

(No Model.)

3 Sheets—Sheet 1.

E. J. GEISSINGER.
METAL BENDING MACHINE.

No. 520,262.

Patented May 22, 1894.

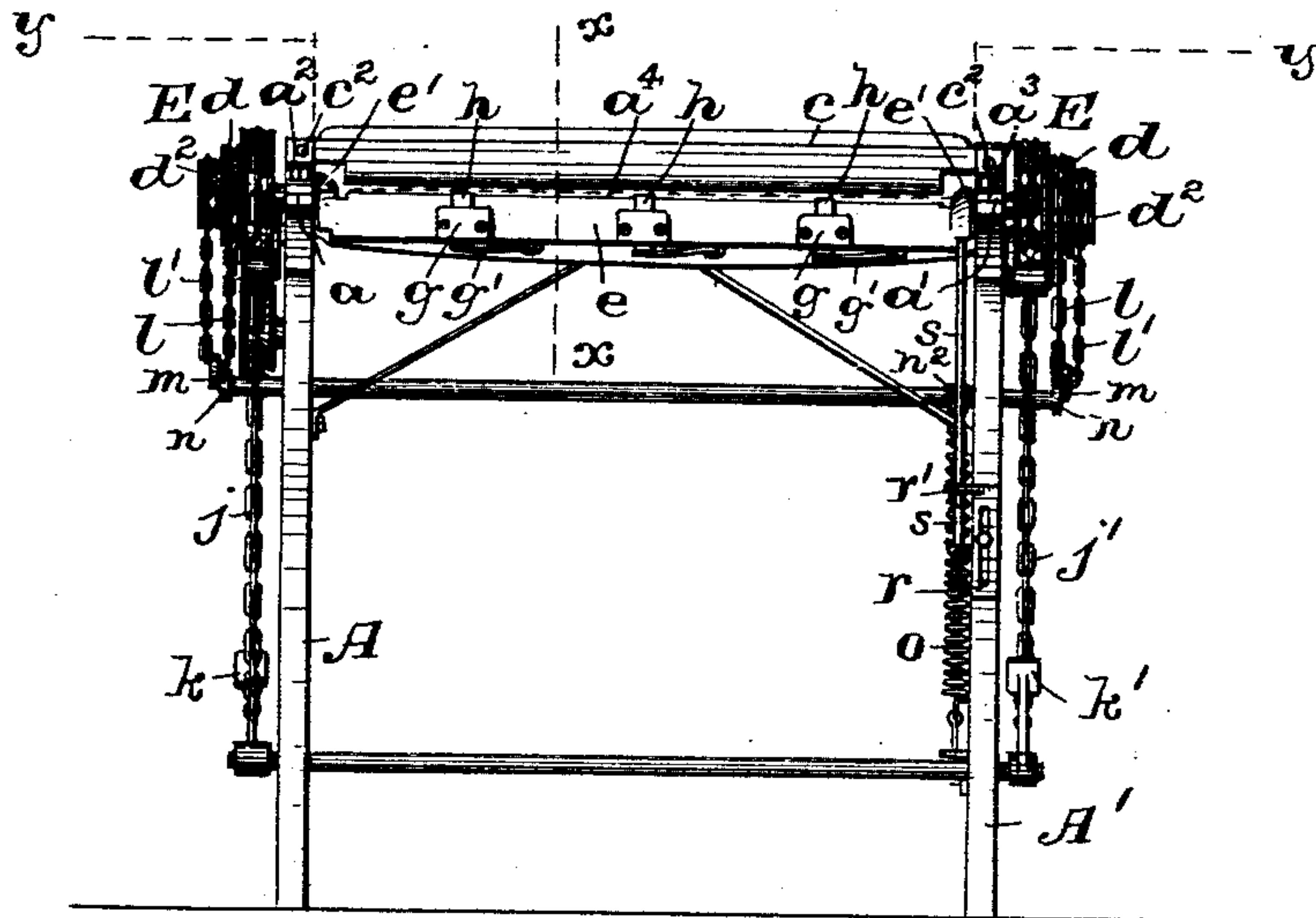


Fig. 1

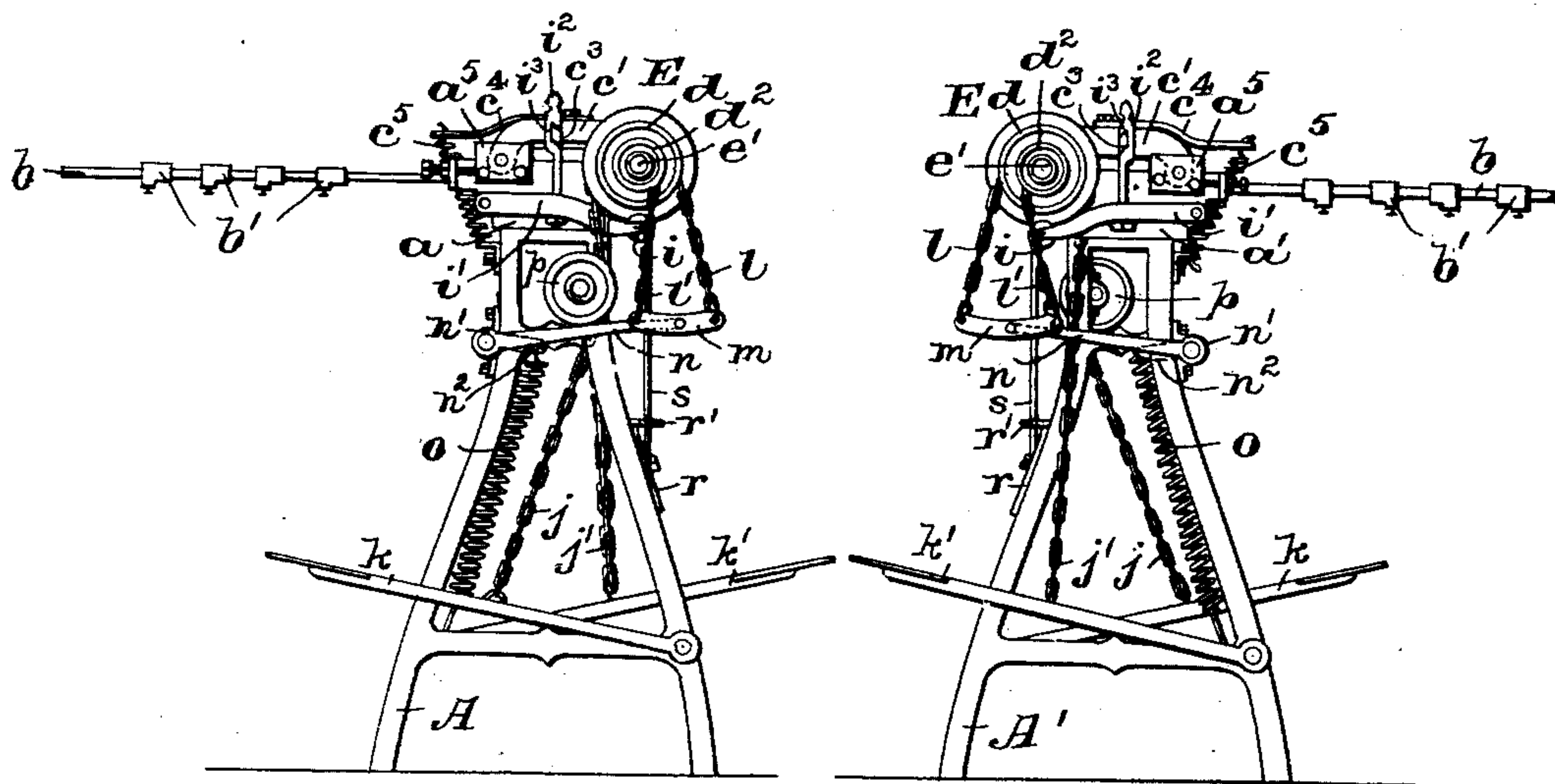


Fig. 2

Fig. 3

WITNESSES:

Wm. H. Campfield, Jr.
H. W. Marsh.

INVENTOR:

E. J. Geissinger,
BY Fred C. Fraentzel, ATT'Y.

(No Model.)

3 Sheets—Sheet 2.

E. J. GEISSINGER.
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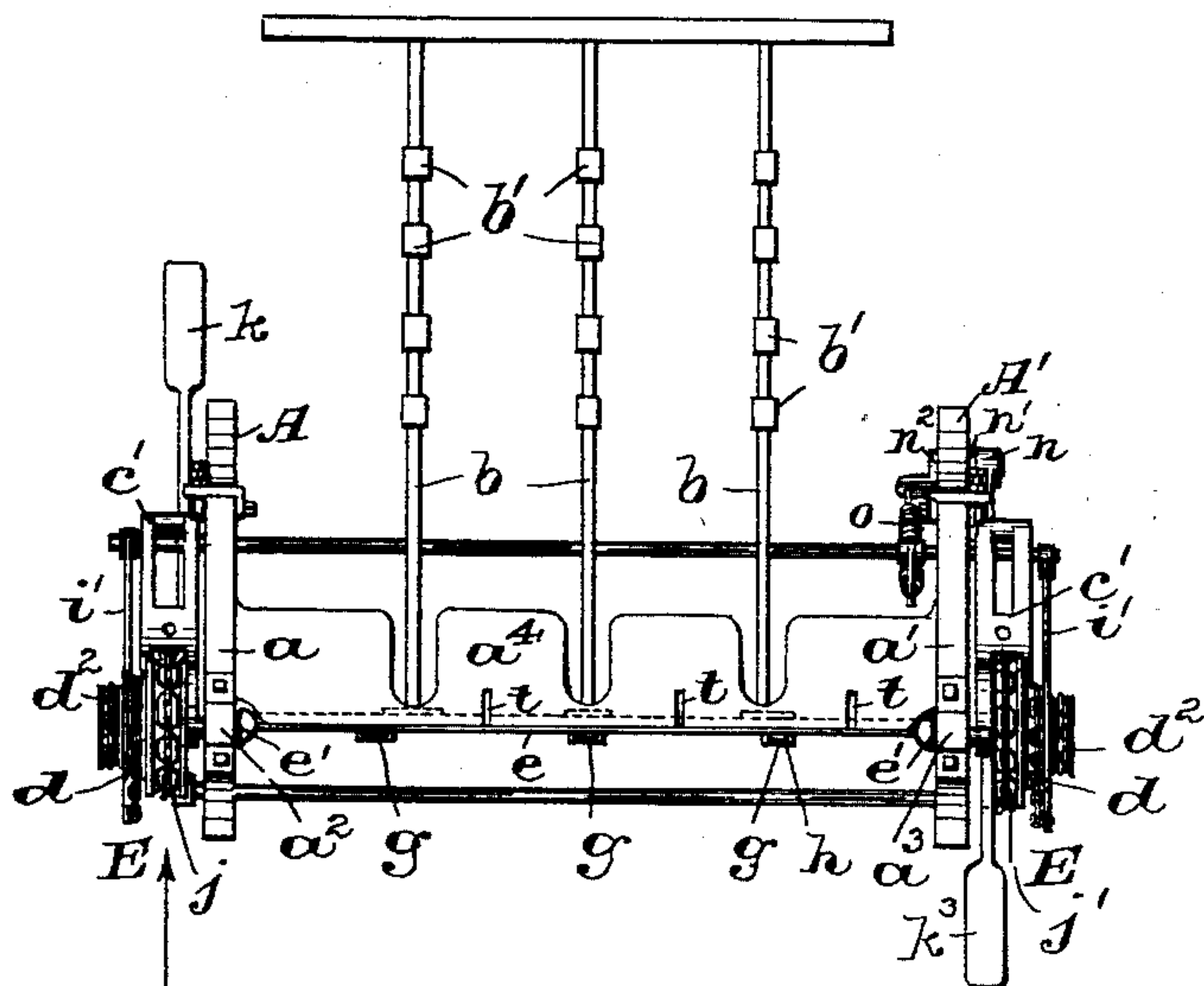


Fig. 4

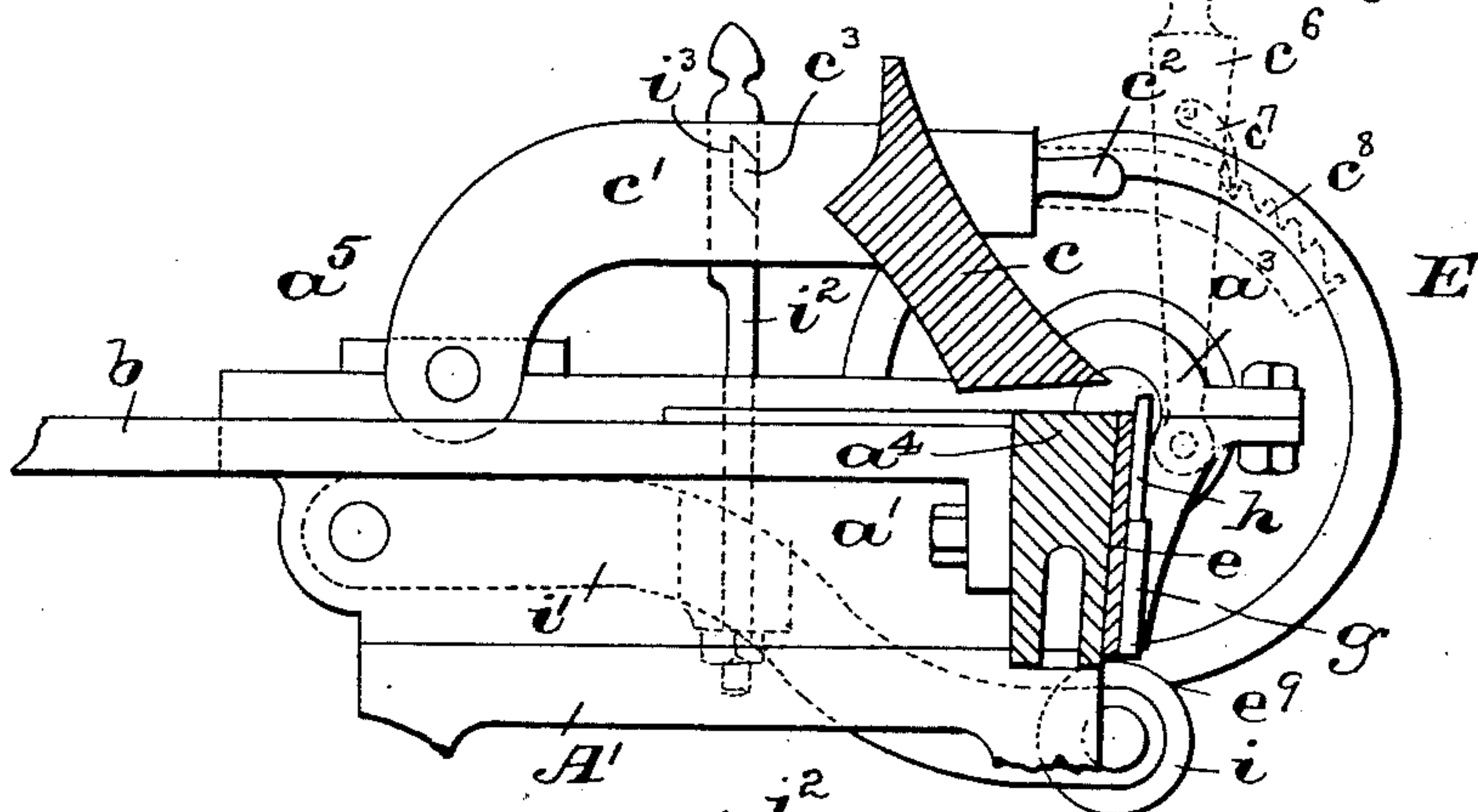


Fig. 5

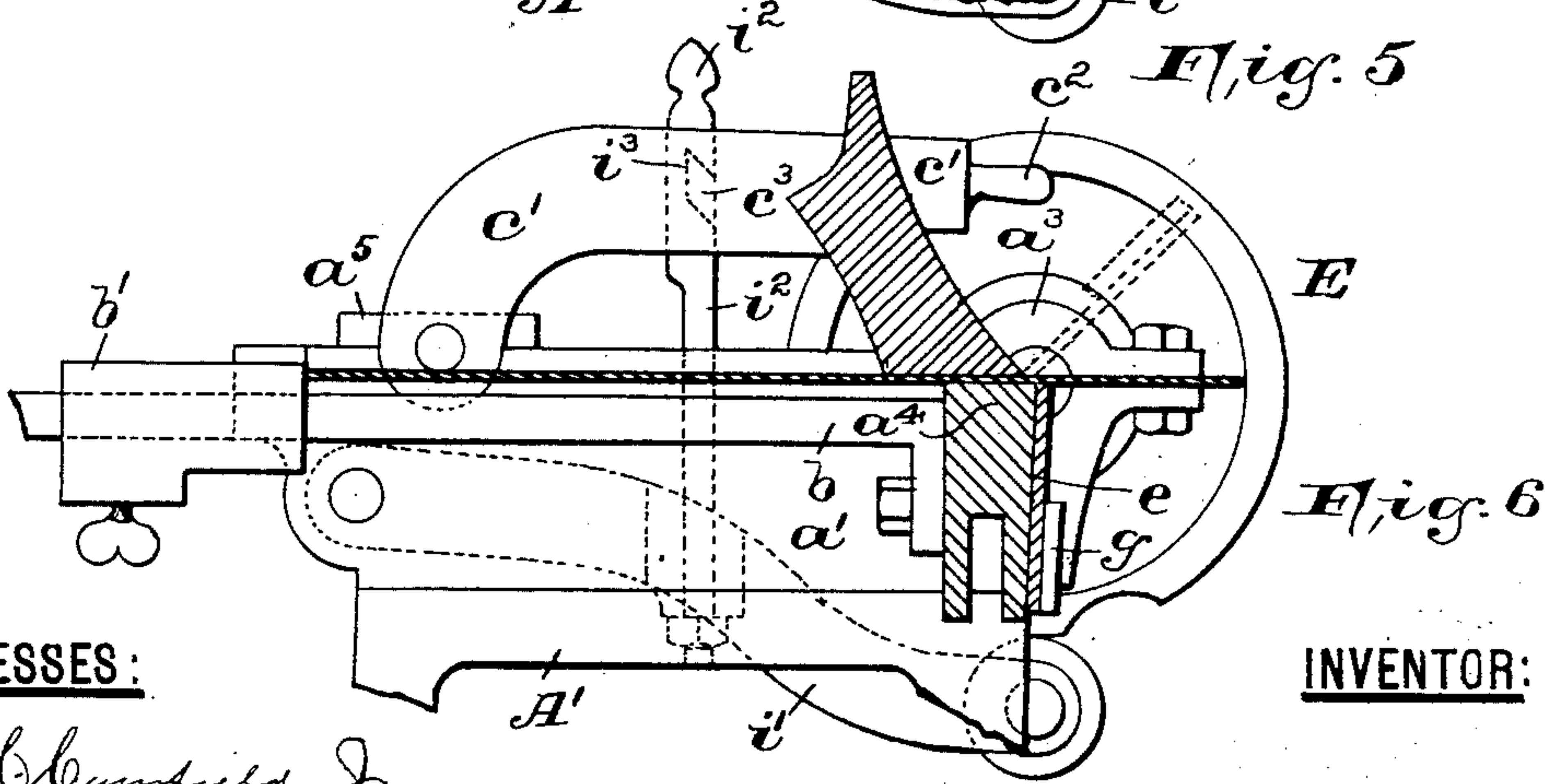


Fig. 6

WITNESSES:

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H. W. Marsh.

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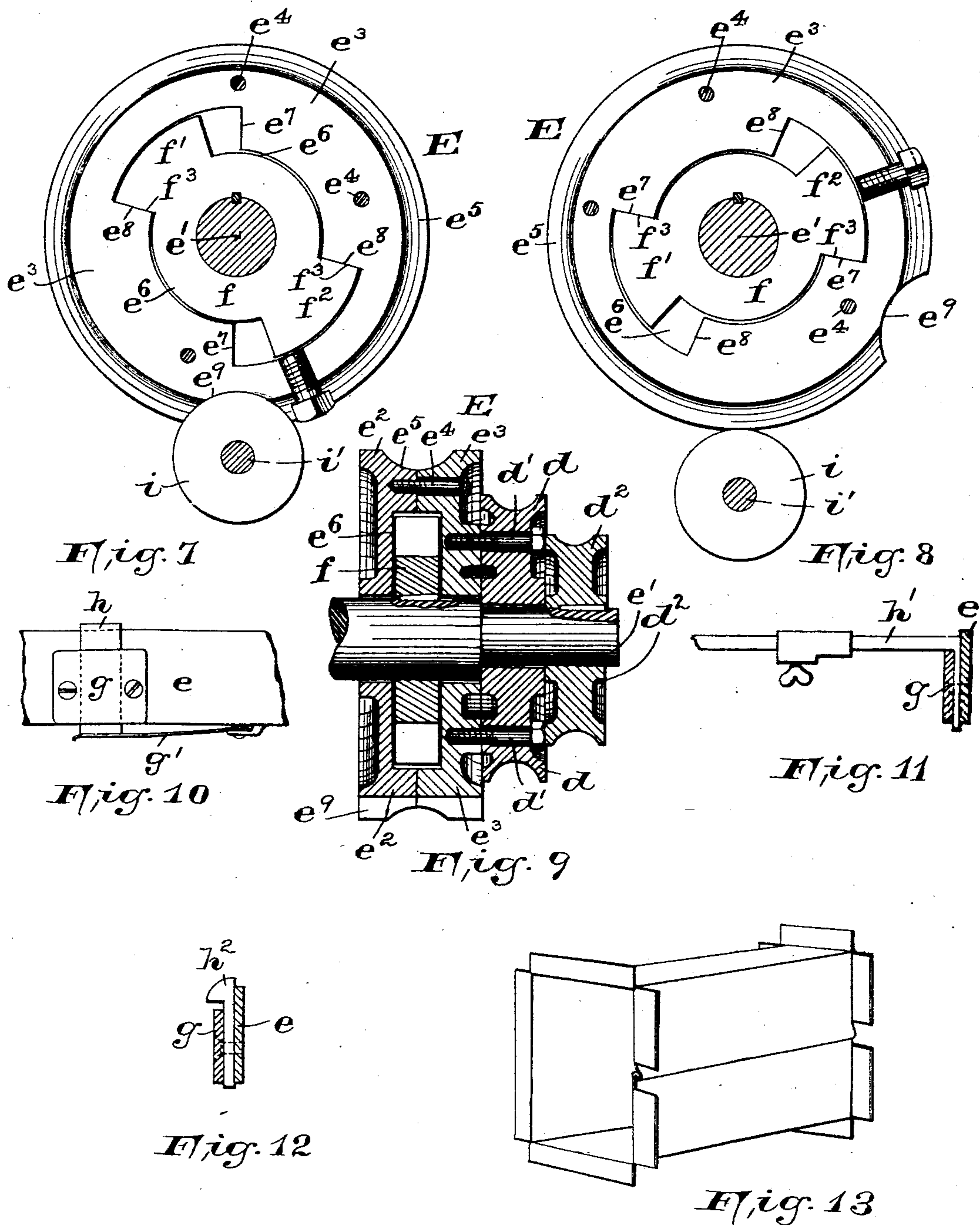
(No Model.)

3 Sheets—Sheet 3.

E. J. GEISSINGER.
METAL BENDING MACHINE.

No. 520,262.

Patented May 22, 1894.



WITNESSES:

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H. W. Marsh.

INVENTOR:

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UNITED STATES PATENT OFFICE.

EDWARD J. GEISSINGER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR
OF ONE-HALF TO THE GEORGE A. OHL & COMPANY, OF NEWARK, NEW
JERSEY.

METAL-BENDING MACHINE.

SPECIFICATION forming part of Letters Patent No. 520,262, dated May 22, 1894.

Application filed July 7, 1893. Serial No. 479,785. (No model.)

To all whom it may concern:

Be it known that I, EDWARD J. GEISSINGER, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Metal-Bending Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters of reference marked thereon, which form a part of this specification.

The purpose of this invention is to provide a machine for the bending of sheet metal, and has for its primary object to provide a machine of the class in which the sheet metal fed into the machine by the operator is first clamped or held fast on the bed of the machine previous to the bending process, the machine being provided with means for automatically operating a turning leaf or bar for bending the metal, said operations of first clamping or holding the sheet metal and then bending it into any desired shape, following consecutively without removing the sheet metal from the machine, it being desirable however, that a short time should elapse between said holding down operation and the bending down operation when the machine does no work, certain parts of the machine being brought into their proper operative positions for acting upon the metal sheet and to properly bend the same into the desired shape. In machines of this class as heretofore made, and which have been commonly termed "cornice bending machines," the clamping leaf or bar and the turning leaf or bar work or operate simultaneously, which, although perfectly feasible and produces the desired end, necessitates greater power to operate the several parts of the machine. In my present form of machine this objection has been overcome, there being less power required, owing to the fact that the operations of the several devices embodied in my machine all operate in a consecutive manner and therefore the force expended in doing the

work of bending the metal is not all required at one time.

My invention therefore consists in means for moving a clamping leaf or bar down upon the bed of the machine, the same means also operating to bring the turning leaf or bar against the edge of the previously clamped metal sheet, whereby the same means cause the operations of both said clamping leaf or bar and that of the turning leaf or bar, not simultaneously as heretofore, but in a consecutive manner.

The invention is further designed to employ in connection with the turning leaf or bar, sockets, in which may be removably placed suitable formers of various patterns, which operate in conjunction with said clamping leaf or bar to bend the metal into a desired shape.

The invention further consists in certain other novel arrangements and combinations of parts, such as will be more fully described hereinafter and as finally embodied in the clauses of the claim.

The form of construction selected to embody the invention in an operative machine is illustrated in the accompanying sheets of drawings, in which—

Figure 1 is a front view of my novel form of sheet metal bending machine. Figs. 2 and 3 are the two end views of the machine and Fig. 4 is a horizontal section of the machine, taken on line *y* in Fig. 1, the view clearly showing the bed of the machine in plan. Fig. 5 is an enlarged vertical section taken on line *x* in Fig. 1, clearly illustrating the normal and inoperative positions of the clamping leaf or bar and the turning leaf or bar; and Fig. 6 is a similar view of the parts illustrated in said Fig. 5, with a piece of sheet metal placed in the machine, the clamping leaf or bar having been brought down to clamp the metal sheet previous to the operation of the turning leaf or bar, which is still in its normal inoperative position. Fig. 7 is a detail view of a clutch wheel employed in connection with said turning leaf or bar, said view representing a sectional view of said wheel, to clearly show the arrangement and workings of the inner mech-

anism of said wheel, when in its normal in-operative position; and Fig. 8 is a like view of said parts in their operative positions. Fig. 9 is a longitudinal section of said wheel and a pair of auxiliary wheels connected with said clutch wheel, to more clearly show the arrangement of said wheels on the turning leaf pintles or journal pins. Fig. 10 is a detail view of one of the sockets employed in connection with the turning leaf or bar and a spring-actuated stop bar arranged therein, and Figs. 11 and 12 are detail views of a gage and a former respectively, which may be used in connection with said sockets on the turning leaf. Fig. 13 is a perspective view of one form of a sheet metal article formed on the machine herein set forth.

Similar letters of reference are employed in each of the above described views, to indicate corresponding parts.

Before describing the construction and operation of the machine, it must be stated, that the machine is well adapted for the bending or forming of sheet metal into various shapes, and is well adapted for the forming of sheet metal cornices, as well as the sheet metal article illustrated in said Fig. 13.

The construction and operation of the sheet metal bending machine will now be described, in order that a more complete understanding may be had of the relation of the several operative devices shown in the drawings. The machine consists essentially of two main frame-supports A and A', which are preferably formed as illustrated in Figs. 1, 2, 3 and 4, and upon which are arranged the heads a and a'. Each of which is provided with a journal bearing a² and a³ respectively, and connecting said heads is a bed a⁴ of the machine. Said bed is preferably formed as illustrated in Fig. 4, and is preferably provided with supporting arms b upon which may be placed any suitable number of adjustable gage stops b'. The clamping leaf or bar c is provided at its ends with suitable arms c', preferably provided with a hand-piece or lifting piece c². Said arms c' are pivoted in bearing a⁵ on said heads a and a', as will be seen more especially from Figs. 5 and 6. Each arm c' is provided on the side thereof with a lug or stop c³, the purpose of which will be described hereinafter. The turning leaf or bar e at the front of the machine is provided with suitable journal pins or pintles e', which are arranged to rotate in said bearings a² and a³, said pins projecting beyond said bearings and having on their free ends the clutch wheels E, as will be seen from said Figs. 1 to 4 inclusive. The turning leaf or bar e, which may be of any suitable form in cross-section, is provided in the front with any desirable number of sockets g, and beneath each socket may be arranged a suitable spring g' upon which is supported a stop-piece h, as illustrated in Figs. 1, and 10, or a support h', as illustrated in Fig. 11, or a former h² of any desired shape or pattern, as illustrated in Fig. 12.

The means for operating the clamping leaf or bar c and then the turning leaf or bar e consecutively, consists substantially of the clutch-wheels E arranged on said journal pins e'. Said wheels E, of which there may be two, one on each side of the machine, (but only one may be used, if desired,) consist, as will be seen from Figs. 7, 8 and 9, of two half-sections e² and e³. Said half-sections when bolted together by means of screws or bolts e⁴, are formed with a peripheral groove e⁵ and a chamber e⁶, which is formed with the edges e⁷ and e⁸, substantially as shown. Within said chamber e⁶ and securely keyed on the journal pin or pintle e' is a clutch device f which is of an outline corresponding to that of the chamber e⁶, but its end-portions f' and f² are smaller than the space between the edges e⁷ and e⁸, whereby said half-sections e² and e³ are capable of a movement when the machine is operated, before their edges e⁷ come in contact with the edges f³, and thereby operate the journal pins e' and hence the turning leaf or bar e. As will be seen more especially from Fig. 9, secured to said half-section e³ of the wheel E, by means of screws or pins d' is a grooved wheel d, and keyed on the end of the journal pin e' is another and smaller wheel d². The action of said wheel d² is independent from the action of the wheel d, as will be described farther on. As will be seen from the several figures of the drawings, said half-sections e² and e³ forming the wheels E, are each provided with a recess e⁹ which is arc-shaped, and into which normally fits a wheel i rotatively arranged on an arm i' pivotally connected on each side of the machine to said heads a and a' hereinabove mentioned. Each arm i' is provided with an upright i² which has a cut-away portion i³ fitting over said lug or stop c³ on each arm c' of the clamping leaf or bar c. Of course, other means may be devised for connecting these parts instead of those herein shown. From the back of each of said pivoted arms c' extend the short arms c⁴, to the ends of which are connected suitable springs c⁵, which are also attached to the frames of the machine. By this means, said wheels i will be normally held in the recesses e⁹ of the clutch-wheels E and the clamping leaf or bar c will be held in its raised and inoperative position, as will be clearly evident from Figs. 2, 3 and 5. Said half sections e² and e³ forming the wheels E are operatively connected by means of chains j and j', or the equivalent thereof, to the operating treadles k and k' at either side of the machine, while the wheels d and d² are similarly connected by means of chains l and l', or their equivalent, to the ends of a small rocker arm m pivotally attached to the end of the lever n, which is also pivoted in a bearing n' on the frame of the machine. Said levers n, of which there may be one on each side of the machine, are provided with suitable arms n², see Figs. 2 and 3, to the ends of which are connected the ends

of suitable springs o , the other ends of the said springs being secured to the frame of the machine. Each chain j and j' is connected with the treadles k and k' respectively therefore and may be passed over an idle pulley p rotatively arranged on the frame of the machine.

The operation of the machine in bending sheets of metal for the purposes desired, is as follows:—A piece of sheet metal is fed into the machine, either from the front or back of the machine, as may be most convenient to the purposes required, and the edge of the metal sheet is brought up against one of the stop-gages herein-above mentioned. The operator places his foot on either treadle k or k' and presses the same down. Said treadles will pull on the chains j and j' and cause the rotary motion of the half-sections e^2 and e^3 and the wheel d in the direction indicated by the arrow in Fig. 7. During this time the half-sections have moved forward until their edges e^7 in the chamber e^6 have come in contact with the edges f^3 of the clutch device f . In the meantime, the small wheel i has been forced out of the recess e^9 , which brings the arms i' down, while the uprights i^2 pull on the lugs c^3 on the sides of the pivoted arms c' carrying the clamping leaf or bar c . By this action said clamping leaf or bar is firmly brought down upon the metal sheet, as will be seen from Fig. 6, causing the spring c^4 to be pulled taut. During all this time the turning leaf or bar e has remained inoperative, but the edges e^7 of the chamber e^6 formed by the half-sections e^2 and e^3 , now having come in contact with the edges f^3 of the clutch-devices f keyed to the journal pins e' of the turning leaf or bar e , will cause the rotation of said journal pins e' and with it the wheel d^2 , as well as the other parts of the clutch-wheels E , to the positions indicated more especially in Fig. 8, thereby bringing the turning leaf or bar e to its raised position, as indicated in dotted outline in Fig. 6, and bending the metal into the desired shape. This action has caused the chains l and l' to be partially wound upon the wheels d and d^2 and the levers n to be raised. Said levers n being raised, will also cause the lifting of the short arm n^2 , whereby the spring o is stretched. After the bend in the sheet metal has been formed and the metal sheet is adjusted to receive another bend, or is removed from the machine, as the case may be, the foot of the operator is taken from the treadle and the springs c^4 and o cause the return of the several operating devices to their normal inoperative positions, ready for another complete operation of clamping and then bending the sheet of metal.

In Figs. 1, 2 and 3, I have shown an adjustable plate r arranged in sliding contact with one of the frame-legs of the machine. Through an eye r' formed on said plate is passed a rod s , which is pivotally connected to the end of the turning leaf or bar e , where-

by the rotative movement of said turning leaf or bar can be regulated and limited, as will be clearly understood.

In the present drawings of the herein described machine, I have shown a set of operating clutch-wheels E , operating treadles and operative connections between said parts, on each side of the machine; but one of said sets of mechanism may be dispensed with and the machine will still be operative.

The machine can be operated from either side and by placing the supports h' in the sockets g , in place of the stops h , a support for the sheet metal is formed on both sides of the machine, whereby the machine is readily adapted for different classes of work. Said supports h' may also be removed from the sockets g and formers h^2 of any desirable shape or pattern may be placed in the sockets, whereby the machine is especially adapted for bending sheet metal into cornices or other like articles.

In some cases the machine is to be used for bending sheet metal into the form illustrated in Fig. 13, in which case the article to be formed is previously formed on the same machine with small flanges projecting at right angles, or approximately so to form the edges of the article. In order that the sheet metal article, when thus provided with these flanges, may be bent into the shape shown in said Fig. 13, the turning leaf or bar c and the bed of the machine are provided with suitable recesses or slots t , as will be seen from Fig. 4, into which said flanges are placed and the operation of bending the sheet metal can be successfully completed without disturbing or jamming said flanges out of position.

It will be understood that many variations of constructions and arrangements of the various parts herein described may be made without departing from the scope of my invention. Hence, I do not wish to be limited to the exact forms of mechanism herein shown and described. For instance, the clutch wheels E and the wheels d and d^2 can be differently arranged and each worked independent of the other, and the machine still be operative, and other changes may be made in other parts of the mechanism of the machine. The essential feature of my machine is therefore, a downwardly moving clamping leaf or bar and a turning leaf or bar, and an operative means for causing the operative working of each independent from the other and in a consecutive manner, and not simultaneously one with the other, as in machines of this class as heretofore made.

In some instances, I may provide the clamping or top leaf c with a suitably notched arm c^8 and upon the bed of the machine I pivotally attach a lever c^6 provided with a dog or pawl c^7 , which is adapted to come in holding contact with either of the notches in said arm c^8 . This arrangement can be used as a closing down handle by pulling on the lever c^6 , whereby the clamping leaf or bar can be firmly

locked in its clamping position upon the metal placed in the machine, as will be clearly understood from an inspection of Fig. 5 of the drawings.

5 Having thus described my invention, what I claim is—

1. In a machine for bending sheet metal, the combination, of a clamping leaf or bar, pivotally arranged in the frame of the machine to clamp a piece of sheet metal, a turning leaf or bar provided with journal pins arranged in bearings on the frame of the machine, adapted to be turned against said piece of sheet metal, and means on said journal pins to work said clamping leaf or bar and also said turning leaf or bar, to cause said operations of the clamping leaf or bar and said turning leaf or bar, to follow consecutively without removing the metal sheet from the machine, for the purposes set forth.

2. In a machine for bending sheet metal, the combination, of a clamping leaf or bar, pivotally arranged in the frame of the machine to clamp a piece of sheet metal, a turning leaf or bar provided with journal pins arranged in bearings on the frame of the machine, adapted to be turned against said piece of sheet metal, and means, consisting essentially of a clutch wheel or wheels *E* arranged on the ends of said journal pins on the turning leaf or bar, and means operated by said clutch wheels *E* for causing the clamping action of said clamping leaf or bar and that of the turning leaf or bar, whereby the action of said clamping leaf or bar and that of the turning leaf or bar follow consecutively without removing the metal sheet from the machine, for the purposes set forth.

3. In a machine for bending sheet metal, the combination of a clamping leaf or bar pivotally arranged in the frame of the machine, to clamp a piece of sheet metal, a turning leaf or bar provided with journal pins arranged in bearings on the frame of the machine, adapted to be turned against said piece of sheet metal, and means, consisting essentially of a clutch-wheel or wheels *E* arranged on the ends of said journal pins on the turning leaf or bar, said clutch-wheel having an arc-shaped recess in its periphery, a wheel *i* in normal engagement with said recess, a lever *i'* pivotally arranged on the frame of the machine, and an upright or rod *i²* connecting said lever *i'* with the pivotally arranged clamping leaf or bar, whereby, the said operations of the clamping leaf or bar and of the turning leaf or bar follow consecutively without removing the metal sheet from the machine, for the purposes set forth.

4. In a sheet metal bending machine, the combination, with a pivoted clamping leaf or bar, and a turning leaf or bar provided with journal pins arranged in bearings in the machine, of a clutch-wheel *E* on one or both of said journal pins, consisting essentially, of half-sections *e²* and *e³*, forming, when secured together, a chamber *e⁶* having edges *e⁷* and *e⁸*,

and a clutch device *f* in said chamber firmly secured on the journal pin and having portions *f'* and *f²* and edges *f³* adapted to engage with said edges *e⁷*, means connecting said clutch wheel with said clamping leaf or bar, and mechanism for operating said clutch-wheel, whereby the operations of said clamping leaf or bar and that of the turning leaf or bar follow consecutively without removing the metal sheet from the machine, substantially as and for the purposes set forth.

5. In a sheet metal bending machine, the combination, with a pivoted clamping leaf or bar, and a turning leaf or bar provided with journal pins arranged in bearings in the machine, of a clutch-wheel *E* on one or both of said journal pins, consisting essentially of half-sections *e²* and *e³*, forming, when secured together, a chamber *e⁶* having edges *e⁷* and *e⁸*, and a clutch device *f* in said chamber firmly secured on the journal pin and having portions *f'* and *f²* and edges *f³* adapted to engage with said edges *e⁷*, an arc-shaped recess in the periphery of the wheel *E*, a wheel *i* in normal engagement with said recess, a lever *i'* pivotally arranged on the frame of the machine, and an upright or rod *i²* connecting said lever *i'* with the pivotally arranged clamping bar or leaf, and mechanism for operating said clutch-wheel, whereby, said operations of the clamping leaf or bar and that of the turning leaf or bar follow consecutively without removing the metal sheet from the machine, substantially as and for the purposes set forth.

6. In a machine for bending sheet metal, in combination, the herein described clutch-wheel *E* and the wheels *d* and *d²*, of a treadle and a chain, connecting said treadle with the clutch-wheel to operate the same, a pivoted lever *n*, and chains, connecting said lever with said wheels *d* and *d²*, an arm *n²* connected with said lever *n*, and a spring *o*, all arranged, substantially as and for the purposes set forth.

7. In a machine for bending sheet metal, in combination, the herein described clutch-wheel *E* and the wheels *d* and *d²*, of a treadle and a chain, connecting said treadle with the clutch-wheel to operate the same, a pivoted lever *n*, a rocker bar *m* on said lever, and chains, connecting the ends of said rocker bar with said wheels *d* and *d²*, an arm *n²* connected with said lever *n*, and a spring *o*, all arranged, substantially as and for the purposes set forth.

8. In a sheet metal bending machine, in combination, a clamping leaf or bar, and a turning leaf or bar, a clutch-wheel *E* connected with said turning leaf or bar, consisting of hollow sections secured together and forming a chamber *e⁶* having edges *e⁷* and *e⁸*, and a clutch device *f* corresponding in outline to the outline of said chamber, but being smaller, and having edges *f³* adapted to be brought into engagement with said edges *e⁷*, substantially as and for the purposes set forth.

9. In a sheet metal bending machine, in combination, with a clutch wheel E and means for operating the same, of a clamping leaf or bar *c* having arms *c'* and bearings in which
5 said arms are pivoted, arms *i'* and rods *i²* connecting said arms *i'* with said arms *c'*, whereby, when said arms *i'* are operated, said clamping leaf or bar is brought down upon the metal sheet, substantially as and for the
10 purposes set forth.

10. In a sheet metal machine, the combination, of the bed *a⁴* of the machine, a clamping leaf or bar and a turning leaf or bar, both arranged to turn in bearings in said bed, a
15 treadle, means connected with said treadle for operating said clamping leaf or bar and said turning leaf or bar, rods *b* secured on said bed *a⁴* and extending rearwardly therefrom, and gages arranged to slide on said
20 rods *b*, substantially as and for the purposes set forth.

11. In a sheet metal bending machine, the turning leaf or bar *e*, sockets *g* arranged on said turning leaf or bar, and a spring beneath
25 each socket, substantially as and for the purposes set forth.

12. In a sheet metal bending machine, in

combination, a turning leaf or bar, and the frame of the machine, an adjustable plate *r*, and a rod *s* connected with said plate and
30 said turning leaf or bar to limit the turning movement of said leaf or bar, substantially as and for the purposes set forth.

13. In a sheet metal bending machine, in combination, with the bed of the machine,
35 and a clamping leaf or bar arranged on said bed, a locking device connected with said bed and clamping leaf or bar, to hold the latter in its clamping position, said locking device consisting essentially, of a notched arm on
40 said clamping leaf or bar, and a lever pivoted to said bed of the machine and the latter provided with a dog or pawl adapted to engage with said notched arm, and mechanism for operating the same, substantially as
45 and for the purposes set forth.

In testimony that I claim the invention set forth above I have hereunto set my hand this 28th day of June, 1893.

EDWARD J. GEISSINGER.

Witnesses:

WM. GREW,

WILLIAM E. TOLAN.