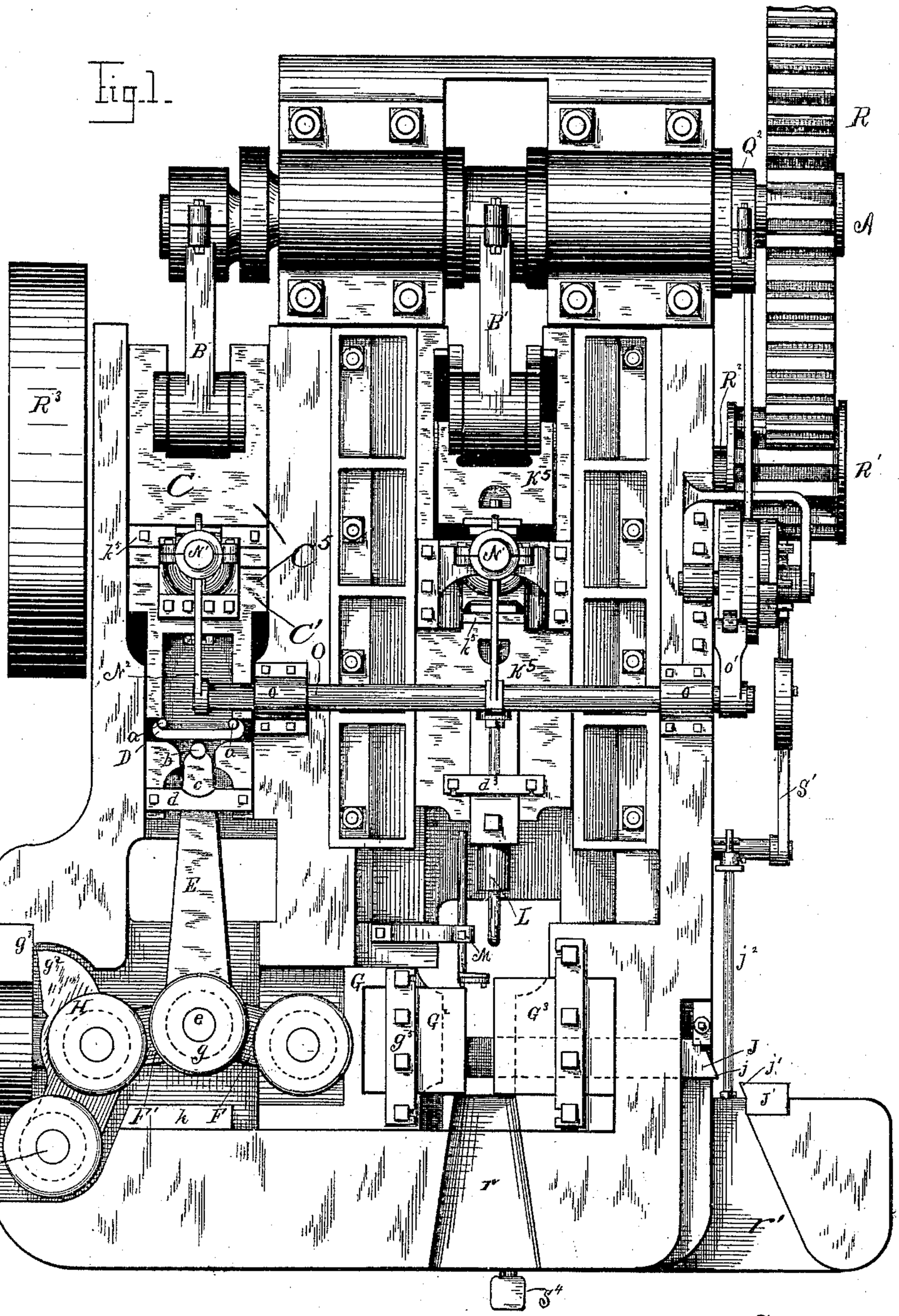
(No Model.) 6 Sheets—Sheet 1.

J. R. BLAKESLEE.

MACHINE FOR GENERAL FORGING.

No. 395,806. Patented Jan. 8, 1889.

Fig. 1.



Witnesses.
C. B. Nash.
E. J. Climo.

Inventor,
J. R. Blakeslee
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Thos. D. Hall.

(No Model.) 6 Sheets—Sheet 2.

J. R. BLAKESLEE.

MACHINE FOR GENERAL FORGING.

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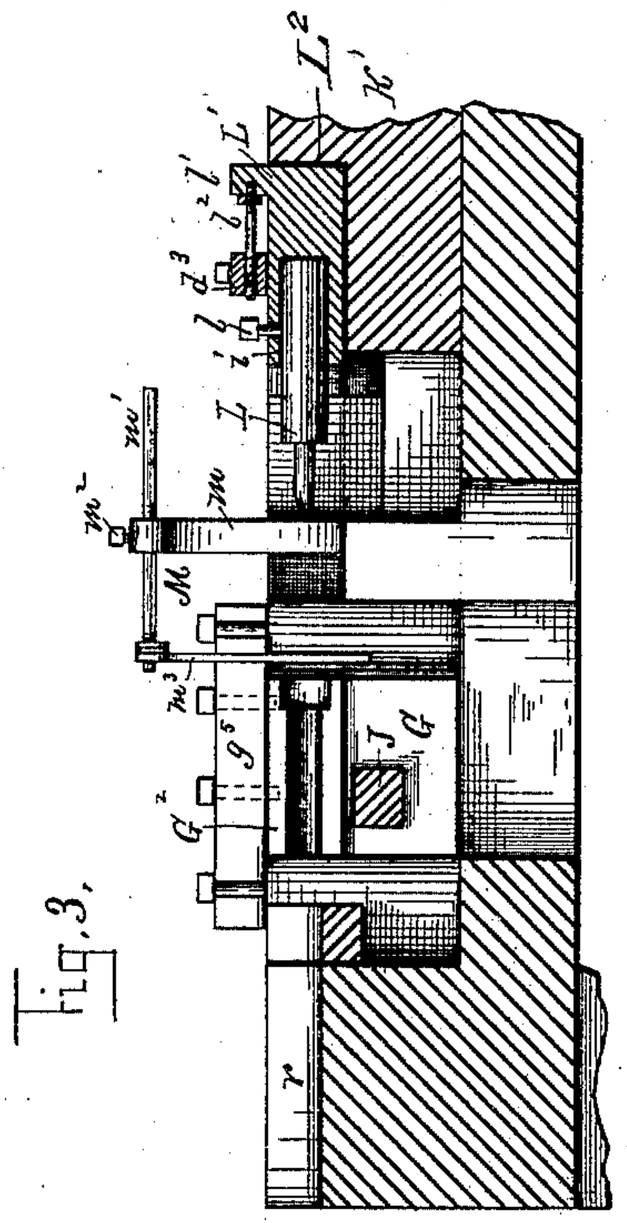

Fig. 3.

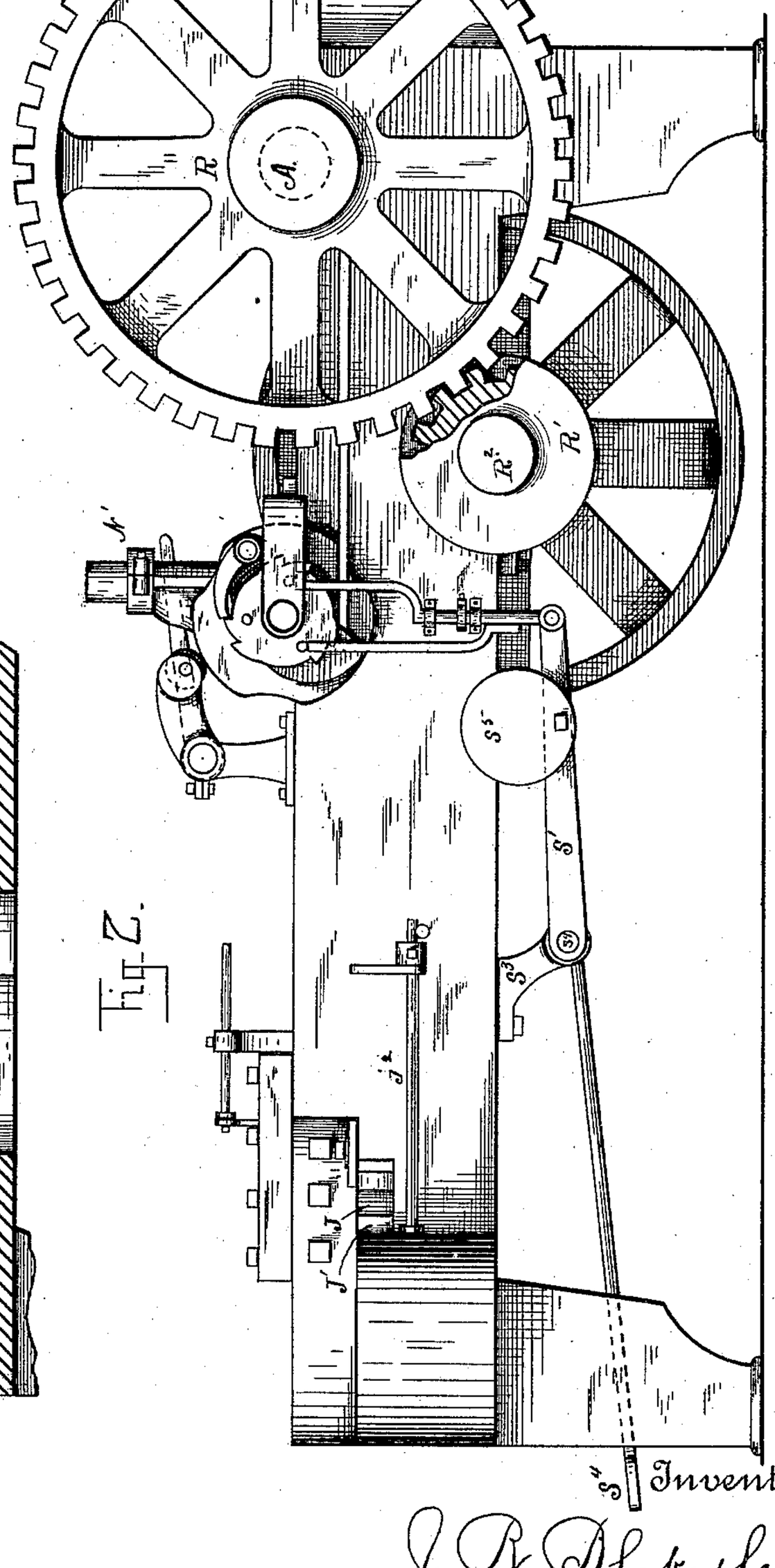

Fig. 2.

Witnesses,
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(No Model.) 6 Sheets—Sheet 3.

J. R. BLAKESLEE.

MACHINE FOR GENERAL FORGING.

No. 395,806. Patented Jan. 8, 1889.

Fig. 4.

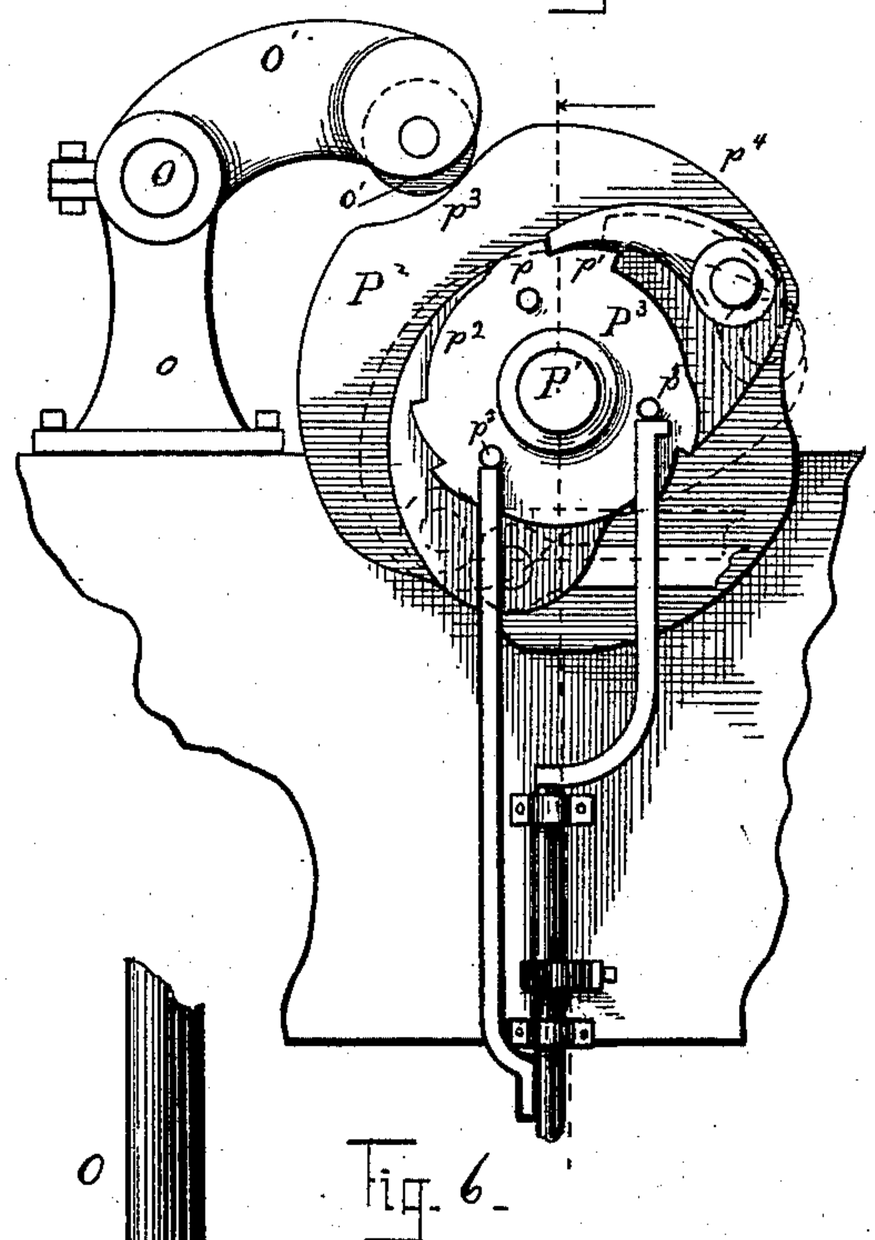


Fig. 5.

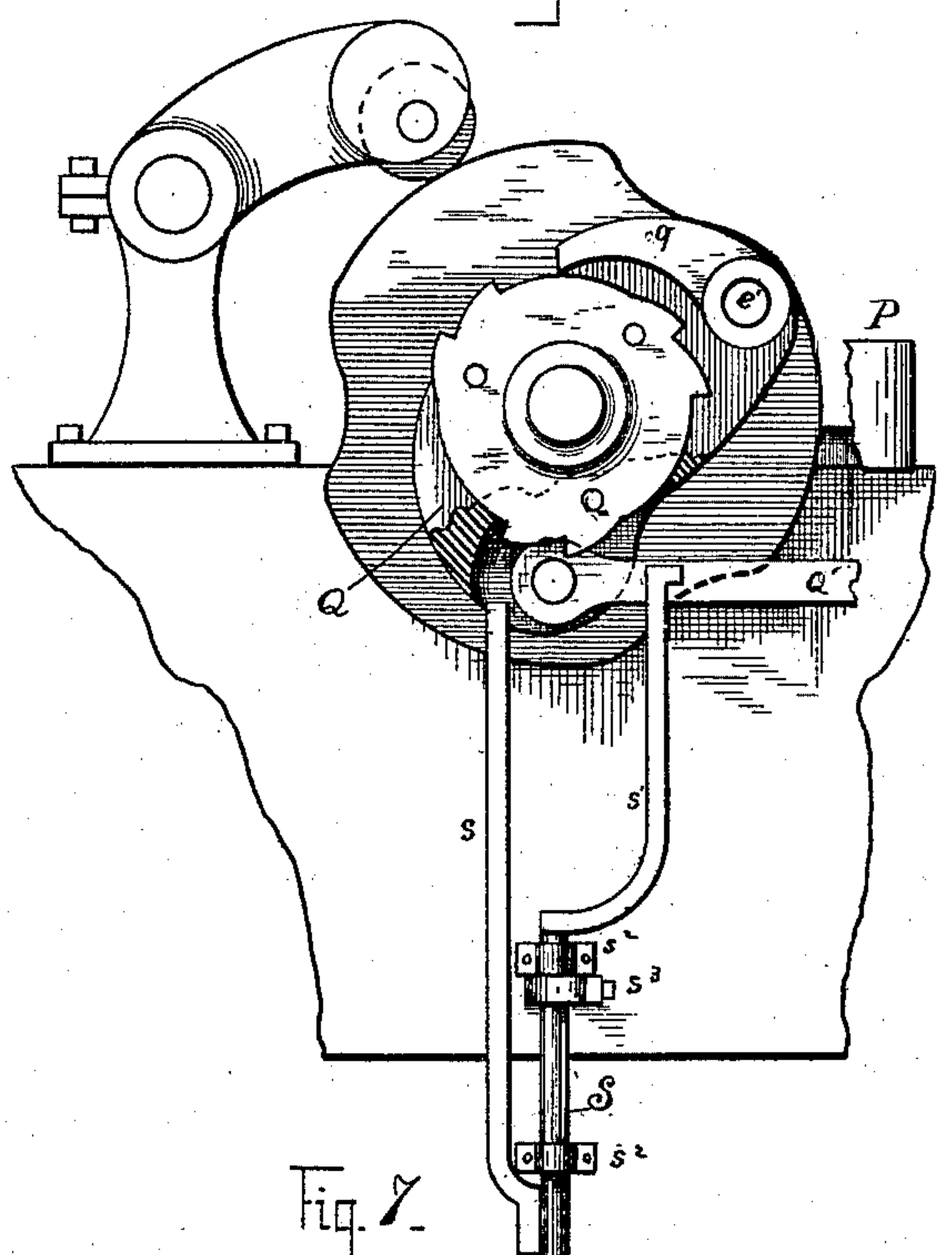


Fig. 6.

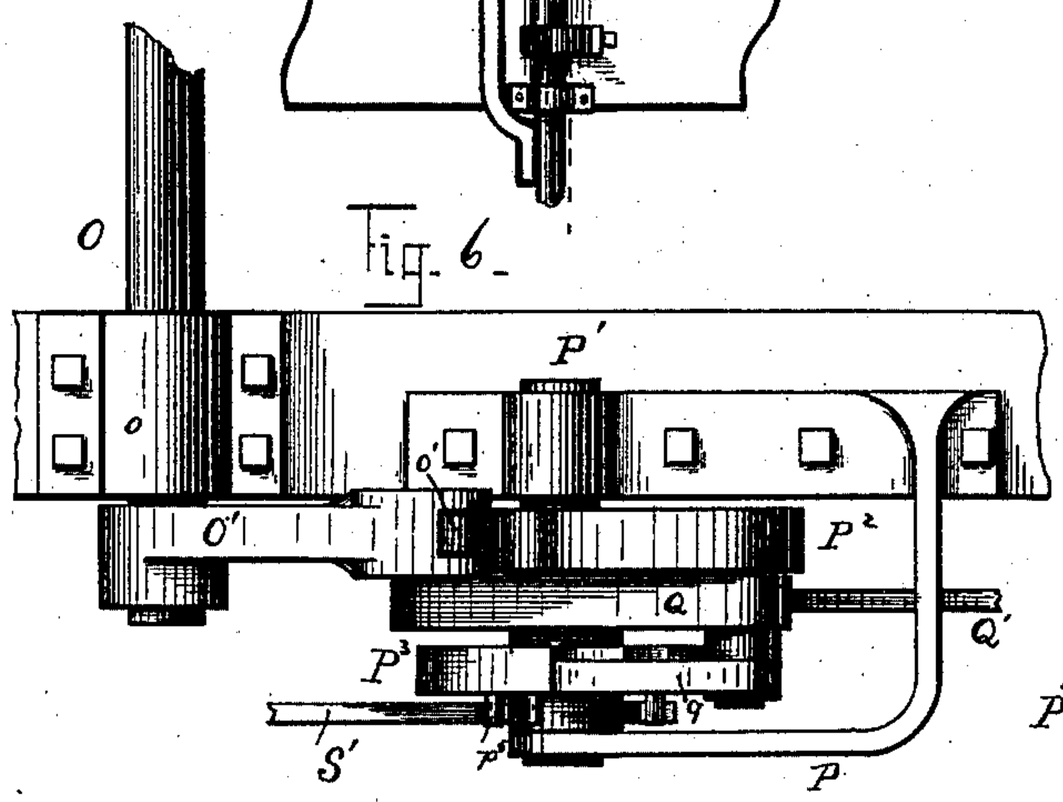
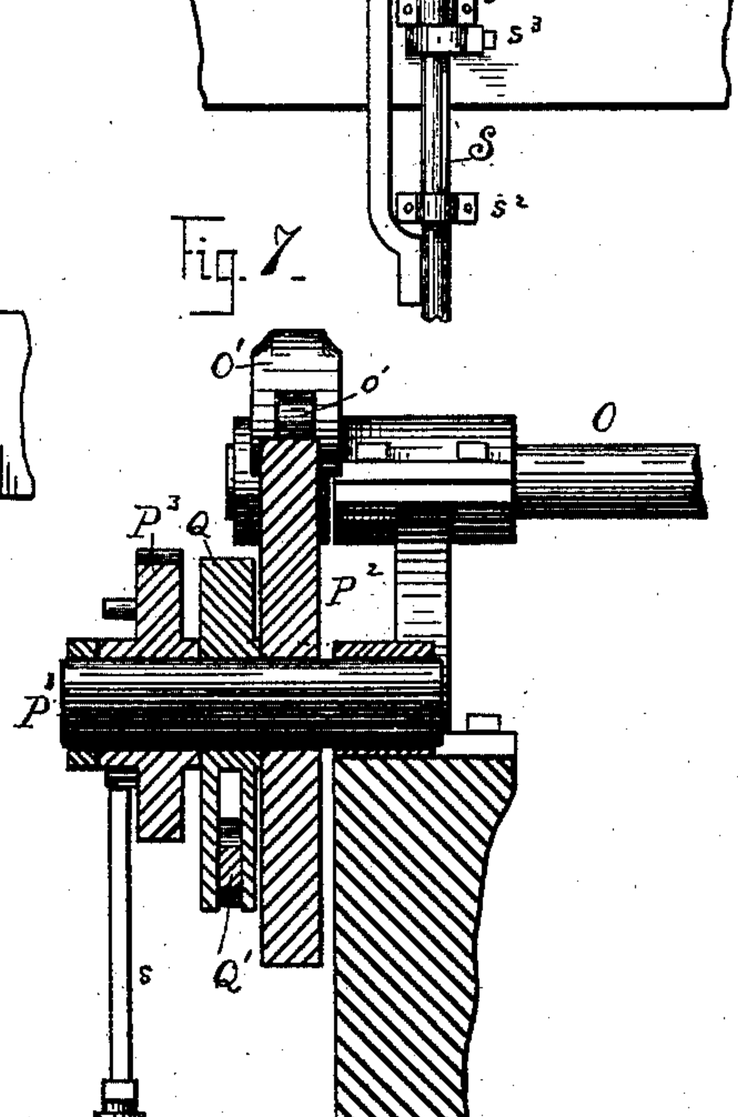


Fig. 7.



Witnesses
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(No Model.) 6 Sheets—Sheet 4.

J. R. BLAKESLEE.

MACHINE FOR GENERAL FORGING.

No. 395,806. Patented Jan. 8, 1889.

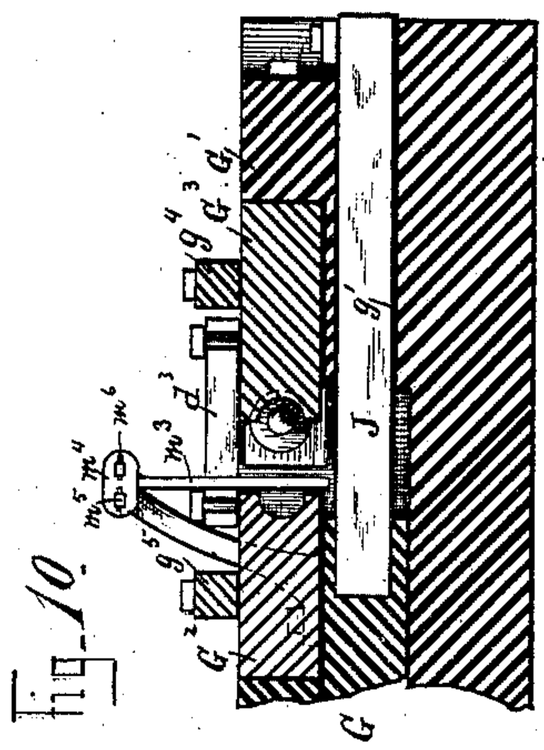

Fig. 10.

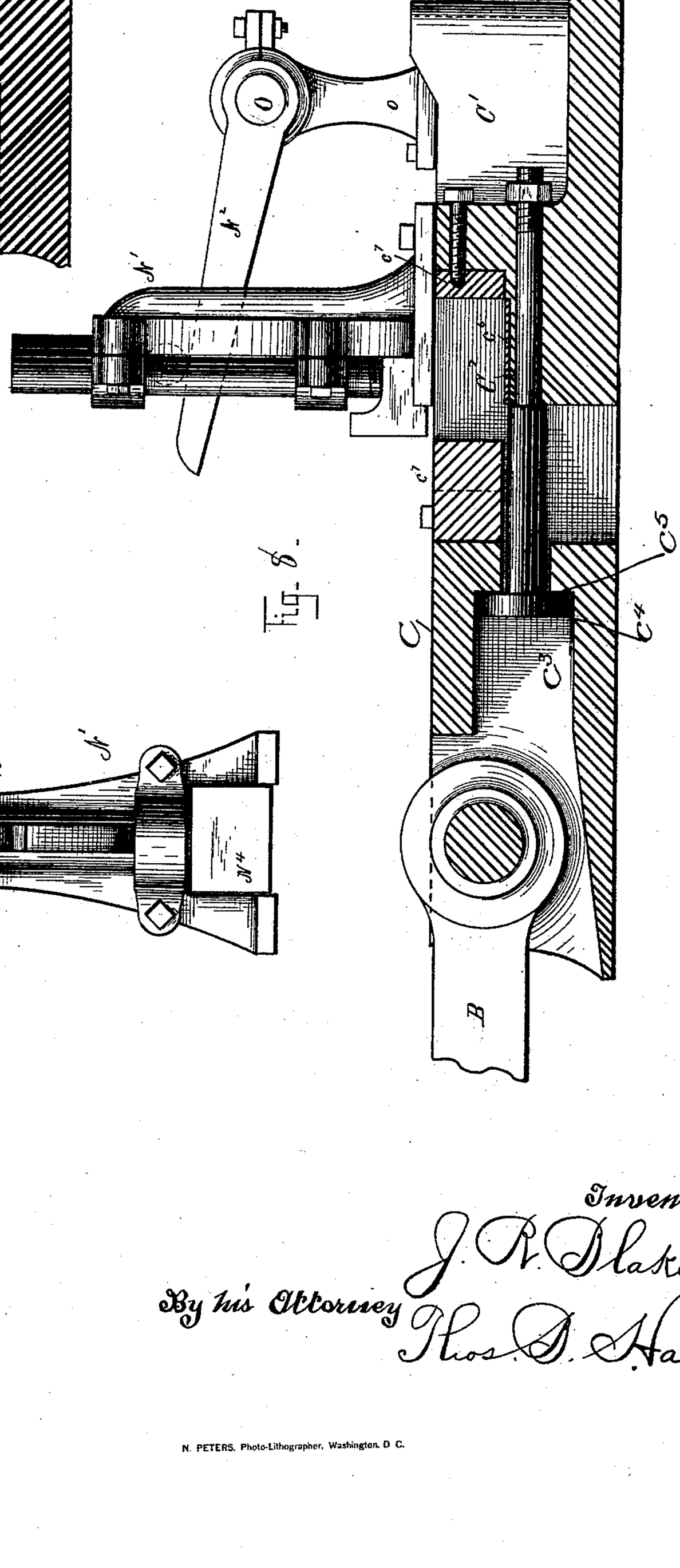

Fig. 6.

Fig. 9.

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(No Model.) 6 Sheets—Sheet 5.

J. R. BLAKESLEE.

MACHINE FOR GENERAL FORGING.

No. 395,806. Patented Jan. 8, 1889.

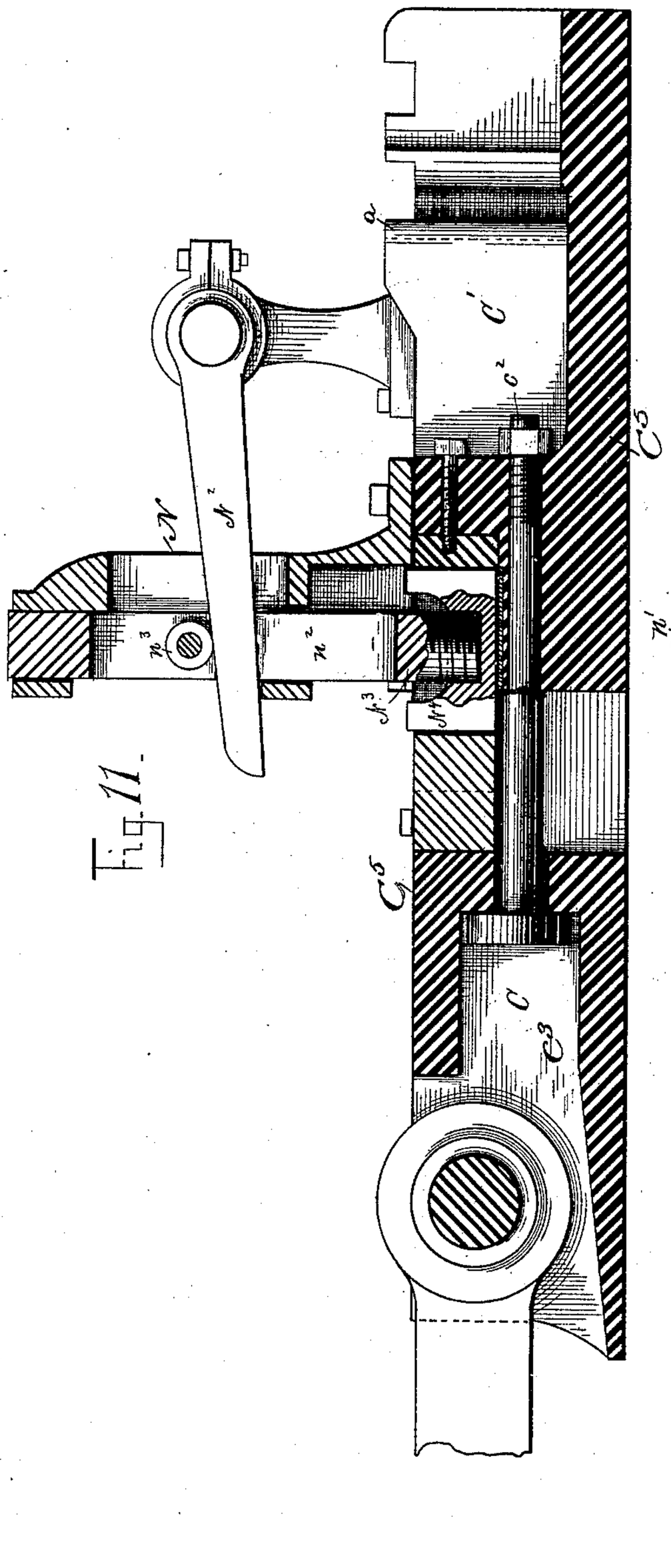

Fig. 11.

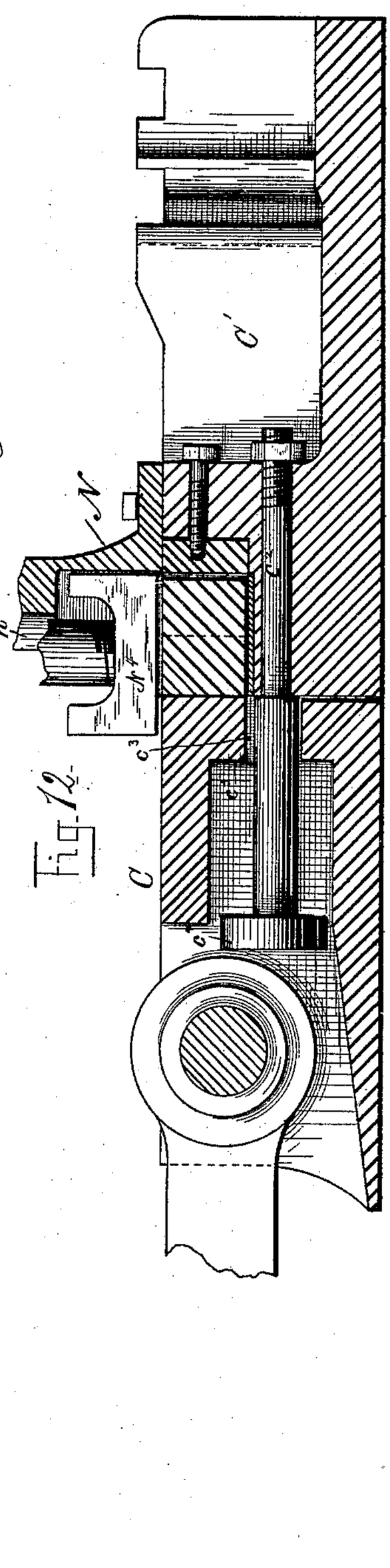

Fig. 12.

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J. R. BLAKESLEE.

MACHINE FOR GENERAL FORGING.

No. 395,806. Patented Jan. 8, 1889.

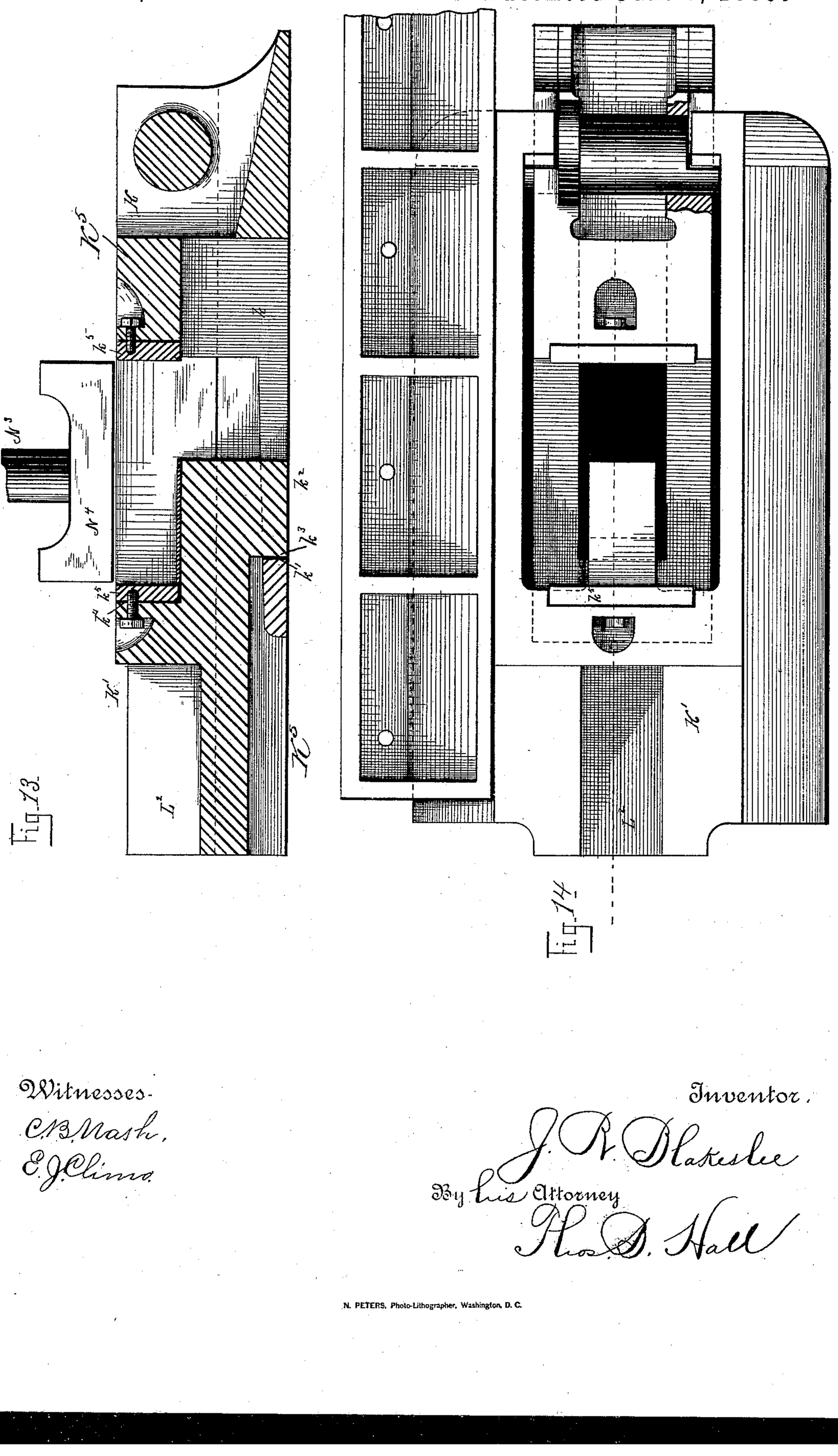

Fig. 13. Fig. 14.

Witnesses.
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UNITED STATES PATENT OFFICE.

JOHN R. BLAKESLEE, OF CUYAHOGA FALLS, OHIO.

MACHINE FOR GENERAL FORGING.

SPECIFICATION forming part of Letters Patent No. 395,806, dated January 8, 1889.

Application filed April 2, 1888. Serial No. 269,348. (No model.)

To all whom it may concern:

Be it known that I, JOHN R. BLAKESLEE, a citizen of the United States, residing at Cuyahoga Falls, county of Summit and State of Ohio, have invented certain new and useful Improvements in Machines for General Forging; and I do hereby declare the following to be a description of the same and of the manner of constructing and using the invention in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it appertains to construct and use the same, reference being had to the accompanying drawings, forming a part of the specification, the principle of the invention being herein explained and the best mode in which I have contemplated applying that principle, so as to distinguish it from other inventions.

This invention relates to a general forging-machine.

The objects I have in view are, first, a locking mechanism by means of which I am enabled to stop the movement of the movable gripping-die and header while the driving-shaft is rotating; second, a certain form of shears secured at one end to the movable die-block and moving with it; third, an adjustable stock-gage; fourth, an improved manner of securing the heading-tool to its slide to prevent the separation of the two when the slide is retracted.

Referring to the drawings, Figure 1 is a plan view of the machine. Fig. 2 is a view of the machine in side elevation. Fig. 3 is a sectional view of a portion of the machine, showing adjustable stock-gage in side elevation. Fig. 4 is a detail side elevation view of the mechanism which operates the lever that lifts the lock, as it appears when the lock is in lower or locked position, the pawl and pawl-arm in full line, showing them in forward position, the dotted line showing the same in retracted position. Fig. 5 is a view similar to Fig. 4, showing the lock in raised position. Fig. 6 is a plan view of the parts shown in the two preceding figures. Fig. 7 is a sectional view of the parts shown in Fig. 4, taken on the dotted line of said figure and in the direction indicated by the arrow. Fig. 8 is a side view, partly in section and partly in elevation, of the lock which connects the two portions C C′ of the slide C^5 and parts connected therewith, the lock being raised and the slide portions separated ready to permit the lock to drop into place. Fig. 9 is a detail face elevation view of the lock and bracket. Fig. 10 is a detail face view of the adjustable gage in elevation, with surrounding parts in section and showing the shear-bar in side elevation. Fig. 11 is a similar view to Fig. 8, showing same parts, the lock being in closed or locked position. Fig. 12 is a view similar to Fig. 11, showing the same parts, the upper section of the lock being broken away and the lever being omitted, showing the lock in raised position and the two slide portions in engagement with each other. Fig. 13 is a detail view, partly in section and partly in elevation, of the two portions of slide K^5 and the lock-bar, the two portions of the slide being shown in open position ready for the lock to be dropped into place. Fig. 14 is a plan view of parts shown in Fig. 12, the lock-bar being omitted.

The driving crank-shaft A has its cranks connected, respectively, by links B B′ with the bipartite slides C^5 K^5, the slide C^5 being composed of the two slide portions C C′, and the slide K^5 being composed of the two slide portions K K′. Connected with slide portion C in manner hereinafter set forth, is slide portion C′, which carries the transverse detachable breaker-plate D. Said breaker-plate has two vertical bearings engaging with the two bearing-posts *a*, rigid with said slide portion C′, said posts being located on the rear face of the breaker, while the front face of the breaker is engaging with the vertical curved bearing *d*, rigid on the rear end of link E. Said link E, at its rearward portion, is further provided with shoulder *c*, which engages with the cross-bar *d*, bolted to the slide portion C′. Said shoulder *c* is horizontally curved and fits in a corresponding concave bearing formed on side bar, *d*.

The relative proportion, strength, and object of the several parts having been set forth in detail in my patent, No. 364,208, of June 7, 1887, do not require more extended description.

The forward extremity of link E is pivoted by pivot *e* to the connecting extremity of links F F′. Link F is pivoted at its opposite ex-

tremity to movable gripping-die block G. Link F′ is pivoted at its opposite extremity to stop-block H, which latter is pivoted at its forward extremity by pivot *f* to the stationary body of the machine. The movement of said gripping-die block is limited in one direction by the stop *g* coming in contact with the frame *h* of the machine, and in opposite movement by the stop g^2 coming in contact with the block g^3. Stop-block H has bearing at one end against a spring, which is similar in form, construction, and mode of operation to the spring mentioned in my above patent. Passing beneath the stationary die-block G′ and formed in the bed of the machine is the rectangular opening *g′*, and through this opening passes the shear-bar J, secured to and rigid with the movable gripping-die block G. Secured, respectively, to die-blocks G G′ are the dies G^2 G^3, which are respectively held in fixed position relative to their die-blocks by bars g^4 g^5. Attached to link B′ is slide portion K of the slide K^5, and connected with said slide portion, in the manner set forth below, is the complementary slide portion K′. The header L is secured in the opening *i* of the die-block L′ by the set-screw *l*, the said die-block fitting in the opening L^2, formed in the slide portion K′, of the slide K^5. The bar d^3, bolted to the slide portion K′, prevents any vertical movement of the block L′, which is provided at its rearward end with the shoulder *l′*. Having bearing at one end against said shoulder and at the other end in said bar d^3 is the bolt l^2, which, by means of its said engagement with said shoulder and bar, prevents the die from being withdrawn from the block when the slide K^5 is retracted from its forward position.

The shear-block J′ is secured in the forward bed of the machine and has its edge *j′* practically in the same plane as the edge *j* of the moving shear-bar J, after the ordinary manner of a shear. In the bed of the machine are stock-openings *r r′* for introducing, respectively, to the header and to the shear the metal which is to be operated upon. Shear-gage j^2 is formed in the usual manner for the purpose of gaging the length of the metal to be cut, and is secured to the machine-bed opposite opening *r′*.

The adjustable stock-gage M consists of standard *m*, bolted to the machine-bed, and rod *m′*, passing through a suitable opening in the upper part of the standard, and adjustably secured thereto by set-screw m^2, said rod having sliding bearing in said standard longitudinally of the machine. Vertical gage-rod m^3 is provided at its upper end with slotted head m^4, which is secured to the rods *m′* and m^3 by means of set-screws m^5. By moving rod *m′* forward or backward in standard *m* the gage-rod m^3 may be adjusted at varying distances from the die-block longitudinally of the machine, and by means of the slots m^6 said gage-rod may be adjusted transversely of said machine.

The lock connecting the two slide portions K K′, as well as lock-bracket and lever N^2, is in all respects similar to lock, lock-bracket, and lever N^2, connecting slide portions C C′, and like letters are used to designate the similar parts; also, the padding on which the lock-bar rests is similar, and is designated by the same letter. The faces k^4 of the slide portions K K′ bearing against the lock-bar are provided with hardened bearing-plates k^5, secured in the usual manner. Similar plates k^5 are provided for the opposite ends of said slide portions K K′ to strike against. Slide portions C C′ are connected by bolts c^2, rigid with slide portion *c′* and have longitudinal play in opening c^3 of slide portion C. The head c^4 of said bolt engages with the inner face, c^5, of the slide portions when the slide has completed its backward stroke. Bolted to and rising from slide portion C′ is the lock-bracket N, which is provided with a vertical slot, *n′*.

Supported by two brackets, *o*, secured to the machine-bed is the shaft O, extending above the machine-bed and transversely to its longitudinal body. Secured to this shaft are the levers N^2, each passing through the vertical slot n^2 in their respective locks N′, in which slot each lever has bearing against its respective friction-roller n^3. Respectively having bearing and vertical movement in the vertical slots *n′* of the lock-brackets is the upright section N^3 of the lock N′, said upright section being threaded in the horizontal lock-bar section N^4.

Face C^2 of slide portion C′, on which face lock-bar N rests when in lowered position, is provided with pads c^6, made of leather, felt, or other suitable material. When these levers are in the raised position shown in Fig. 8, the lock-bar N^4 is raised above the horizontal plane of the upper face portion of slide portion C; but when the lever is in lowered position, as shown in Fig. 11, the lock-bar has bearing on either side against hardened-steel bearing-plates c^7, secured in the customary manner to the slide portions C C′.

The manner of connecting together slide portions K K′ is as follows: The slide portion is formed with the recess *k* and the shoulder *k′*. Fitting in said recess and having longitudinal play therein is the tongue k^2 of slide portion K′. The shoulder k^3 of the tongue engages with the shoulder *k′* when the slide has completed its backward stroke.

The mode of turning the shaft O so as to raise and lower the levers N^2 will now be described.

On the outer end of shaft O is a third lever, O′. Pivoted in its extremity opposite to the shaft is the friction-wheel *o′*. Bracket B is bolted to the frame-work of the machine and provided with shaft P′, having journal-bearings at either end in the two prongs of the said bracket. Cam-wheel P^2 is rigidly secured on the shaft in the same vertical plane as lever O′, the friction-wheel *o′* of which has bearing on the periphery of said cam. On the

outer end of said shaft P′ is the ratchet-wheel P³, provided with the three series of teeth *p* *p′* and the plane peripheral portion p^2, the cam-wheel having three recessed and three raised portions, respectively, $p^3 p^4$, corresponding with said toothed and said plane portions of said ratchet-wheel. The ratchet-wheel is provided on its outer diametric face with three pins, p^5. Loosely journaled on said shaft P′ intermediate of said cam and ratchet wheel, is the pawl-arm Q. Pawl *q* is pivoted at one end to said arm by pivot *e′*. Pivoted to the opposite and lower end of said pawl-arm is the pitman Q′. Spur-wheel R is also attached to said shaft A and meshes with pinion R′, secured to shaft R², which extends transversely across and through the machine-bed. Said shaft is provided on its opposite end with pulley-wheel R³, connected up in the usual manner to driving power. Lock-fork S, provided with two prongs, respectively, *s* *s′*, and the two stops S², rigidly secured to said fork S, has vertical movable bearing in the bracket s^3, secured to the side of the machine-bed. Supporting said lock-fork is the lever S′, attached to shaft S², which is in turn supported by bracket S³ in the usual manner. Foot-treadle S⁴ is also connected to said shaft S², by means of which the lock-fork may be raised and lowered. Lever S′ is further provided with weight S⁵.

The operation of the machine is as follows: Shear-gage j^2 and stock-gage M are respectively adjusted to suit the requirements of the particular metal to be operated upon. The movable die-block with its die being open, the metal to be worked upon is introduced through the opening *r* between said movable die G² and said stationary die G³, the proper introduction of the metal being determined by gage M. The forward stroke of the slide C⁵ thereupon operates through the toggle-joint mechanism to bring up the movable die into closed position with the stationary die, thereby gripping the metal. The header L is then carried forward by slide K′, operates upon the working metal, and commences its return movement. As soon as the header is clear of the working metal, the movable die releases the latter and the foregoing operation may then be repeated. It will be understood that the locks N′ are in their lowered or locked position at the beginning of this operation. So far the operation of this machine is exactly similar to that of my bolt heading and upsetting machine described and patented in United States Letters Patent No. 364,208, of June 7, 1887, and so long as the locks remain in their locked position the operation of this machine is substantially similar to that of my said bolt heading and upsetting machine. It, however, frequently occurs that, owing to the rapid revolution of shaft A, the operator is unable to properly adjust and secure the metal to be operated upon and then remove the same between each stroke of the header; or it may occur that he may desire to see the metal after it has received one stroke before he will permit the header to again come in contact with it. Under my old style of machine this was impossible without stopping the whole machine; but with this machine this is very easily accomplished.

When the lock is in locked position, the levers N² are in the positions shown in Fig. 11, the lever O′ is in the position shown in Fig. 4, and the friction-roller *o′* engages with the depressed portion p^3 of the cam P². While in this position the pawl engages with the first tooth of the series of teeth, and is moved forward and rotates the ratchet-wheel P³ as far as the distance of its stroke permits. It is then retracted and drops into engagement with the next tooth, *p′*, of said series, and moves again on its forward stroke the distance of its throw, and is then in the position illustrated in Fig. 5. As the cam-wheel and ratchet-wheel are rigid on said shaft P′, a movement of the ratchet-wheel causes a corresponding movement of the cam, and hence as the pawl has rotated the ratchet-wheel the distance above stated it has thereby moved the cam a corresponding distance and caused the raised portion p^4 of the periphery of said cam to be rotated in contact with the friction-roller *o′*. Thus the lever O′ has been raised. This lever is rigid on the shaft O, as are also the two levers N²; hence as this lever O′ has been raised the levers N² have correspondingly been raised, and engaging, as they do, with the friction-rollers n^3 in the respective slots of the lock N′ they have raised said locks from their lower or locked position into the position shown in Fig. 8, thus permitting the slide portions, respectively, C K to move forward without engaging with their corresponding slide portions, C′ K′. The rotation of shaft A may now continue without any corresponding movement of the slide portions C′ K′, and the mechanism, respectively, connected therewith. If it is desired to drop the lock, the operator presses the treadle S⁴, and by means of the connecting mechanism raises the lock-fork S, the two prongs thereof coming in contact with pins p^5 on the face of said ratchet-wheel P³. These pins are so adjusted that when the two prongs of said lock-fork engage with the two pins the ratchet-wheel is turned around to the position shown in Fig. 4—viz., is so turned that the pawl *q* may engage with the first tooth, *p*, of the three series of ratchet-teeth formed on the periphery of said ratchet, and the friction-roller *o′* may drop into the recessed portion of said cam. Meanwhile the shaft A is still rotating, and the eccentric-rod Q′ is oscillating the pawl-arm Q, and thus the pawl rotates said ratchet-wheel, is retracted, drops, and comes in contact with the next tooth, *p′*, on said wheel, and again partially rotates said wheel by its forward movement, thus automatically raising the locks, as before set forth.

If it is desired to keep the links in locked position, it can be done as follows: The pawl

engages with and forces forward the ratchet-tooth p. When the pawl has reached the full throw of its stroke and begins its backward movement, the operator may press on said treadle, and by the engagement of prong s' with one of said pins p^5 may turn the ratchet-wheel in a direction opposite to that given it by the pawl, and thus overcome the movement of the pawl and not permit it to drop into engagement with the tooth p'. The pawl will then repeat its forward movement while engaging with said tooth p, and the operator must again overcome said movement in the way indicated.

I claim—

1. In a machine for general forging, the combination, with a two-part slide and a lock which rigidly locks said portions together, of automatic mechanism which automatically releases said lock from engagement with said slide portions, substantially as set forth.

2. In a machine for general forging, the combination, with a two-part slide, the two portions of which are loosely connected together, and a reciprocating lock which locks said two portions together at will, of mechanism which automatically frees said lock from locking engagement, substantially as set forth.

3. In a machine for general forging, the combination, with a two-part slide, the two portions of which are loosely connected together, said two portions having an opening between them at certain portions of their stroke, and a lock adapted to fit in said opening, and thereby rigidly lock said two portions together, of actuating mechanism that at the will of the operator locks said two portions rigidly together or frees them from engagement with said lock, substantially as set forth.

4. In a machine for general forging, the combination, with a two-part slide, the two parts of which have an opening between them at certain portions of their stroke, of a vertically-reciprocating lock fitting in said opening at will of the operator, substantially as set forth.

5. In a machine for general forging, the combination, with a two-part slide, the two portions of which are respectively provided with bearing-plates on their adjacent faces, of a lock fitting between said two portions at will of the operator, substantially as set forth.

6. In a machine for general forging, the combination of a driving-shaft and movable die-block, the two-part slide connected, respectively, by intermediate mechanism with said shaft and die-block, and a lock which locks the two portions of said slide together, substantially as set forth.

7. In a machine for general forging, the combination of a two-part slide, the two portions of which have an opening formed between them at certain portions of their stroke, a bolt loosely connecting them together, and a lock fitting in the opening between said two portions, substantially as set forth.

8. In a machine for general forging, the combination of a two-part slide, one portion of which is provided with a recess, the other portion of which is provided with a tongue fitting in said recess, an opening being formed between said two parts at certain portions of their stroke, and a lock fitting in the opening between said two portions, substantially as set forth.

9. In a machine for general forging, the combination, with a stock-gage, of adjusting mechanism for adjusting said gage longitudinally and transversely of said machine, substantially as set forth.

10. In a machine for general forging, a stock-gage consisting in the combination of a standard, a rod having sliding bearing therein, a slotted head secured to said rod, and a second rod depending from the latter, substantially as set forth.

11. In a machine for general forging, the combination, with a two-part slide, a joint-lock, and primary and secondary rocking levers rigidly connected together, of actuating mechanism with which said primary lever engages, substantially as set forth.

12. In a machine for general forging, the combination of a two-part slide, a joint-lock, primary and secondary rocking levers rigidly connected together, and a rotary cam engaging with the primary lever, substantially as set forth.

13. In a machine for general forging, the combination of a two-part slide, a lock, a ratchet-wheel and cam rigidly connected, and mechanism adapted partially to rotate said ratchet-wheel at will, substantially as set forth.

14. In a machine for general forging, the combination of a two-part slide, locking mechanism, a cam-wheel, intermediate mechanism connecting the two latter, a ratchet-wheel and pawl, said ratchet-wheel and cam rigidly connected, and actuating mechanism engaging with said ratchet-wheel at the will of the operator, substantially as set forth.

15. In a machine for general forging, the combination of a two-part slide, a joint-lock, primary and secondary rocking levers rigidly connected together, a rotary cam engaging with the former, and mechanism adapted to rotate said cam, whereby said primary lever is raised and lowered as it respectively engages with the swell and depressed portions of said cam, substantially as set forth.

16. In a machine for general forging, the combination of a two-part slide, locking mechanism, primary and secondary rocking levers connected together, a ratchet-wheel, intermediate mechanism connecting said ratchet-wheel with said primary lever, and lever mechanism engaging with said ratchet-wheel at the will of the operator, substantially as set forth.

17. In a machine for general forging, the combination of a two-part slide, locking mechanism, primary and secondary rocking levers connected together, a ratchet-wheel provided

on its side face with a pin, intermediate mechanism connecting said ratchet-wheel with said primary lever, and lever mechanism engaging with said pin at the will of the operator, substantially as set forth.

18. In a machine for general forging, the combination of a lock-bracket secured to a slide, a lock having bearing in said bracket, a lever engaging with said lock, and actuating mechanism for raising and lowering said lever, substantially as set forth.

19. In a machine for general forging, the combination of a shaft, primary and secondary levers rigid therewith, a lock having engagement with said primary lever, a cam having engagement with said secondary lever, and actuating mechanism rotating said cam, substantially as set forth.

20. In a machine for general forging, the combination of a driving-shaft, a pitman journaled thereon, a secondary shaft, a cam and ratchet-wheel rigid thereon, a pawl-arm journaled on said shaft and having a pawl engaging with said ratchet, and mechanism connecting said pitman and pawl-arm, substantially as set forth.

21. In a machine for general forging, the combination of a die-block provided with a shoulder, a slide provided with an opening, a die-block fitting therein, a bar extending across the face of said die-block, and mechanism connecting said bar and shoulder, whereby the die-block is held rigidly in position, substantially as set forth.

In testimony that I claim the foregoing to be my invention I have hereunto set my hand this 14th day of July, A. D. 1887.

JOHN R. BLAKESLEE.

Witnesses:
E. J. CLIMO,
J. B. FAY.