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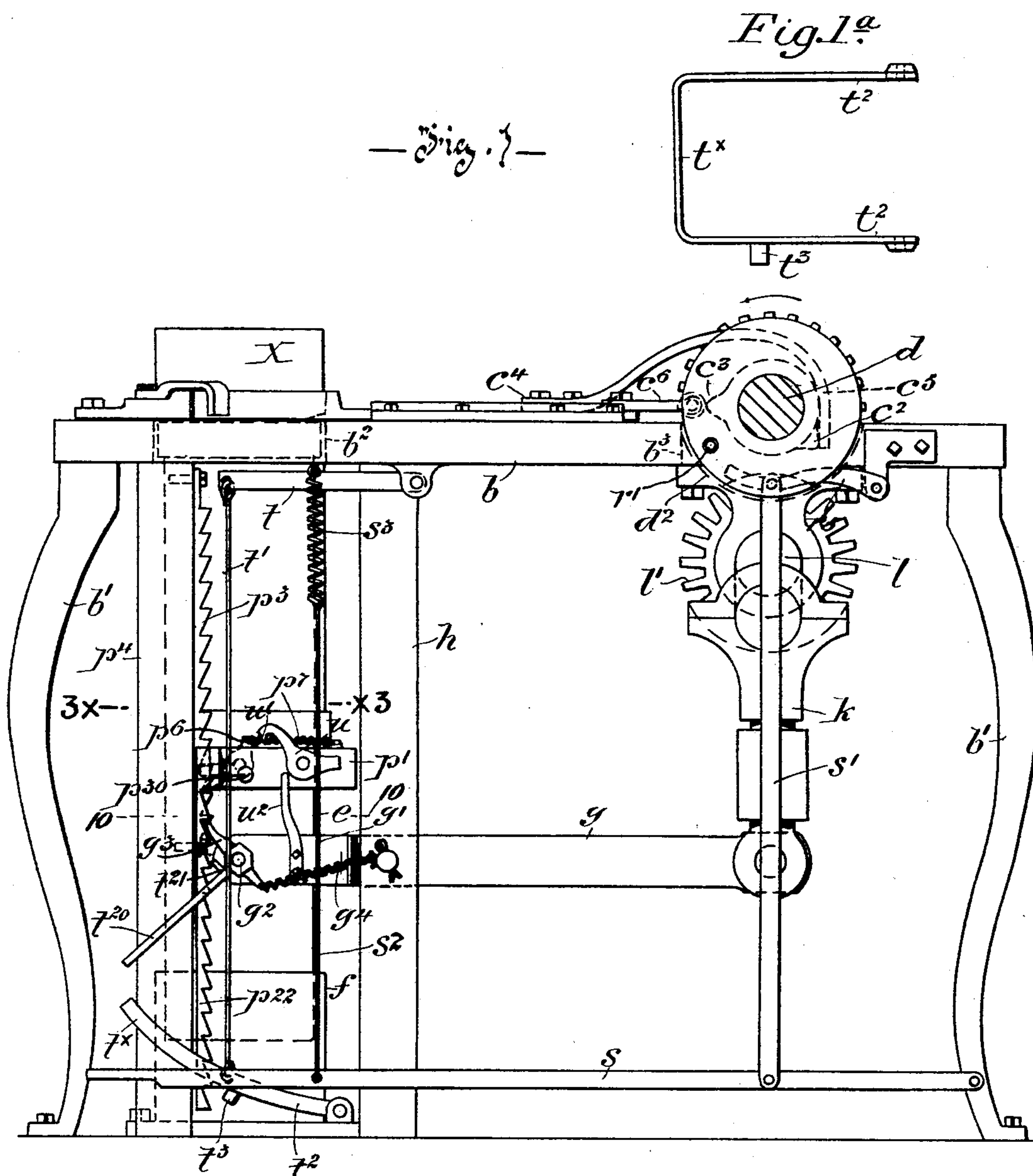
4 Sheets—Sheet 1.

J. RUSSELL.

STOVEPIPE ELBOW MAKING MACHINE.

No. 591,776.

Patented Oct. 12, 1897.



~~Witnesses~~

Wm. R. Seal
R. G. Kimbrell

Inventor

James Russell

By *his* Attorney

John N. Wain

(No Model.)

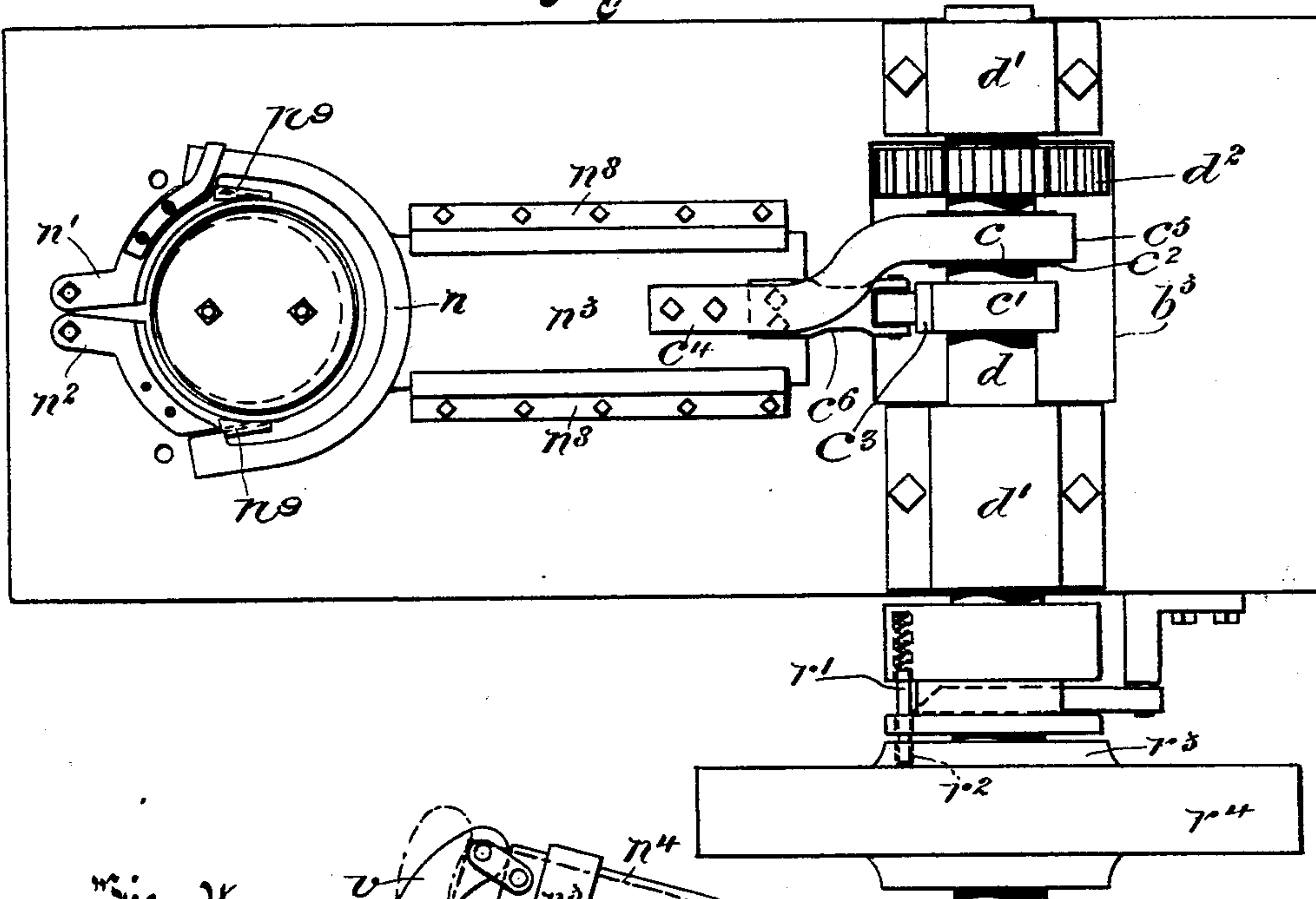
4 Sheets—Sheet 2.

J. RUSSELL.
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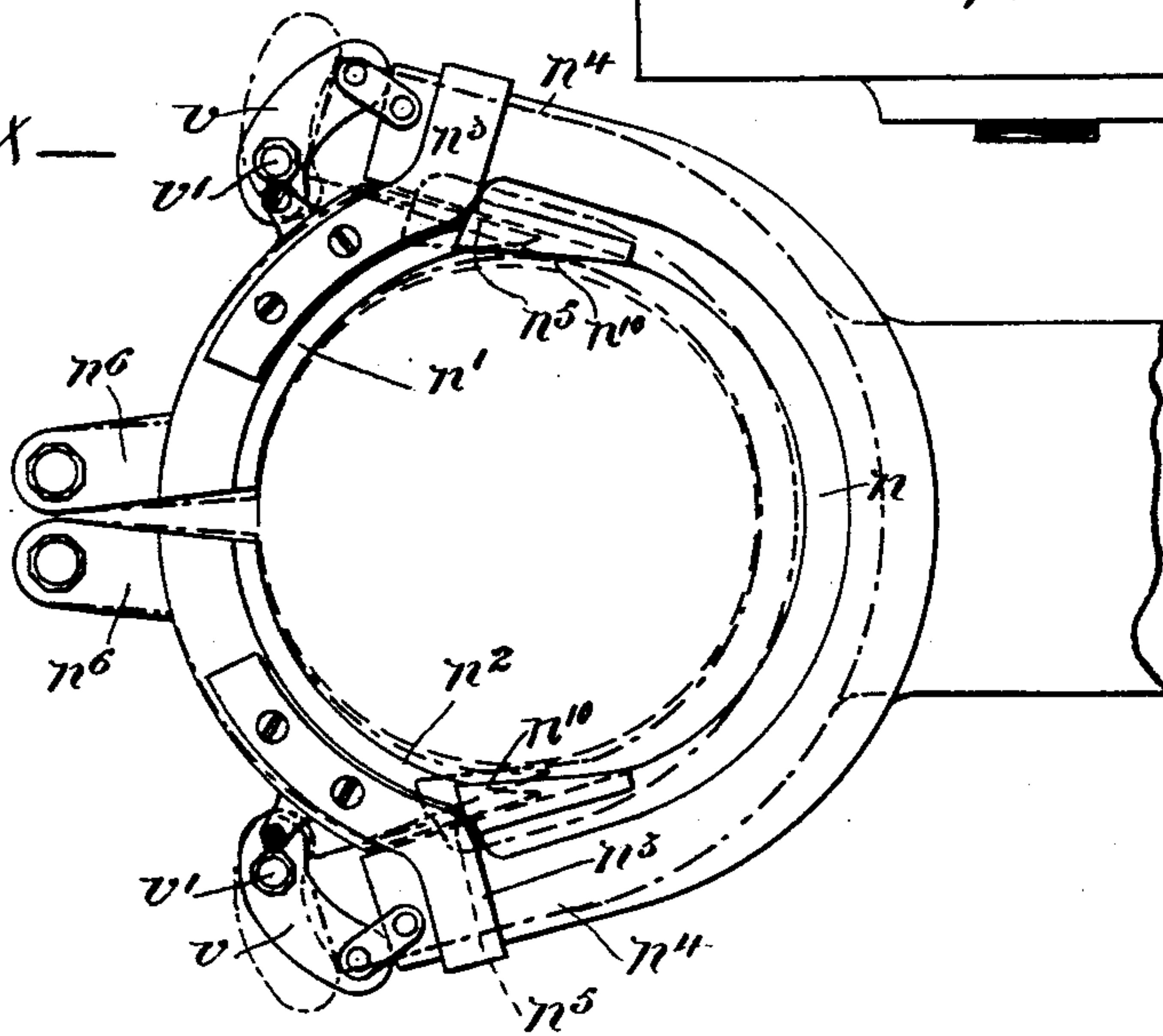
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Witnesses
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 R. G. Kimber

James Russell Inventor
By his Attorney
C. H. Mann

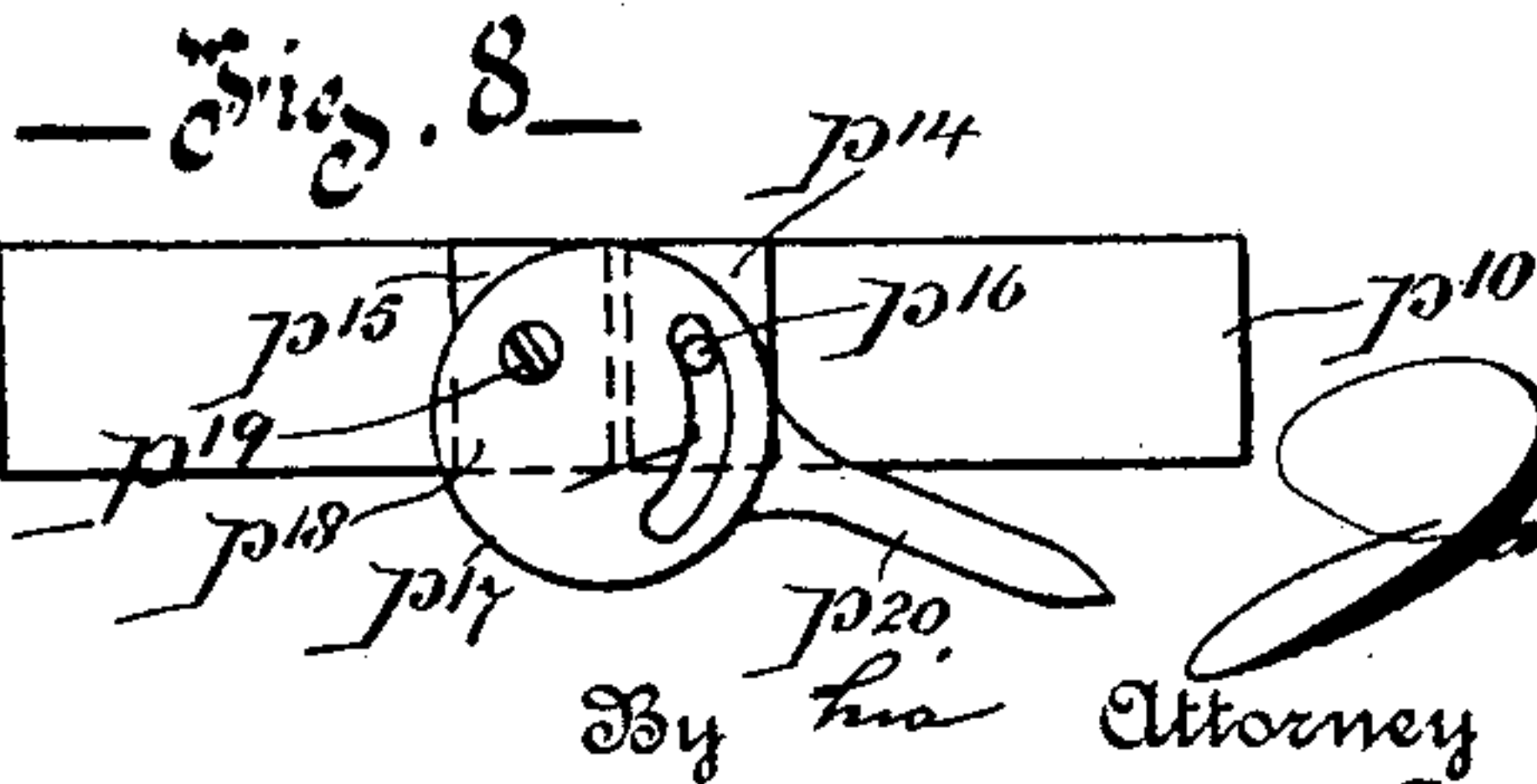
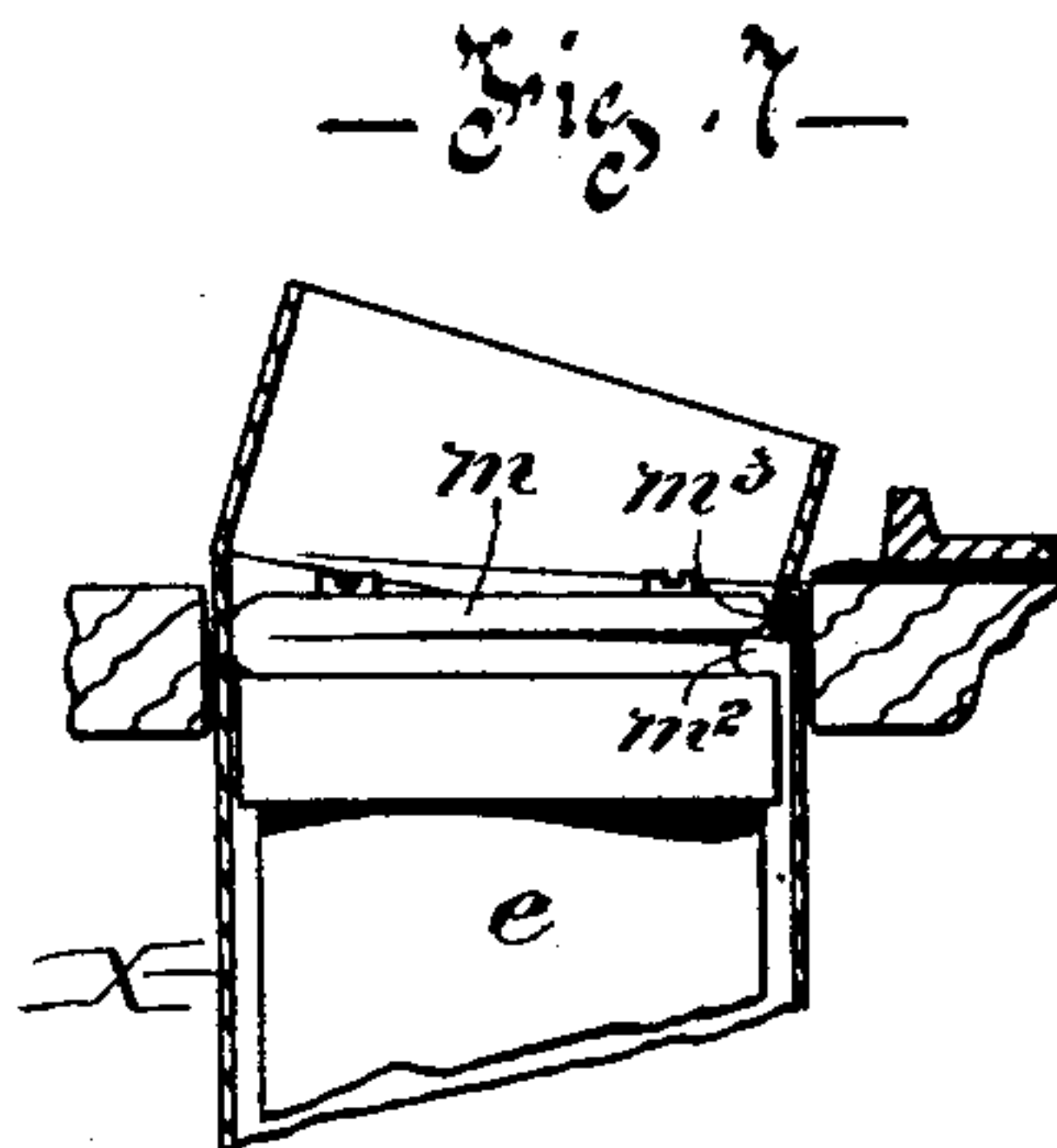
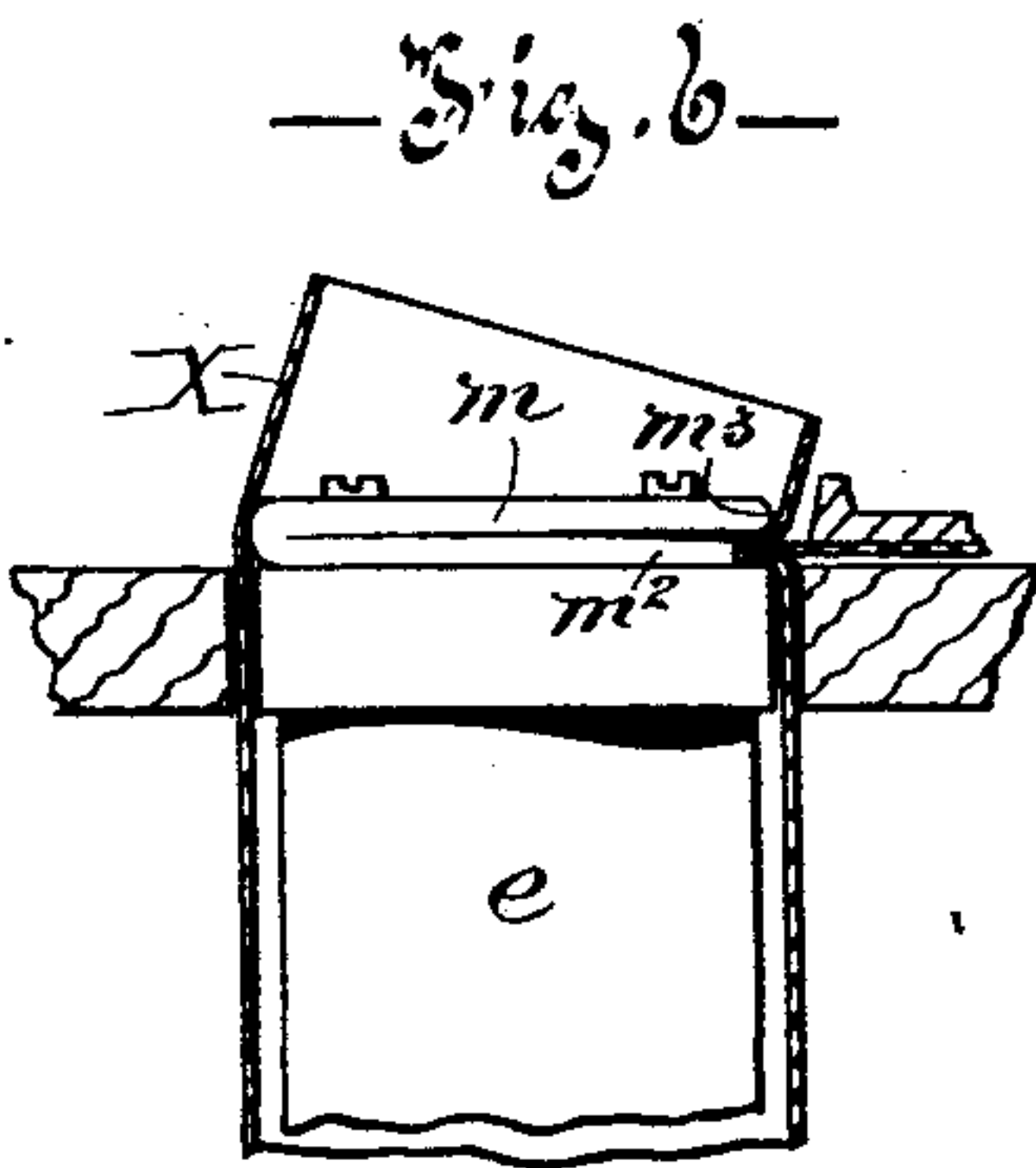
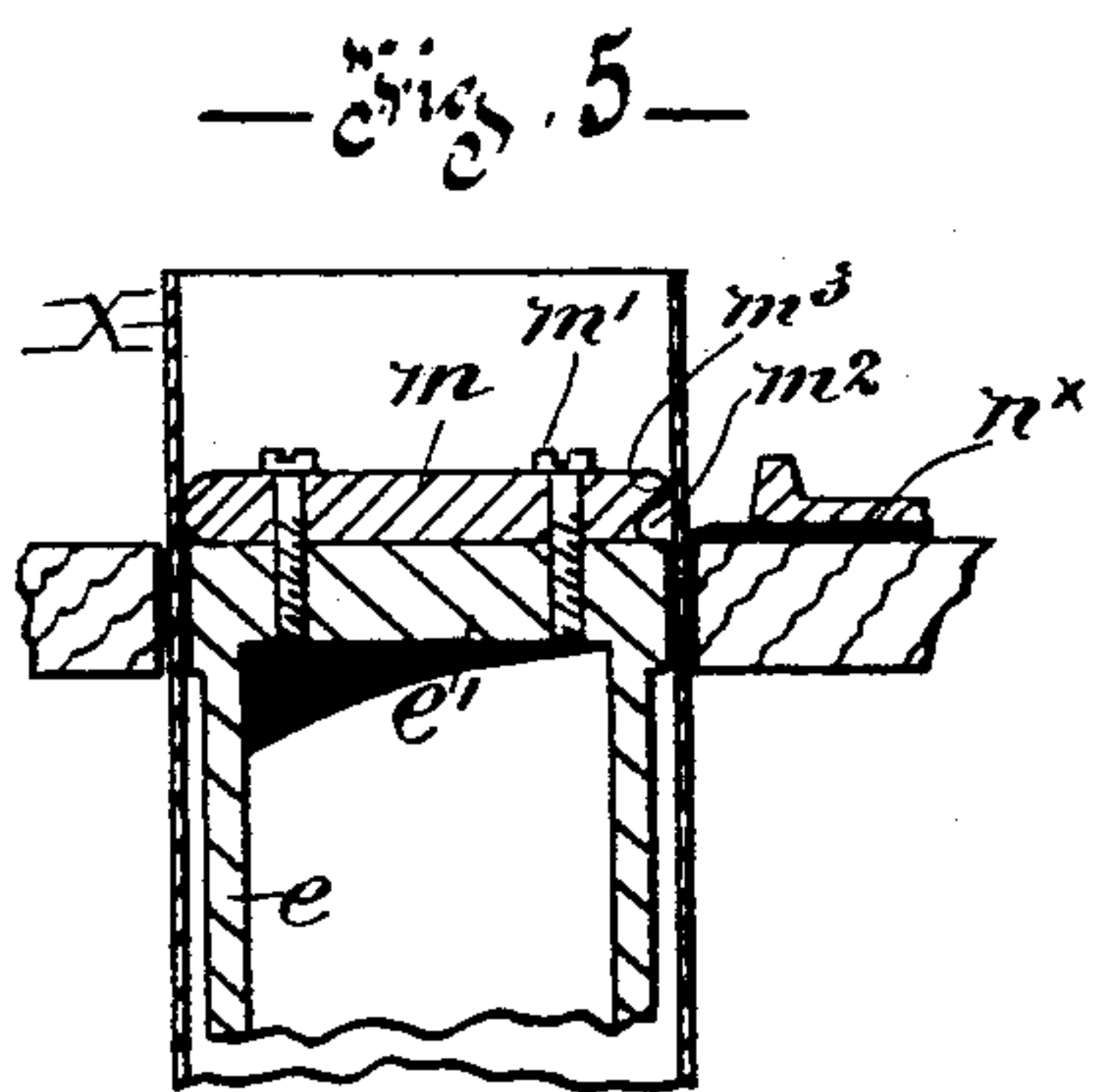
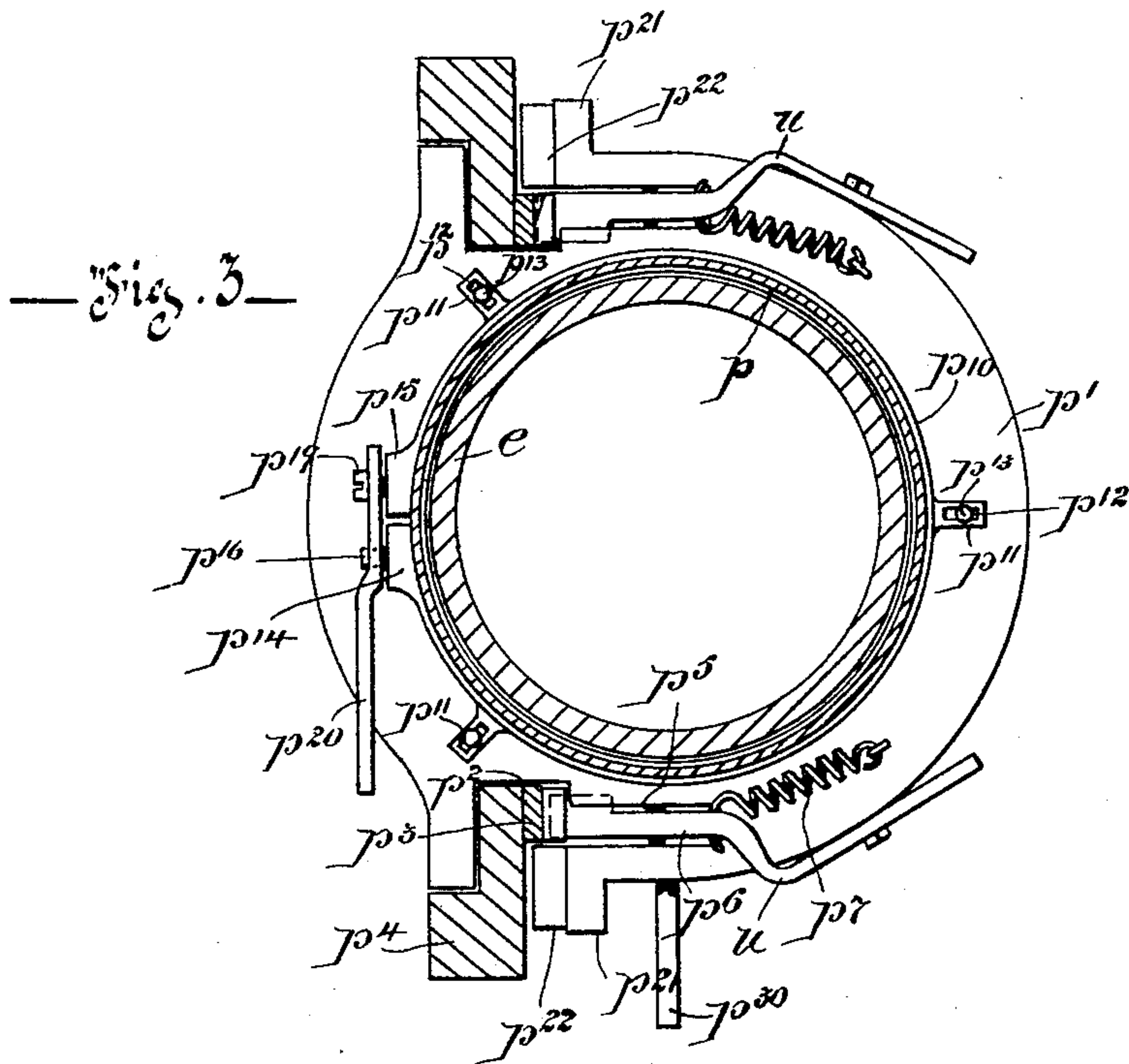
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4 Sheets—Sheet 3.

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Patented Oct. 12, 1897.



Witnesses
[Signature]
R. C. Kimber

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By *[Signature]* Attorney
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(No Model.)

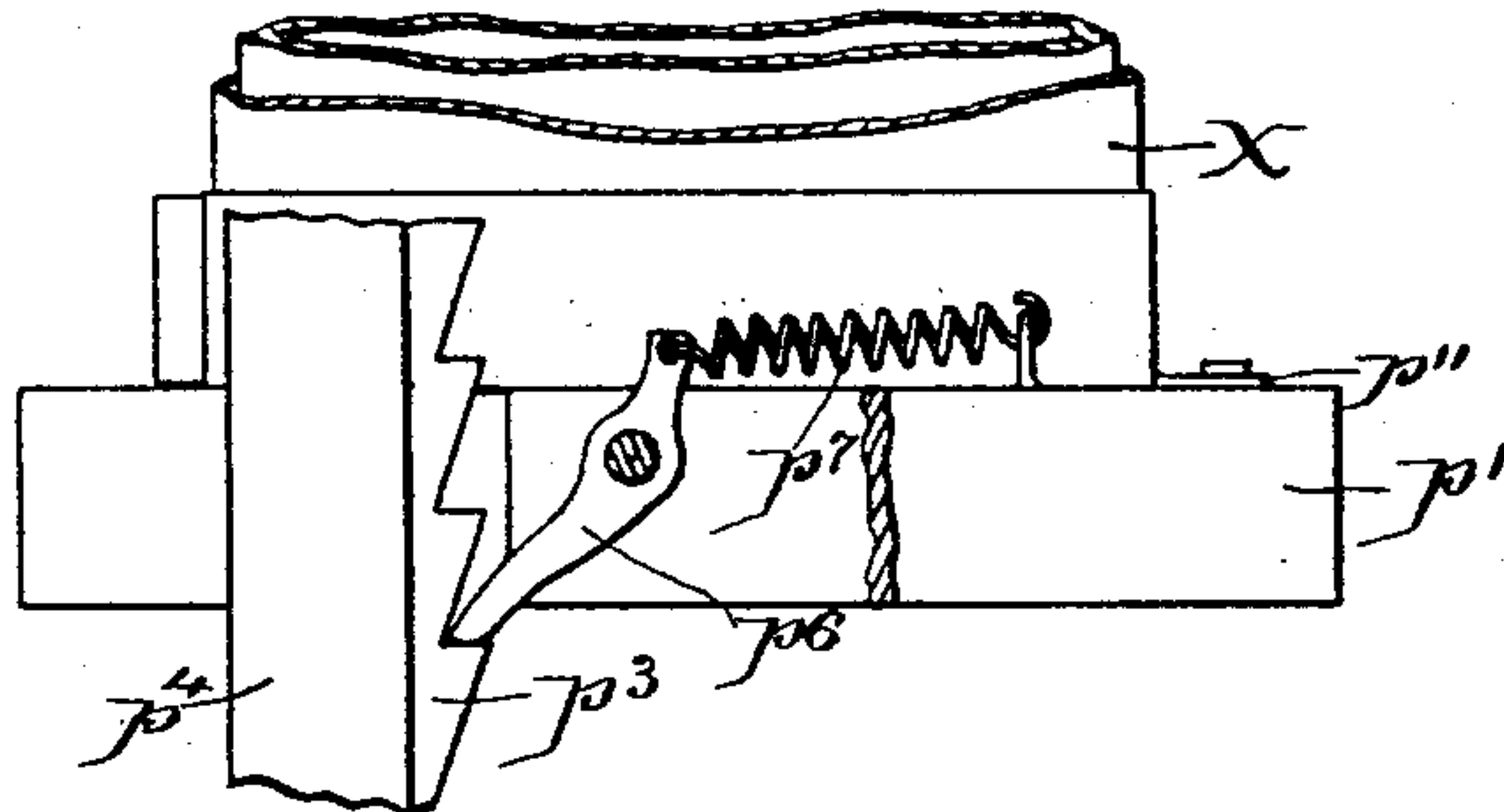
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J. RUSSELL.
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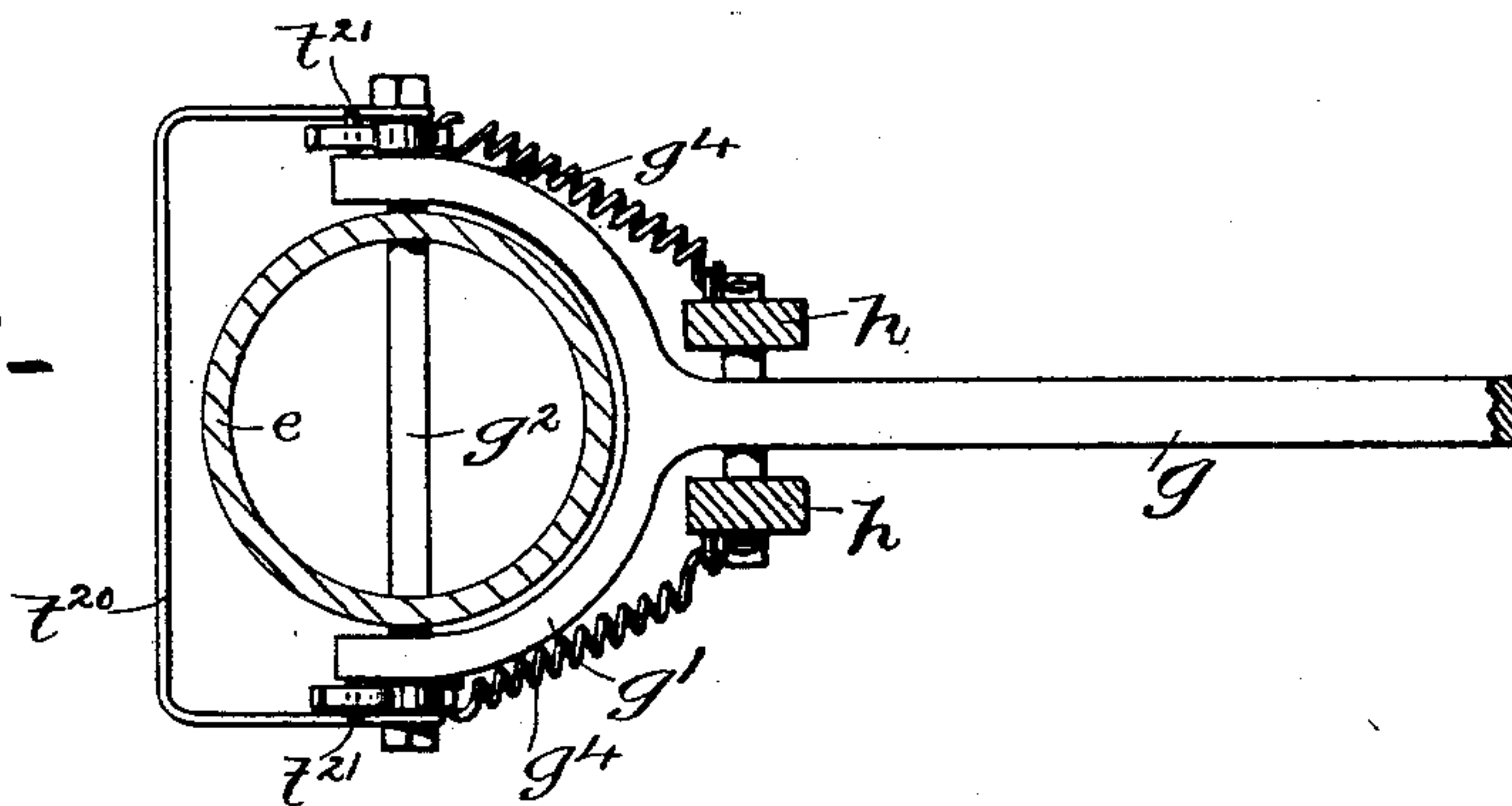
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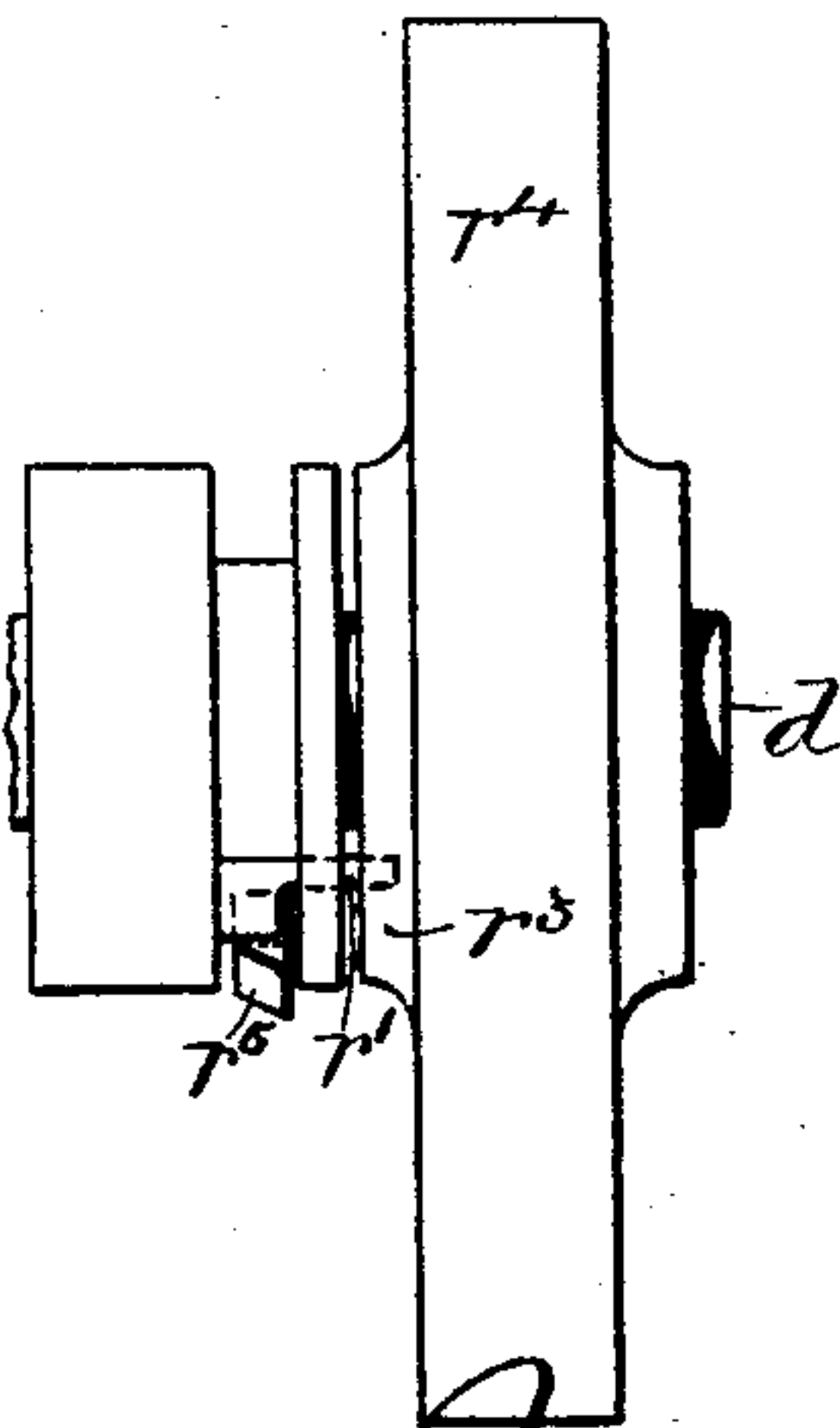
-Fig. 9-



-Fig. 10-



-Fig. 11-



Witnesses
R. C. Kimber
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UNITED STATES PATENT OFFICE.

JAMES RUSSELL, OF MONTREAL, CANADA, ASSIGNOR TO THE THOMAS
DAVIDSON MANUFACTURING COMPANY, LIMITED, OF SAME PLACE.

STOVEPIPE-ELBOW-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 591,776, dated October 12, 1897.

Application filed July 24, 1893. Serial No. 600,426. (No model.)

To all whom it may concern:

Be it known that I, JAMES RUSSELL, of the city of Montreal, in the District of Montreal and Province of Quebec, Canada, have invented certain new and useful Improvements in Stovepipe-Elbow-Making Machines; and do hereby declare that the following is a full, clear, and exact description of the same.

The object of my invention is to provide a machine for the manufacture of stovepipe-elbows that will have the advantage over other machines for a like purpose of having less parts to operate and being able to run at a higher rate of speed with less risk of getting out of order and produce a better finished and less expensive elbow than has been possible in such machines heretofore, the machine built according to my invention being besides constructed and arranged in such a manner that the vibration of the machine during operation will be comparatively *nil*.

To these ends the invention may be said, broadly, to consist in providing improved crimpers, an integral crimping and flattening head, and an improved pipe carriage and feed, besides improving the general arrangement and operation of such parts and of the mechanism for actuating the same, and also in improving the general arrangement and combination of such parts whereby a more evenly-operating and cheaper machine and one with less parts to operate and get out of order is produced than has been known heretofore.

For full comprehension, however, of the invention reference must be had to the accompanying drawings, forming a part of this specification, in which like symbols indicate the same parts, and wherein—

Figure 1 is a side elevation of a stovepipe-elbow-making machine constructed according to my invention; Fig. 1^a, a detail view of a portion of the preferred means for releasing the carriage. Fig. 2 is a plan view thereof; Fig. 3, a transverse horizontal sectional view thereof taken on line 3-3, Fig. 1; Fig. 4, a detail plan view of the crimpers; Figs. 5, 6, and 7, detail vertical sectional views illustrating the operation of the mandrel and crimping-head in forming a crimp; and Fig. 8, a detail face view of the pipe-retaining band; Fig. 9, a

detail view of the means for retaining the pipe in its fed position; Fig. 10, a detail horizontal sectional view of the mandrel and means for reciprocating same, and Fig. 11 a front view of the clutch.

The preferred embodiment of my machine consists in a frame composed of a horizontal table portion *b*, supported by legs *b'*, and having near the forward end thereof a circular opening *b*², through which the pipe is fed during the crimping operation, a second and preferably rectangular opening *b*³ being provided to accommodate the cams *c* and *c'*, having rises *c*² and *c*³, respectively, that operate the crimpers, as will be hereinafter set forth. These cams are mounted rigidly upon a horizontal shaft *d*, carried in bearings *d'* *d'* upon the table portion *b*. A mandrel *e* is guided at its lower end in a sleeve *f*, secured to the floor immediately below the opening *b*² in the table, and is supported in the forked end *g'* of a lever *g*, to which it is pivotally connected by means of a spindle *g*², passing through the ends of such fork and the body of such mandrel. This lever is fulcrumed to a vertical brace *h*, secured at one end to the under side of the table and at its other to the floor, while the other end of lever *g* is pivotally connected to the lower end of an extensible pitman *k*, which is connected at its upper end to the crank of a crank-shaft *l*, mounted below the shaft *d* in bearings secured to the under side of the table portion, gear-wheels *d*² and *l'* being mounted upon the respective shafts *d* and *l* and adapted to intermesh with one another. This mandrel *e* is in the form of a hollow cylinder having one of its ends closed, as at *e'*, to which the flattening section *m* is rigidly secured and made integral therewith, preferably by screws *m'*. This flattening section *m* is circular and of a size that will closely fit the inside circumference of the pipe, and it is formed with a recessed edge, as at *m*², such edge being rounded, as at *m*³.

n, *n'*, and *n*² are the crimpers. *n* is formed integral with a slide *n*³ and has its central portion in the form of an arc of slightly-smaller radius than the circumference of the pipe to be crimped, while the ends *n*⁴ of such central portion are extended tangen-

tially. The crimpers n' and n^2 are in the form of arcs having one end beveled, as at n^5 , and the other end radially offset, as at n^6 , and perforated to allow of their being pivotally connected to the surface of the table portion, as shown in Figs. 2 and 4, while such crimpers n' and n^2 are operatively connected to the main crimper n , preferably by links n^3 , rigidly connected at one end to the body of such crimpers n' and n^2 , and bent to take loosely over the tangential portions of crimper n . These crimpers each have a knife-section n^x secured to their lower faces, and the ends n^9 of the knife-sections upon the lower sides of the crimpers n' n^2 are adapted to take under knife-edged wing-sections n^{10} formed upon the crimper n .

The slide n^3 is located and guided in guiding-strips n^8 , secured to the surface of the table and it is operatively connected to the cam c by a hook connected rigidly at its straight end c^4 to such slide and having its hooked end c^5 extending over cam c and normally engaging with the rear face thereof, and a forked bracket c^6 is rigidly secured to the rear end of the slide n^3 and has a roller mounted in the forked end thereof and adapted to normally engage the forward face of cam c' .

The feed-carriage preferably consists of a thin collar or short sleeve p , adapted to encircle and fit closely about the mandrel e , and the lower end of this collar or sleeve is horizontally offset and increased in thickness, as at p' , and recessed, as at p^2 , to take over a pair of ratchet-toothed racks p^3 , carried by a pair of vertical guides p^4 , secured at their upper ends to the under side of the table portion and at their lower ends to the floor, and such offset portion p' is further recessed, as at p^5 , to receive the pawls p^6 , which are fulcrumed within such recess and to the inner portion of such ring, the lower ends of these pawls being normally kept in engagement with said racks by retractile helical springs p^7 , connected at one end to the upper ends thereof and at their other ends to the horizontal portion of such ring or sleeve.

The pipe X is gripped firmly to the thin vertical portion of the ring by means of a resilient band or open ring p^{10} , having horizontally-extending lugs p^{11} formed integrally with the lower edge of such band and being provided with radial slots p^{12} , through which screws p^{13} take into the carriage, while the ends p^{14} p^{15} of this band are increased in thickness, the end p^{14} having a radially-projecting pin p^{16} thereon to take into a groove p^{17} in an eccentric p^{18} , which is fulcrumed to the end p^{15} of the band by means of a screw p^{19} and provided with a handle p^{20} . The carriage thus formed has radial projections p^{21} adjacent to the racks p^3 , and to these projections the upper ends of a second pair of ratchet-toothed racks p^{22} are rigidly connected, such racks being of sufficient length to extend downward past the forked end g' of

the lever g when the carriage is in its highest position.

A pawl g^3 is fulcrumed upon each end of the spindle g^2 , which ends are extended sufficiently beyond the fork to receive such pawls and retaining-nuts therefor thereon, the upper and engaging ends of such pawls being kept normally in engagement with the racks p^{22} by means of helical springs g^4 , connected at one end to the lower ends of such pawls and at their other ends to the brace h . The clutch that I prefer to use consists of a roller having a central peripheral recess and mounted rigidly upon the shaft d , a spring-operated bolt r' being carried in such recess with its end adapted to project laterally through said roller and take into a slot r^2 in the adjacent side of the hub r^3 of the driving-wheel r^4 , which is mounted loosely upon said shaft and in close proximity to such roller. A lever r^5 is fulcrumed to the frame of the machine adjacent to such roller and in position to be adjusted to engage said spring-bolt r' and move same out of engagement with the slot r^2 in the driving-wheel. A treadle s , fulcrumed preferably to one of the rear legs of the table, is located below the lever r^5 and is connected to same near the forward end of such lever r^5 by a link s' , while the forward end of this treadle is preferably yieldingly supported by a link s^2 and a helical spring s^3 , connected at one end to the upper end of such link s^2 and at its other end to the under side of the table portion. A second lever t is fulcrumed underneath and near the forward end of the table and has its forward end connected by a link t' to a U-shaped section t^x , having the ends of its arms t^2 fulcrumed to the floor, this U-shaped section having a lateral projection t^3 adapted to project under the treadle and engage or be engaged by same.

Another U-shaped section t^{20} has the ends of its arms pivotally connected to the ends of the spindle g^2 , this U-shaped section having lateral projections 21 adapted to engage the pawl g^3 and move same out of engagement with the racks p^{22} .

In the foregoing all the parts necessary to produce an elbow from a straight cylindrical length made of sheet metal of medium hardness have been fully set forth, and I will now describe the operation thereof.

The pipe is first passed downwardly through the opening in the table and over the crimping and flattening head and mandrel and has its end inserted between the collar or sleeve of the carriage and the adjustable band or open ring, which latter may then be tightened about the pipe, thus firmly locking it to the carriage. The carriage is then lowered until the pawls p^6 engage the lowermost teeth of the ratchet-toothed racks p^3 , the machine being then ready to start. To accomplish this, the treadle s should be depressed, which will draw the lever r^5 downward and release the clutch and allow it to engage the normally rotating driving-wheel r^4 . The cam c' then

acts upon the slide n^3 and through such slide forces the crimper or knife n , and with it the portion of the pipe with which it comes in contact, into the peripheral recess m^2 in the head. During this movement the tangential portions of this crimper n will bear upon the beveled ends of the crimpers n' and n^2 , and as the other ends thereof are pivoted to the frame such crimpers will be caused to enter at their beveled ends as deeply into the recess as the crimper n , while the distance the remaining portion of these crimpers n' and n^2 enter into the recess will be gradually diminished, until at the forward side of the pipe the crimpers will only lightly touch the exterior surface of the pipe, thus completing a crimp. The cam c will then act upon the hook c^5 and draw the slide n^3 away from the pipe and the knife-section of the crimper n out of the crimp, while at the same time the outer faces of the tangential portions of such crimper will act upon the inner faces of the links n^3 and cause the crimpers n' and n^2 to also recede out of the crimp. The crank-shaft will then, through pitman k , commence to raise the rear end of the lever g , which will cause the mandrel and with it the recessed head to be drawn down, thus folding the crimp and flattening the same against the inside of the pipe. During this movement the pawls g^3 will be caused to engage the next lower teeth of the racks p^{22} , which will, when the lever g is returned to its normal position, simultaneously cause the pipe (through the feed-carriage and such racks) and the head $m e'$ to be raised to the required position to allow the repetition of the above-mentioned crimping operation, the engagement of the pawls p^6 with the racks p^3 holding the carriage at whatever height it may be raised.

In order to automatically disengage the pawls p^6 from their racks at the completion of an elbow, I fulcrum a lever u to the carriage adjacent to each pawl and extend their upper ends immediately over the space between the rear side of such pawls and the recesses in which they are mounted, the lower edges of such ends of these levers being provided with a beveled projection u' . Thus when the carriage reaches its highest point and the elbow is completed such levers will come into contact with the under side of the table and be forced against the upper ends of the pawls, thereby turning same and moving their lower ends clear of the teeth of the racks, this happening before such lower ends of the pawls will have engaged a tooth of the rack. To automatically reengage said pawls with their racks, a vertical standard u^2 is secured to the lever g , below and in line with the forward end of each lever u , with which such lever u will engage when the carriage reaches its lowermost position, thereby moving the ends of the levers out of engagement with the upper ends of the pawls and allowing the springs p^7 to act upon the pawls and cause the same to reengage the teeth of the

racks, and by raising the U-shaped section t^{20} the pawls g^3 will be disengaged from the racks p^{22} . When the carriage has reached its highest point, a lateral spindle projection p^{30} thereon engages and lifts the lever t and through such lever link t , U-shaped section t^x , lateral projection t^3 , treadle s , link s' , and places the end of lever r^5 into position to engage the clutch-pin and disengage it from the driving-wheel, thereby automatically stopping the machine.

To crimp pipes of comparatively hard metal, I have found it advantageous to provide auxiliary means for operating the crimpers $n' n^2$, which consists of a pair of short levers $v v$, fulcrumed, as at $v' v'$, to the table of the machine adjacent to ends of the crimpers n and with one end of each of these levers $v v$ bearing upon the end of said crimper, while the other ends thereof bear upon the adjacent side edge of each of the crimpers n' and n^2 , each end of these auxiliary bars being preferably linked to the crimpers to which they are adjacent in order that when occasion may require the links n^3 may be dispensed with.

The vibration of the machine, due to the reciprocation of the head in bending back the crimped portion of the pipe, is reduced to a minimum by setting the mandrel in the vertical position shown, because then the resistance to such bending back of the crimp will be through the carriage, racks, and frame in a straight line to the floor, instead of being, as heretofore, exerted against the legs of the machine.

It will be obvious that many changes in the construction and arrangement of the parts may be made and certain parts changed or dispensed with without departing from the spirit of my invention.

What I claim is as follows:

1. In a stovepipe-elbow-making machine, the combination with means for holding the pipe to be operated upon, of a main crimper and a pair of auxiliary crimpers, the latter operated by the main crimper and the main and auxiliary crimpers adapted to impinge upon and crimp the pipe, and means for operating said main crimper.

2. In a stovepipe-elbow-making machine, the combination with means for holding the pipe to be operated upon, of a main crimper and a pair of auxiliary crimpers, the latter operated by the main crimper and the main and auxiliary crimpers adapted to simultaneously impinge upon and crimp the pipe, and means for operating said main crimper.

3. In a stovepipe-elbow-making machine the combination with means for crimping the pipe, of a reciprocating circumferentially-recessed crimping and crimp-flattening head having the parts thereof stationary relatively to one another, and means for reciprocating said head, for the purpose set forth.

4. In a stovepipe-elbow-making machine, the combination with means for holding the pipe to be operated upon and means for

crimping the pipe, of a reciprocating head having a rigid pipe-supporting section and a rigid crimp-flattening section formed integrally with said head, said sections being permanently divided by a space adapted to receive the crimped portion of the pipe between them, and means for reciprocating said head.

5. In a stovepipe-elbow-making machine, the combination with means for holding the pipe to be operated upon, of a main crimper and a pair of auxiliary crimpers, the latter operated by the main crimper and the main and auxiliary crimpers adapted to impinge upon and crimp the pipe; means for operating said main crimper; a reciprocating solid head for bending back the crimped portion, and means for reciprocating said head.

6. In a stovepipe-elbow-making machine, the combination of horizontally-operating crimpers, a vertically-reciprocating solid head comprising rigid pipe-supporting and rigid crimp-flattening sections, said sections being permanently divided by a space adapted to receive the crimped portion of the pipe between them, means for operating said crimpers and means for reciprocating said head, for the purpose set forth.

7. In a stovepipe-elbow-making machine, the combination of, a horizontal table portion having an opening therein; a main crimper located adjacent to said opening and connected to one end of a slide; a pair of auxiliary crimpers pivoted to said table portion adjacent to said opening; means for operating said main crimper and an operative connection between said main and auxiliary crimpers; a reciprocating mandrel having a head formed integrally therewith, said head being adapted to receive said crimped portion of the pipe and means for operating said main crimper; means for reciprocating said mandrel, and means for feeding the pipe.

8. In a stovepipe-elbow-making machine, the combination with means for holding the pipe to be operated upon, of a main crimper; a pair of auxiliary crimpers; link connections between said main and auxiliary crimpers; whereby said main and auxiliary crimpers will be caused to simultaneously impinge upon the pipe, and means for operating said main crimper.

9. In a stovepipe-elbow-making machine, the combination with means for holding the pipe to be operated upon, of a main crimper having its ends extended tangentially; a pair of pivoted auxiliary crimpers having their free ends beveled and located in contact with the tangential ends of said main crimper; links carried rigidly upon the free ends of said auxiliary crimpers and adapted to take over said tangential portions of the main crimper and means for reciprocating said main crimper.

10. In a stovepipe-elbow-making machine, the combination with means for holding the pipe to be operated upon—of a main crimper

having its ends extended tangentially; a pair of pivoted auxiliary crimpers having their free ends beveled and located in contact with the tangential ends of said main crimper; levers fulcrumed in close proximity to the adjacent ends of said main and auxiliary crimpers and adapted to normally bear upon same; links connecting the ends of said levers to said crimpers; and means for reciprocating said main crimper.

11. In a stovepipe-elbow-making machine, the combination of, a horizontal table portion having an opening therein; a main crimper located adjacent to said opening and connected to one end of a slide; a pair of auxiliary crimpers pivoted to said table portion adjacent to said opening; means for reciprocating said slide and an operative connection between said main and auxiliary crimpers; a vertically-reciprocating mandrel having a solid head secured to the upper end thereof, said head being adapted to receive said crimped portion of the pipe; a pair of stationary vertical racks secured to the frame of the machine, a vertically-movable carriage consisting of a rigid portion adapted to encircle said mandrel and an open ring encircling said rigid portion, one of the ends of said ring being provided with a pin projection and the other having an eccentric fulcrumed thereto, said eccentric being slotted to take over said pin projection; a pair of pawls carried by said carriage and adapted to engage said racks, a pair of racks secured at one end to said carriage and a lever fulcrumed to the frame of the machine and carrying a pair of pawls in one end, said pawls being adapted to engage said last-mentioned racks and said lever being operatively connected to said mandrel and means for operating said lever, for the purpose set forth.

12. In combination with the driving-shaft and pipe-feeding carriage of a stovepipe-elbow-making machine, of clutch mechanism mounted tightly upon said driving-shaft and a driving-pulley mounted loosely upon said shaft; a lever fulcrumed adjacent to said clutch mechanism and adapted when moved in one direction to effect the engagement of said clutch mechanism and driving-pulley and when moved in the opposite direction to effect the disengagement of said clutch mechanism and driving-pulley; and means adapted to be engaged and operated by said carriage for moving said lever.

13. In combination with the frame, driving-shaft and pipe-feeding carriage of a stovepipe-elbow-making machine, of clutch mechanism mounted tightly upon said driving-shaft and a driving-pulley mounted loosely upon said shaft; a lever fulcrumed adjacent to said clutch mechanism and adapted when moved in one direction to effect the engagement of said clutch mechanism and driving-pulley and when moved in the opposite direction to effect the disengagement of said clutch mechanism and driving-pulley; a lever fulcrumed

to the frame of the machine and adapted to be engaged by said carriage at the completion of an elbow, a lever fulcrumed to the frame of the machine and extending parallel to said last-mentioned lever and said clutch-operating lever, a link connection between said parallel lever and the clutch-operating lever and the lever to be engaged by said carriage for the purpose set forth.

14. In combination with the frame, driving-shaft and pipe-feeding carriage of a stovepipe-elbow-making machine of clutch mechanism mounted tightly upon said driving-shaft and a driving-pulley mounted loosely upon said shaft, a lever fulcrumed adjacent to said clutch mechanism and adapted when moved in one direction to effect the engagement of said clutch mechanism and driving-pulley and when moved in the opposite direction to effect the disengagement of said clutch mechanism and driving-pulley; a lever fulcrumed to the frame of the machine and adapted to be engaged by said carriage at the completion of an elbow, a treadle fulcrumed to the frame of the machine and extending parallel to said last-mentioned lever and said clutch-operating lever, link connections between said treadle and the clutch-operating lever, a U-shaped section having the ends of its arms fulcrumed to the floor and said section having a lateral projection adapted to project under the treadle and engage or be engaged by the same, and a link connection between said U-shaped section and the lever to be engaged by the carriage, for the purpose set forth.

15. In a stovepipe-elbow-making machine, a pipe-feeding carriage consisting of a rigid portion adapted to receive the pipe about the same, an open ring encircling said rigid portion, one end of said ring being provided with a pin projection and the other end having an eccentric fulcrumed thereto and carried thereby, said eccentric being slotted to take over said pin projection.

16. In a stovepipe-elbow-making machine, the combination of, a table portion having an opening therein; a main crimper located adjacent to said opening and connected to one end of a slide; a pair of auxiliary crimpers pivoted to said table portion adjacent to said opening; means for reciprocating said slide and an operative connection between said main and auxiliary crimpers; a reciprocating mandrel having a solid head secured to the upper end thereof, said head being adapted to receive said crimped portion of the pipe; a pair of stationary racks secured to the frame of the machine, a movable carriage consisting of a rigid portion *p* adapted to encircle said mandrel and an open ring encircling said rigid portion, one of the ends of said ring being provided with a pin projection and the other having an eccentric fulcrumed thereto, said eccentric being slotted to take over said pin projection; a pair of pawls carried by said carriage and adapted to engage said

racks, a pair of racks secured at one end to said carriage and a lever fulcrumed to the frame of the machine and carrying a pair of pawls in one end, said pawls being adapted to engage said last-mentioned racks, and said lever being operatively connected to said mandrel, and means for operating said lever, for the purpose set forth.

17. In a stovepipe-elbow-making machine, the combination of, a table portion having an opening therein; a main crimper located adjacent to said opening and connected to one end of a slide; a pair of auxiliary crimpers pivoted to said table portion adjacent to said opening; a shaft extending at right angles to said slide, a pair of cams carried by said shaft, an arm carried by said slide and adapted to be engaged by the adjacent side of the cam adjacent thereto, a second arm carried by said slide and extended and curved to extend over and be engaged by the other cam; and an operative connection between said main and auxiliary crimpers; a reciprocating mandrel having a solid head secured to the upper end thereof, said head being adapted to receive said crimped portion of the pipe; a pair of stationary racks secured to the frame of the machine, a movable carriage consisting of a rigid portion *p* adapted to encircle said mandrel and an open ring encircling said rigid portion, one of the ends of said ring being provided with a pin projection and the other having an eccentric fulcrumed thereto, said eccentric being slotted to take over said pin projection; a pair of pawls carried by said carriage and adapted to engage said racks, a pair of racks secured at one end to said carriage and a lever fulcrumed to the frame of the machine and carrying a pair of pawls in one end, said pawls being adapted to engage said last-mentioned racks; and said lever being operatively connected to said mandrel and means for operating said lever, for the purpose set forth.

18. In a stovepipe-elbow-making machine, the combination of, a horizontal table portion having an opening and connected to one end of a slide; a pair of auxiliary crimpers pivoted to said table portion adjacent to said opening; means for reciprocating said slide, a vertically-reciprocating mandrel having a solid head secured to the upper end thereof, said head being adapted to receive said crimped portion of the pipe; a pair of stationary vertical racks secured to the frame of the machine, a vertically-movable carriage consisting of a rigid portion *p* adapted to encircle said mandrel and an open ring encircling said rigid portion, one of the ends of said ring being provided with a pin projection and the other having an eccentric fulcrumed thereto, said eccentric being slotted to take over said pin projection; a pair of pawls carried by said carriage and adapted to engage said racks, a pair of racks secured at one end to said carriage and a lever fulcrumed to the frame of the machine and carrying a pair of pawls in one end, said pawls being adapted to engage said last-mentioned racks; and said lever being operatively connected to said mandrel and means for operating said lever, for the purpose set forth.

rying a pair of pawls in one end, said pawls being adapted to engage said last-mentioned racks, and means for operating said lever, for the purpose set forth.

- 5 19. In a stovepipe-elbow-making machine, the combination of, a horizontal table portion having an opening therein; a main crimper located adjacent to said opening and connected to one end of a slide; a pair of auxiliary crimpers pivoted to said table portion
10 adjacent to said openings; means for reciprocating said slide and an operative connection between said main and auxiliary crimpers; a vertically-reciprocating mandrel having a
15 solid head secured to the upper end thereof, said head being adapted to receive said crimped portion of the pipe; a pair of stationary vertical racks secured to the frame of the machine, a vertically-movable carriage
20 consisting of a rigid portion *p* adapted to encircle said mandrel and an open ring encircling said rigid portion, one of the ends of said ring being provided with a pin projection and the other having an eccentric fulcrumed
25 thereto, said eccentric being slotted to take over said pin projection; a pair of pawls carried by said carriage and adapted to engage said racks, a pair of racks secured at one end to said carriage and a forked lever fulcrumed
30 to the frame of the machine, the forked end thereof straddling the mandrel, a spindle passing through perforations in the ends of said fork and through a perforation through the mandrel, a pair of pawls mounted upon said
35 spindle near the ends thereof, said pawls being adapted to engage said last-mentioned racks, and said lever being operatively connected to said mandrel, and means for operating said lever, for the purpose set forth.
- 40 20. In a stovepipe-elbow-making machine, the combination of, a horizontal table portion having an opening therein; a main crimper located adjacent to said opening and connected to one end of a slide; a pair of auxiliary crimpers pivoted to said table portion
45 adjacent to said opening; means for reciprocating said slide; a vertically-reciprocating mandrel having a solid head secured to the upper end thereof, said head being adapted to receive said crimped portion of the pipe; a pair of stationary vertical racks secured to the frame of the machine, a vertically-movable carriage consisting of a rigid portion *p* adapted to encircle said mandrel and an open
50 ring encircling said rigid portion, one of the ends of said ring being provided with a pin projection and the other having an eccentric fulcrumed thereto, said eccentric being slotted to take over said pin projection; a pair
55 of pawls carried by said carriage and adapted to engage said racks, a pair of racks secured at one end to said carriage and a forked lever fulcrumed to the frame of the machine, the forked end thereof straddling the mandrel,
60 a spindle passing through perforations in the ends of said fork and through a perforation through the mandrel, a pair of pawls mounted

upon said spindle near the ends thereof, said pawls being adapted to engage said last-mentioned racks, a U-shaped section fulcrumed
70 at its ends upon said spindle adjacent to said pawls and having lateral projections adapted to engage said pawls, and means for operating said lever, for the purpose set forth.

21. In stovepipe-elbow-making mechanism, a reciprocating head, a lever for reciprocating said head, a crank-shaft for operating said lever and an extensible pitman for operatively connecting said lever and crank-shaft.
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22. In combination with a pipe-feeding carriage of a stovepipe-elbow-making machine and means for moving said carriage, means for retaining said carriage in its fed position consisting of one or more racks secured to
85 the frame of the machine; and one or more spring-actuated pawls carried by said carriage and adapted to normally engage said racks; means for automatically disengaging said pawls and racks at the completion of an elbow.
90

23. In combination with a pipe-feeding carriage of a stovepipe-elbow-making machine and means for moving said carriage, means for retaining said carriage in its fed position
95 consisting of one or more racks secured to the frame of the machine; and one or more spring-actuated pawls carried by said carriage and adapted to normally engage said racks; means for automatically disengaging said
100 pawls and racks at the completion of an elbow, and means for automatically causing the reengagement of said pawls and racks.

24. In combination with a vertically-traveling pipe-feeding carriage of a stovepipe-elbow-making machine and means for moving said carriage, one or more racks secured to the frame of the machine, one or more spring-actuated pawls carried by said carriage and adapted to normally engage said racks,
105 said pawls having upwardly-extending ends, a lever carried adjacent to each of said pawls and having one end beveled and extended in close proximity to the upper end of the pawl and said beveled end being adapted to be
110 engaged by the frame of the machine at the completion of an elbow and thus cause said beveled end to engage the upper end of the pawl and disengage said pawl from its rack, and means for causing the reengagement of
115 said pawl and rack, substantially as and for the purpose set forth.
120

25. In combination with a vertically-traveling pipe-feeding carriage of a stovepipe-elbow-making machine and means for moving said carriage, one or more racks secured to the frame of the machine, one or more spring-actuated pawls carried by said carriage and adapted to normally engage said racks,
125 said pawls having upwardly-extending ends, a lever carried adjacent to each of said pawls and having one end beveled and extended in close proximity to the upper end of the pawl, and said beveled end being adapted to be en-
130

gaged by the frame of the machine at the completion of an elbow and thus cause said beveled end to engage the upper end of the pawl and disengage said pawl from its rack; 5 a projecting section immovable relatively to said carriage and carried by the machine in line with the beveled end of said lever and adapted, upon the carriage being moved to a position to receive a pipe-length to be operated upon, to engage said lever and disengage same from the pawl, and allow the re-engagement of said pawl and its rack, substantially as and for the purpose set forth. 10

26. In combination with the frame, driving-shaft and pipe-feeding carriage of a stove-pipe-elbow-making machine, of clutch mechanism mounted tightly upon said driving-shaft and a driving-pulley mounted loosely upon said shaft; a lever fulcrumed adjacent 15 to said clutch mechanism and adapted when moved in one direction to effect the engagement of said clutch mechanism and driving-pulley and when moved in the opposite di-

rection to effect the disengagement of said clutch mechanism and driving - pulley; a 25 lever fulcrumed to the frame of the machine and adapted to be engaged by said carriage at the completion of an elbow, a treadle fulcrumed to the frame of the machine and extending parallel to said last-mentioned lever 30 and said clutch-operating lever, link connections between said treadle and the clutch-operating lever and a yielding support for said treadle; a U-shaped section having the ends of its arms fulcrumed to the floor, said section 35 having a lateral projection adapted to project under the treadle and engage or be engaged by same, and a link connection between said U-shaped section and the lever to be engaged by the carriage, for the purpose 40 set forth.

Montreal, July 13, 1896.

JAMES RUSSELL.

Witnesses:

WILL P. McFEAT,
FRED. J. SEARS.