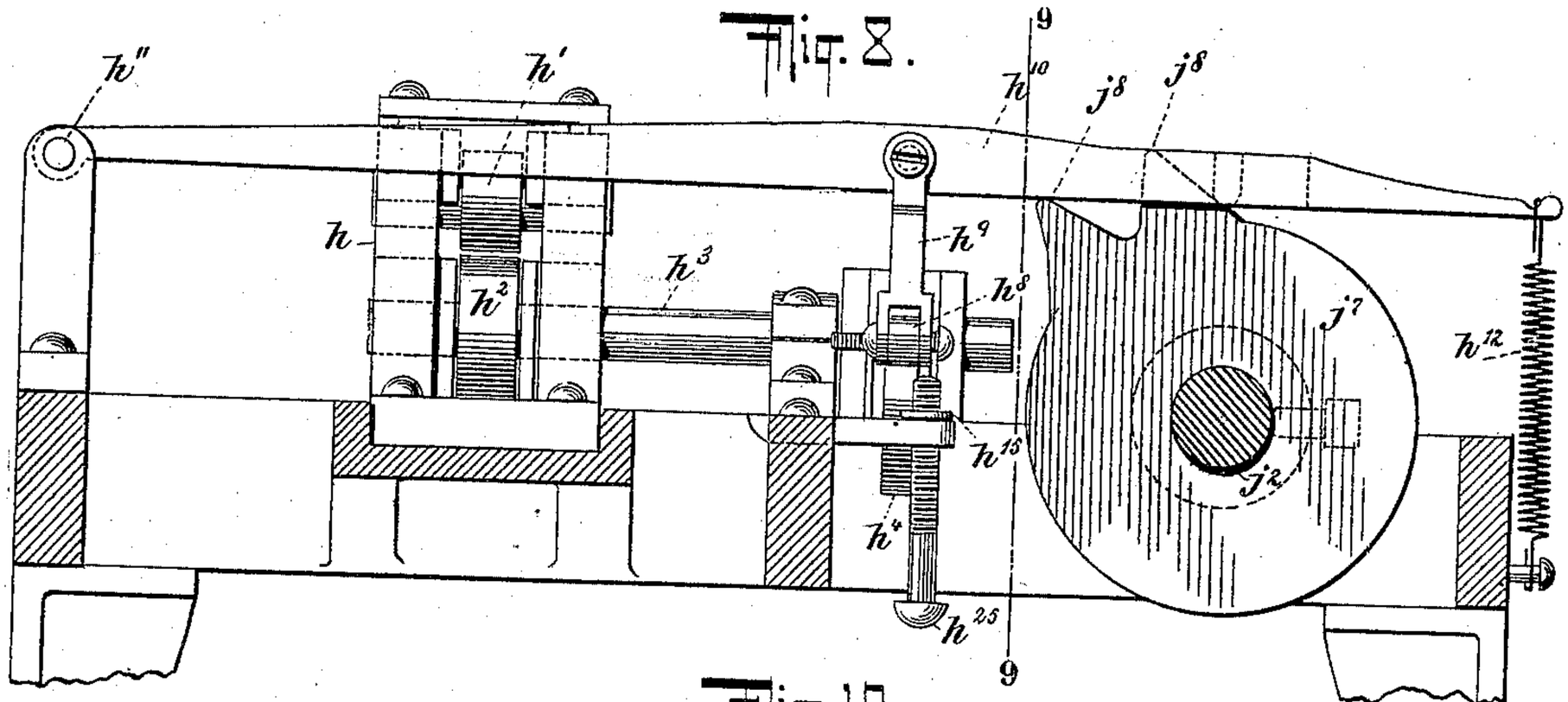


Fig. 10.

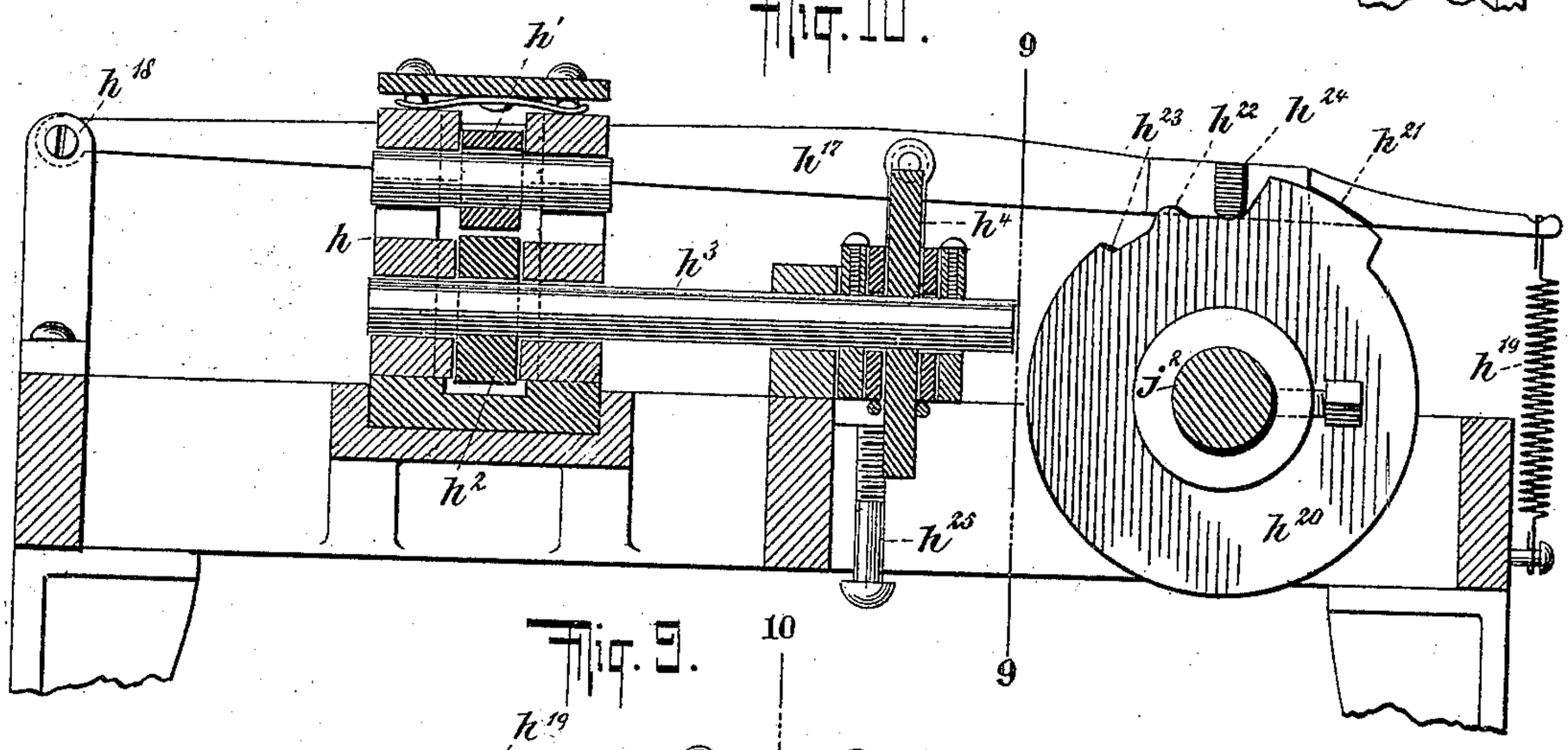
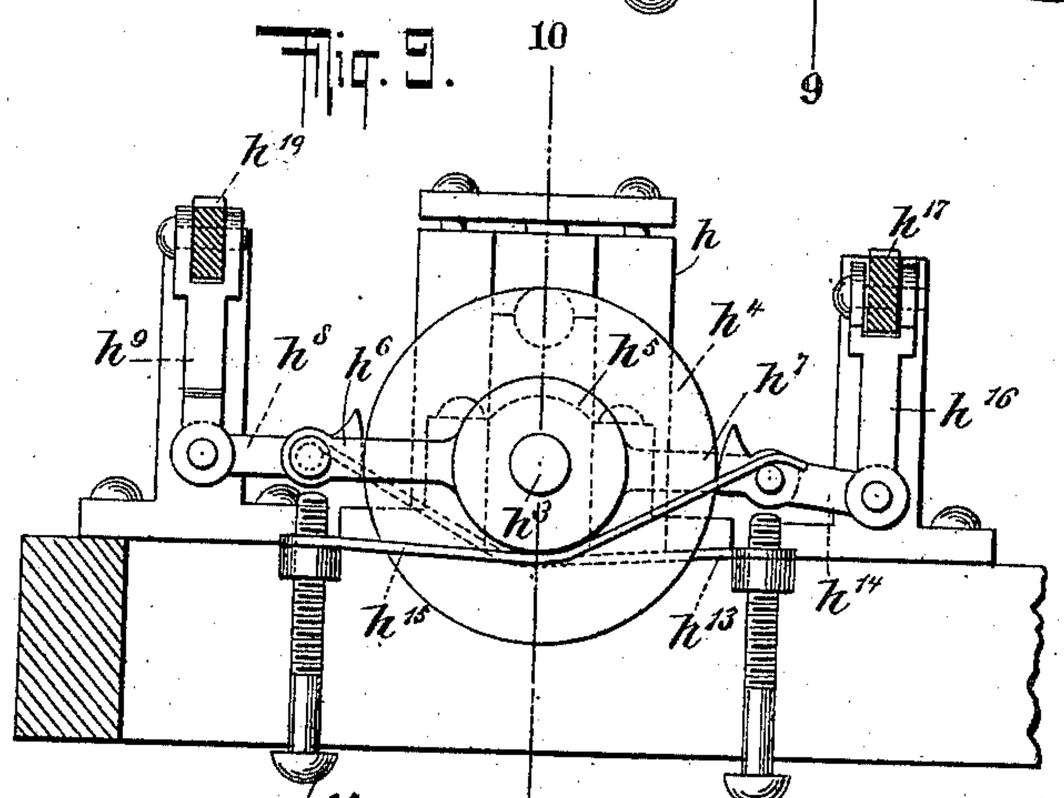


Fig. 9.



WITNESSES:

Gustave Dietrich.

F. E. Mehnert.

INVENTOR

Charles W. Woodford

BY Briesen & Knauth

ATTORNEYS

UNITED STATES PATENT OFFICE.

CHARLES W. WOODFORD, OF PORT HENRY, NEW YORK.

HORSESHOE-NAIL-FORGING MACHINE.

SPECIFICATION forming part of Letters Patent No. 652,468, dated June 26, 1900.

Application filed October 17, 1899. Serial No. 733,877. (No model.)

To all whom it may concern:

Be it known that I, CHARLES WELLINGTON WOODFORD, a citizen of the United States, residing at Port Henry, Essex county, State of New York, have invented certain new and useful Improvements in Horse-Nail-Forging Machines, of which the following is a specification.

My invention relates to horse-nail-forging machines, and will be described with reference to the accompanying drawings, in which I have shown a horse-nail-forging machine in which my invention is embodied. I have chosen this particular machine for illustrative purposes only, as the same embodies an efficiently-acting organism for carrying out my invention. The details of my invention will be particularly pointed out in the claims, to which reference is hereby made and wherein the term "nail" includes "nail-blank."

Generally stated, my invention consists in so organizing and combining the elements of a horse-nail-forging machine as to produce a highly-efficient structure, and in the present instance is shown as embodied in that class of horse-nail-forging machines wherein a revolving hammer or planetary roll is employed in combination with laterally-operating die mechanism and means for cutting the nail-blank from the stock.

In the accompanying drawings, Figure 1 is a plan view of a nail-forging machine in which my invention is embodied. Fig. 2 is a longitudinal section thereof on the line 2 2 of Fig. 1. Fig. 3 is a transverse section of the machine taken on the line 3 3 of Fig. 1. Fig. 4 is a plan view of the operating-dies, showing the same in their open position. Fig. 5 is a similar plan view showing the dies in what I call their "closed" position—that is to say, the position assumed by the dies at the instant that the dies coöperate to forge the nail. Fig. 6 is another plan view, similar to Figs. 4 and 5, showing the dies and the cutting mechanism in the positions assumed at about the instant of cutting off the blank from the stock. Fig. 7 is an enlarged sectional elevation of the dies and correlated parts, the section being taken on or about the line 7 7 of Fig. 1. Fig. 8 is a detail sectional elevation of the stock-feeding mechanism, which will be fully described, the section being taken on line 8 8 of Fig. 1. Fig. 9 is a side elevation, partly in section, of the means for causing rotation of the feed-rolls for the stock, the section being taken on the line 9 9 of Figs. 8 and 10. Fig. 10 is a sectional elevation of the parts just referred to, the section being taken on the line 10 10 of Fig. 9.

In the drawings, a is the main shaft of the machine. This main shaft a carries the planetary roll or revolving hammer b, (see Fig. 2,) which coöperates with the anvil or anvil-die c, carried on the same die-block c' as the side die d. The swinging hammer e or reciprocating side die coöperates with the side die d, as will be described. The nosepiece f is carried upon the arm or carrier f', as will be described. A suitable furnace g is located in front of the forging device, and h is a suitable feed mechanism for feeding the stock, all of which parts and the mechanism for moving them will be fully described hereinafter. The main shaft a receives its motion from a suitable pulley or gear a' and transmits this motion by means of suitable gearing—for instance, the spur-gear a^2—to other gearing—for instance, the gear-wheel a^3, carried upon the intermediate shaft i. The intermediate shaft i is provided with means, such as the pinion i^2, for transmitting motion to other gear—for instance, the pinion j on the cam-shaft j^2, which cam-shaft by means of the various cams thereon imparts an intermittent movement at predetermined times to the side die, which, however, is normally stationary when the forging is being effected. The cam-shaft j^2 likewise operates the arm or carrier f' of the nosepiece, the means for effecting the forward feed of the stock, and likewise the means for exerting tension or backward pull upon the stock at a predetermined instant, all of which will be fully described hereinafter. The cutter is operated by the intermediate shaft i.

I will first describe the construction and operation of the side die d. This side die d, as before explained, is mounted upon the die block or carrier c', which is pivoted in laterally-adjustable trunnions c^2 and is preferably provided with an arm c^3, provided with a roller c^4, which coöperates with an edge-cam j^3 on the cam-shaft j^2, whereby the cam j^3 is operated at predetermined times to impart a

double throw to the said die-block by means of the cam portion thereof j^4 j^{40}. As before stated, the anvil c is rigidly carried upon the swinging die-block c' and partakes of its motion. It will be understood, however, that the swinging die-block c' remains stationary during the forging of the nail, the roller c^4 resting upon the plain surface of the rotating cam j^3 during such forging, the cam portion j^4 j^{40} coming into action when the cutting off of the stock and the feed thereof is being effected. The swinging hammer e is carried upon a swinging carrier or block e', which is pivoted in laterally-adjustable trunnions e^2 above the pivot c^2 of the swinging die-block c' and between the said pivot c^2 and the point of stroke of the hammer.

By referring to Fig. 7 it will be noted that both the swinging die-block c' and the swinging arm e', as before stated, are carried on trunnions or gudgeons, in contradistinction to the mode of mounting such swinging parts on centers, as heretofore proposed, and are made adjustable longitudinally by means of any suitable adjusting device—for instance, the stirrup or strap e^3, provided with a screw and jam-nut device e^4 e^5, carried thereon and bearing on the trunnions or gudgeons referred to. The constructive relation of these parts is clearly shown in Figs. 4 and 5, which, however, being in plan, show merely the adjusting means for the upper trunnion carrying the hammer. It will be understood, however, that similar devices are employed to adjust the die-block trunnion in the same manner. The hammer-arm e' receives its motion from a pitman e^6, actuated by an eccentric on the main shaft a. The hammer e is swung each time the shaft a makes a complete rotation, the roll b and hammer e acting alternately upon the blank being forged.

Before describing the nosepiece and its operating gear and motions I will describe the means whereby the cutting off of the forged blank is effected. Carried by the die-block c' is a fixed cutter or cutting edge c^5. This cutting edge is stationary when the cutting is being effected and is carried by the lateral swing of the die-block into position to act upon the stock carried in the nosepiece to effect the severance of the forged blank and coöperates with a movable cutter k, carried on an arm k', mounted on a rock-shaft k^2, mounted in a bearing k^3, carried by the die-block c'. The rock-shaft k^2 is rocked by means of an arm k^4, provided with a lug k^5, which coöperates with a conical cam-wheel i^3, carried on the intermediate shaft i. The arm k^4 is provided with a suitable spring k^6 for retracting the same. The object of making the surface of the cam-wheel i^3 conical is to enable the lever k^5 to move laterally over the smooth surface thereof when the die-block c' is retracted by the spring c^5 when the roller c^4 rolls into the depressed portions j^{40} j^4 of the cam j^3 and at the same time keep the two members of the cutter in their normal position with respect to each other, for unless the arm k^4 follows the swing of the die-block the movable cutter must receive some motion. For instance, if the upper face of the cam-wheel i^3 were horizontal the die-block c', swinging laterally and downwardly, would cause the horizontal surface of said cam-wheel to act upon the rear end of the arm k^4, so as to disturb the relative position of the movable cutter with respect to the fixed cutter. As before stated, the nosepiece f is carried by the arm or lever f', which is pivoted at f^2 to a link f^3, pivotally hung at f^4 from the frame of the machine or other fixed part. The arm or lever f' is provided with a retracting-spring f^5 at its rear end, to produce a vertical spring, and with a suitable spring f^6, herein shown as a leaf-spring, to produce a lateral retraction. This operating lever or carrier f' for the nosepiece f receives motion from two cams j^5 j^6 on the cam-shaft j^2. The cam j^5 operates upon the pin f^7 on the lever f' to cause a rising-and-falling motion of the outer end of the operating arm or lever f', and thereby producing a raising-and-lowering motion of the nosepiece. This cam j^5 is shown clearly in Fig. 3 and is provided with a series of elevations of substantially the same size and a single elevation f^8 of abnormal size, which elevation f^8 comes into action at the time that the forged blank is to be severed to produce an abnormal lowering motion or vertical drop of the nosepiece to bring the said nosepiece down to the level of the stationary cutter. The back-and-forth motion of the lever f' is effected by the cam j^6, carried upon the cam-shaft j^2, acting upon a lug f^9, carried upon an arm f^{10} on the operating-lever f'. This lever, lug, and arm may be integral. As before stated, the lever f', being supported by the pivots f^2 f^4, can be readily swung and moved back and forth, so that the combination of these motions will be made by the nosepiece. The stock is fed through the furnace g to the nosepiece by suitable feeding mechanism, which may be of any desired appropriate character. The feeding mechanism shown in the drawings, and especially in Figs. 2, 8, 9, and 10 thereof, is a good efficient mechanism for this purpose. Referring for the present to these figures and to the plan view Fig. 1, the feed of the stock is effected by a plurality of feed-rolls h' h^2, which grip the stock between them. The said feed-rolls are suitably supported from the framework of the machine, one of the said rolls being carried upon the shaft h^3, which shaft carries the disk h^4. The shaft h^3 carries bosses h^5, each provided with an arm h^6 h^7, respectively. Pivoted to the arm h^6 is a gripper-pawl h^8, which is swung by the link h^9, pivoted to an arm h^{10}. (See Figs. 8 and 10.) The forward extremity or shoe of the gripper-pawl h^8 is adapted to bear against the periphery of the disk h^4 when the pawl h^8 is swung on its pivot, so as to grip the edge of the said disk to produce a forward rotation of the disk

when the pawl is lifted. The lever h^{10} is pivoted at h^{11} and is provided at its opposite end with a spring h^{12}. This lever is operated by the cam j^7, which is shown as provided with a plurality of elevations j^8 j^8, to cause the feed-works to make a double forward movement. The pawl h^8 is provided with a suitable adjustable restoring-spring h^{13}. The operation of the parts just described will be readily understood. It may be stated, however, that when the cam j^7 causes the lever h^{10} to be swung upward the shoe h^6 of pawl h^8 grips the periphery of the disk h^4, and as the lever h^{10} continues to move upward it will carry with it the pawl, which swings on the shaft h^3 as a center, and will thereby move the rotating disk h^4 and the feed-rolls one step forward. The cam j^7 is shown as cut to produce two forward steps for every nail-feed. I have likewise provided means for producing a slight backward pull on the stock when the same has been gripped by the side dies. In order to do this, I impart to the feed-rolls a slight backward movement as follows: The swinging arm h^7 has pivoted thereto a pawl h^{14}, similar to the pawl h^8 and provided with a similar restoring-spring h^{15}. This pawl h^{14} is pivoted to a link h^{16}, which in turn is pivoted to the lever h^{17}. The lever h^{17} is pivoted to bracket h^{18}, is provided with a restoring-spring h^{19}, and is acted upon by the cam h^{20}. This cam h^{20} is provided with elevations or cam portions h^{21} h^{22} h^{23}. The operation is as follows: Just before the finished nail is moved into position to be severed from the stock and while it is still gripped by the dies the cam h^{21} comes in contact with the lug h^{24} on the lever h^{17}, and thereby raises the said lever, drawing upon the pawl h^{14} and swinging the disk h^4 backward, thereby producing a backward pull upon the stock, which has the effect of straightening out any bends or irregularities in the stock, and during the time that the lug h^{24} is riding upon the elevation h^{21} the nail is being severed by the cutters. The succeeding elevation h^{22} is to cause a slight backward pull upon the rod during the interval between the two steps of the forward feed thereof produced by the elevations j^8 j^8 on the cam j^7. The amount of throw imparted to the feed-rolls by the pawls may be efficiently regulated by regulating the throw of the said pawls, which, as the pawls are pivoted upon the swinging arms and the swinging links, may be effected by the adjusting-screws h^{25}, which, lying beneath the middle pivotal points of the pawls, may be adjusted upward or downward to limit the stroke of the said pawls or to even entirely disengage the said pawls from the disk h^4.

Having described the construction and location of the parts of the illustrative machine shown in the drawings and their relation to each other, I will now proceed to describe the detailed operation of the machine.

Let it be supposed that the stock has been fed onto the anvil. As is well known, the rotations of the planetary roll produced by the main shaft a and the lateral movement of the hammer e will cause the planetary roll and hammer e to operate alternately upon the stock on the anvil, it being understood that the side die d is stationary during this period as the roller c^4 thereof is rolling upon the concentric surface or portion of the cam j^3. As the cam-shaft j^2 rotates, the nosepiece f, carried by the lever f', will be given a diagonal motion by the operation of both cams j^5 j^6 on the arm f'. The stock is laid upon the anvil to be operated upon by the planetary roll and is then raised and moved laterally against or in front of the side die, to be operated upon by the swinging hammer, this diagonal motion being the resultant or component of the two motions imparted to the lever or nosepiece carrier f' by the cams j^5 j^6, carried on the cam-shaft j^2. When the planetary roll b and hammer e have made the requisite number of motions, (I have shown provision for ten in the drawings, although the number may be reduced to seven or any other efficient number which may be desired,) and while the nail-blank is still gripped between the hammer and side die, the cam h^{21} comes into action to produce the backward pull upon the stock in the manner heretofore described in order to straighten out any bends or kinks or defects which may have occurred in the said stock, holding the stock in the retracted position as the lug h^{24} of the lever h^{17} rides upon the cam h^{21} until the nail has been severed by the cutters, which operate at this time as follows: When the planetary roll and hammer e have completed their motions as aforesaid, the roller c^4 falls into the cut-away portion j^4 of the cam j^3, thereby swinging the die-block c' and side die and anvil laterally to the right, removing the anvil from beneath the nail, so as to leave the nail-blank still attached to the stock and supported by the nosepiece. Then the projection f^8 on the cam j^5 operates upon the lever f', thereby swinging the nosepiece f vertically downward, level with the bottom cutter c^5, carried by the die-block. Then the roller c^4, as the cam-shaft j^2 continues to revolve, drops into the deeper recess or cut-away portion j^4 of cam j^3, thereby further swinging the die-block c' and bringing the cutters c^5 k in position to operate to cut off the nail from the stock, it being remembered that the lever k^4 swings over the conical surface of the cutter-operating cam i^3 and is swung upward to effect the cutting by the cam-piece carried by the said operating-cam. After the nail is severed the cams operate to restore the die-block to initial position and to likewise restore the nosepiece to its initial position, and during this period of restoration the first forward feed of the stock is effected by the feed-rolls, which are operated, as described, by the pawls acted upon by the lever h^{10}, which is moved by the first cam projection j^8 of the cam j^7. After this forward movement of the

stock it receives another slight backward pull, caused by the lug h^{24} riding up on the cam h^{22}, (see Fig. 10,) the lug of the lever h^{10} at this time resting in the depression between the cams j^8 j^8. The lug h^{24} now drops into the recess which follows the cam h^{22}, and the lever h^{10} is acted upon by the second cam j^8 to effect a further forward movement or step of the stock, and thereupon the lug h^{24} rides up the incline h^{23} and resting upon the concentric surface of the cam h^{20} holds the feed-wheels stationary to prevent any forward motion of the stock while the nail is being forged.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a nail-forging machine the combination of a side die and an anvil-die carried by a pivoted die-block and means for swinging the said die-block at predetermined times and for maintaining the said die-block stationary during the delivery of several blows of a nail-forging apparatus.

2. In a horse-nail-forging machine, the combination of a combined reciprocating side die and anvil, two cutter members carried thereby, a planetary roll and a reciprocating hammer and means for reciprocating the side die upon the termination of the forging operation.

3. In a horse-nail-forging machine, the combination of a combined side die and anvil, means for maintaining the same stationary during the delivery of the blows of the forging apparatus and for swinging the same when the forging is effected, a planetary roll or revolving hammer coöperating with the anvil and a reciprocating hammer coöperating with the side die.

4. In a horse-nail-forging machine, the combination of nail-forging mechanism comprised in part by a side die with means for causing the said side die to remain stationary while the nail is being forged and for causing the same to reciprocate at predetermined times, of a plurality of cutter members carried by the mechanism which supports the side die, one of the said cutter members being movable and means for moving the said member.

5. In a horse-nail-forging machine, the combination with suitable nail-forging mechanism of a nosepiece or rod-guide with means for imparting to the same a vertical and horizontal movement, and for operating the same in harmony with and during the operation of the nail-forging mechanism to bring the nail alternately in position to be operated upon by different parts of the forging mechanism.

6. In a horse-nail-forging machine, the combination of forging devices comprising side dies and anvil and a planetary roll or revolving hammer, a nosepiece or rod-guide and means for imparting to the said nosepiece a vertical and horizontal movement in harmony with and during the operation of the forging devices whereby the nail is brought by positive movement alternately in position to be operated upon by the side dies and in position with respect to the anvil to be operated upon by the planetary roll or revolving hammer.

7. In a nail-forging machine, the combination of a combined side die and anvil with means for maintaining the same stationary during forging of the nail and for moving the same to clear them of the nail when the nail has been forged, nail-forging mechanism adapted to forge the nail by striking the same several blows, a nosepiece or rod-guide and means for causing the said nosepiece or rod-guide to drop into the space vacated by the anvil when the forging of the nail is completed, whereby the nail is brought into position to be severed from the rod.

8. In a nail-forging machine, the combination with nail-forging apparatus of a nosepiece or rod-guide executing a normal movement during the forging of the blank to bring the said blank alternately into position to be operated upon by the different elements of the forging mechanism, and means for imparting to the said nosepiece a substantially-vertical movement downward upon the completion of the nail-forging operation to bring the said nail into position to be severed from the rod.

9. In a horse-nail-forging machine, the combination of nail-forging mechanism comprised in part by an anvil and a planetary roll or revolving hammer, means for moving the anvil laterally, blank-severing mechanism and means coöperating therewith to effect the severing of the nail-blank from the rod at a point beneath the path described by the revolving hammer or planetary roll and in the space vacated by the anvil when the same has been moved laterally.

10. In a horse-nail-forging machine, the combination of nail-forging mechanism comprised in part by an anvil and a revolving planetary roll of a nail rod or stock guiding device or nosepiece and a cutter with cam means for moving the nosepiece to bring the rod to a point in the plane of the path described by the revolving hammer or planetary roll and for effecting the severing of the nail-blank from the stock by the cutter at this point, and means for moving the anvil laterally to permit the stock to be brought into the position for severing.

11. In a nail-forging machine, the combination of nail-forging mechanism comprised in part by an intermittently-vibrating die-block carrying a side die and anvil of a cutter stationary with respect to the die and anvil and carried by the die-block and a movable cutter also carried by the said die-block and cooperating with the stationary cutter.

12. In a nail-forging machine, the combination of an intermittently-vibrating die-block carrying a side die and anvil and also carrying a cutting mechanism for severing the nail-blank from the stock.

13. In a nail-forging machine, the combina-

tion of an intermittently-vibrating die-block carrying a cutter normally located below the plane of the strike of the side dies and a nosepiece with means for depressing the said nosepiece to bring the same into position for the cutter to operate upon the stock, and for vibrating the die-block to position the cutter for action.

14. In a nail-forging machine, the combination with forging mechanism of a nosepiece and a support therefor comprising a link pivoted at one end to the nosepiece-carrier and to some stationary point, whereby the nosepiece-carrier will be doubly suspended so as to swing upon one pivot of its support and to move bodily in a lateral direction upon the other pivot of its support.

15. In a nail-forging machine, the combination of intermittently-rotating feedworks and the intermittently-vibrating die and anvil-block operating in harmony therewith.

16. In a nail-forging machine, the combination with nail-forging mechanism of feed mechanism comprised in part by a friction or feed wheel h^4 with gripping-pawls, substantially as described, and means for moving the same to cause the said pawls to impart a backward-and-forward movement to the feed-wheel.

17. In a nail-forging machine, the combination of side dies, one of which is stationary during the forging of the nail and intermittently movable, of a cutter carried by the means for carrying the intermittently-movable side die at a point below the line of strike or impression of the dies, means for moving the intermittently-movable side die to bring the cutter in position to effect its cut, a nosepiece and means for dropping or depressing the nosepiece to bring the blank into position to be operated upon by the cutter.

18. In a horse-nail-forging machine, the combination of nail-forging mechanism comprised in part by a combined side die and anvil, and movable part or die-block carrying the said side die and anvil, and a cutter likewise carried by the said movable part and a nosepiece and means for imparting the following movements to the parts mentioned, to wit: a lateral movement of the side die and cutter to move the anvil from beneath the blank, a downward movement of the nosepiece to bring the stock into position to be operated by the cutter and a further lateral movement of the side-die carrier to bring the cutter into position to operate upon the blank.

19. In a nail-forging machine, the combination of a laterally-moving carrier, a cutter carried thereby having a movable member, an arm for operating the said movable member and an operating-cam for the said arm having a conical face to permit the cutter to be carried laterally by the carrier without operating the said cutter.

20. In a horse-nail-forging machine, the combination of a side die and an anvil-die stationary with respect to each other and carried by an intermittently-reciprocating die-block stationary during forging of the nail and means coöperating therewith to forge the nail by a succession of blows while the said die-block is stationary; and a plurality of cutters carried by the die-block, one of said cutters being movable substantially as described.

21. In a horse-nail-forging machine the combination of a side die and an anvil, said side die and anvil being located at an angle to each other, a nosepiece for guiding the stock and positive means other than the die mechanism for moving the nosepiece to bring the stock against the anvil and free from contact with the side die and maintain the same there during the delivery of the forging blow and for thereupon bringing the said stock against the side die and maintaining the same there during the delivery of a forging blow.

22. In a horse-nail-forging machine the combination of an anvil and a side die disposed at an angle to each other, a planetary roll coöperating with the anvil and a hammer coöperating with the side die; a nosepiece and positive means other than the die mechanism for swinging the said nosepiece to bring the stock into contact with the anvil at a point where it will be free from contact with the side die and for thereupon moving the said stock into contact with the side die where it will be free from contact with the anvil-die.

23. In a horse-nail-forging machine the combination of a side die and anvil combined with nail-forging mechanism and a nosepiece with positive means other than the die mechanism for moving the said nosepiece to bring the stock into forging proximity with the anvil and free from contact with the side die and for moving the said nosepiece to bring the stock into forging proximity with the side die and free from contact with the anvil.

24. In a horse-nail-forging machine the combination of a pivoted die-block, an anvil and side die mounted thereon and disposed at an angle to each other; forging mechanism for coöperating with the said anvil and side die, means for swinging the said die-block and a nosepiece substantially as described.

25. In a horse-nail-forging machine, the combination of nail-forging mechanism comprised in part by a side die with means for causing the said side die to remain stationary while the nail is being forged and for causing the same to reciprocate at predetermined times, of a plurality of cutter members carried by the mechanism which supports the side die, one of the said cutter members being movable and means for moving the said member; a nosepiece and means for causing the said nosepiece to bring the stock into forging proximity with the side die, substantially as described.

26. In a horse-nail-forging machine, the combination of nail-forging mechanism comprised in part by a side die with means for causing the said side die to remain stationary

while the nail is being forged and for causing the same to reciprocate at predetermined times, of a plurality of cutter members carried by the mechanism which supports the side die, one of the said cutter members being movable and means for moving the said member; an anvil located at an angle to the said side die, a nosepiece and means for causing the said nosepiece to bring the stock alternately into contact with the anvil and with the side die substantially as described.

27. In a horse-nail-forging machine, the combination of nail-forging mechanism comprised in part by a side die with means for causing the said side die to remain stationary while the nail is being forged and for causing the same to reciprocate at predetermined times, a plurality of cutter members carried by the mechanism which supports the side die, one of the said cutter members being movable and means for moving the said member, a nosepiece with means for moving the said nosepiece in harmony with the forging mechanism and for moving the said nosepiece to bring the stock into coöperation with the cutters.

28. In a horse-nail-forging machine the combination of a swinging die-block, a cam acting thereon to hold the said die-block stationary during the forging of the nail and to swing the said die-block upon the completion of the nail-forging operation, a cutter and a nosepiece provided with a support comprising a link pivoted at one end to the nosepiece-carrier and to some stationary point whereby the nosepiece-carrier will be doubly suspended so as to swing upon one pivot of its support and to move bodily in a lateral direction upon the other pivot of its support.

29. In a nail-forging machine the combination of a pivoted die-block, a cam acting thereon to hold the same stationary during the nail-forging operation and to swing the same upon the completion of the nail-forging operation, a nosepiece and a support therefor comprising a link pivoted to one end of the nosepiece-carrier and to some stationary point whereby the nosepiece-carrier will be doubly supported so as to swing upon one pivot of its support and to move bodily in a lateral direction upon the other pivot of its support and a plurality of cams for acting upon the nosepiece-carrier, one of said cams being operated to swing the nosepiece-carrier on its suspension-link and the other of said cams being operated to move the said nosepiece-carrier bodily.

30. In a nail-forging machine the combination of a pivoted die-block, a cam acting thereon to hold the same stationary during the nail-forging operation and to swing the same upon the completion of the nail-forging operation, a nosepiece and a support therefor comprising a link pivoted at one end to the nosepiece-carrier and to some stationary point whereby the nosepiece-carrier will be doubly supported so as to swing upon one pivot of its support and to move bodily in a lateral direction upon the other pivot of its support and a plurality of cams for acting upon the nosepiece-carrier, one of said cams being operated to swing the nosepiece-carrier on its supension-link and the other of said cams being operated to move the said nosepiece-carrier bodily and cutters for severing the stock.

31. In a nail-forging machine the combination of a pivoted die-block, a cam for maintaining the said die-block stationary during the forging of the nail and for swinging the same upon the completion of the forging operation, a plurality of cutters carried by the said die-block and a cam located in proximity to the said cutters for effecting the operation thereof.

32. In a horse-nail-forging machine the combination of a pivoted die-block, a cam for holding the said die-block stationary during forging of the nail and for swinging the said die-block upon the completion of the nail-forging operation, a movable cutter carried by the die-block for severing the stock and a conical cam for operating the same.

33. In a nail-forging machine the combination of a feed-wheel, a cam mechanism for moving the feed-wheel to effect a forward feed of the stock and a cam mechanism for moving the feed-wheel to effect a retraction of the stock, the said cam mechanism being so organized as to operate in harmony with the nail-forging apparatus to feed the stock by the forward movements and to straighten the stock by movements of retraction.

CHARLES W. WOODFORD.

Witnesses:
GEO. E. MORSE,
OTTO V. SCHRENK.