No. 610,231. Patented Sept. 6, 1898.

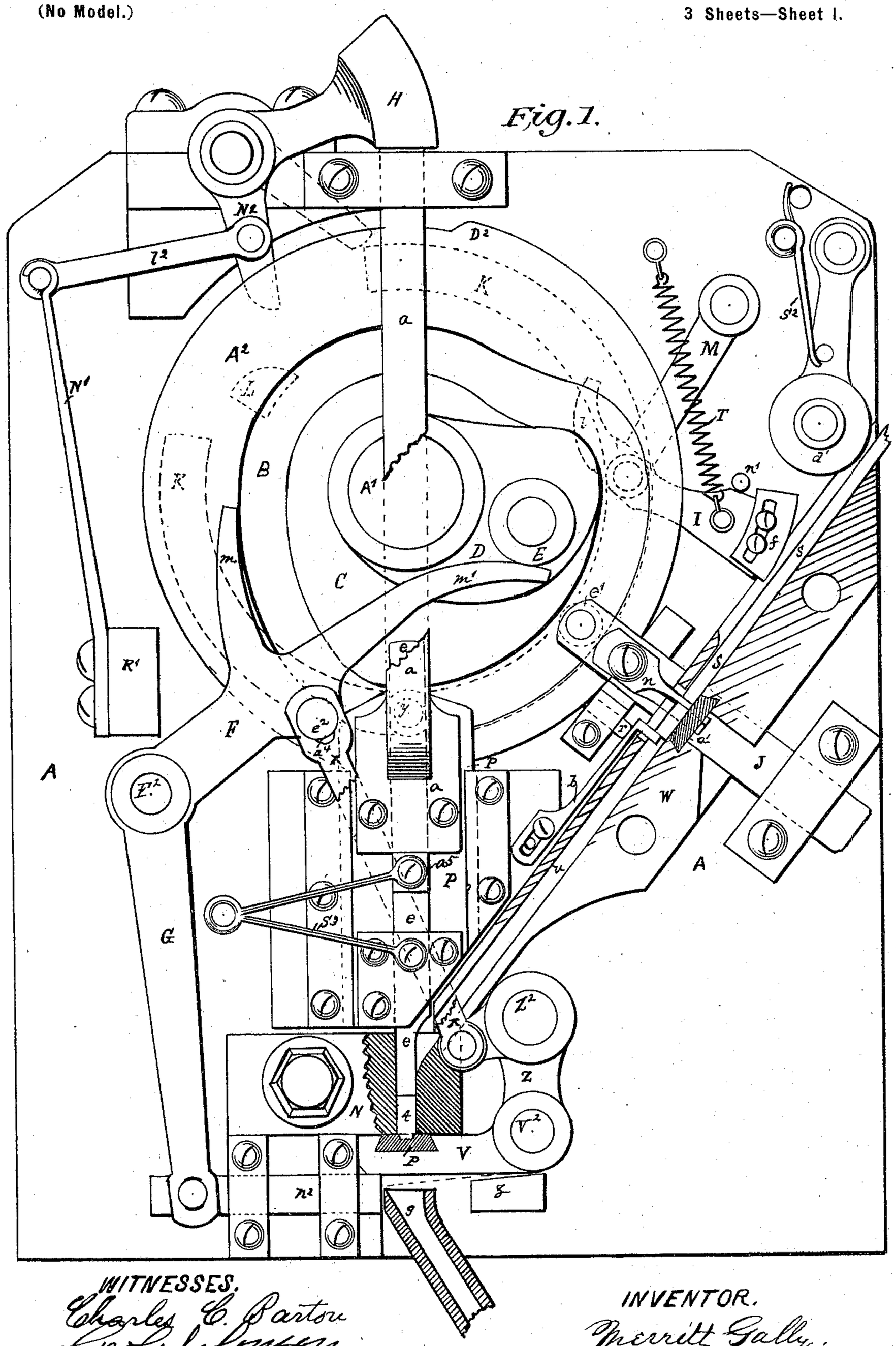
M. GALLY.

TYPE MAKING MACHINE.

(Application filed June 9, 1897.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1.



WITNESSES.

Charles C. Parton

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INVENTOR.

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(No Model.) 3 Sheets—Sheet 2.

Fig. 2.

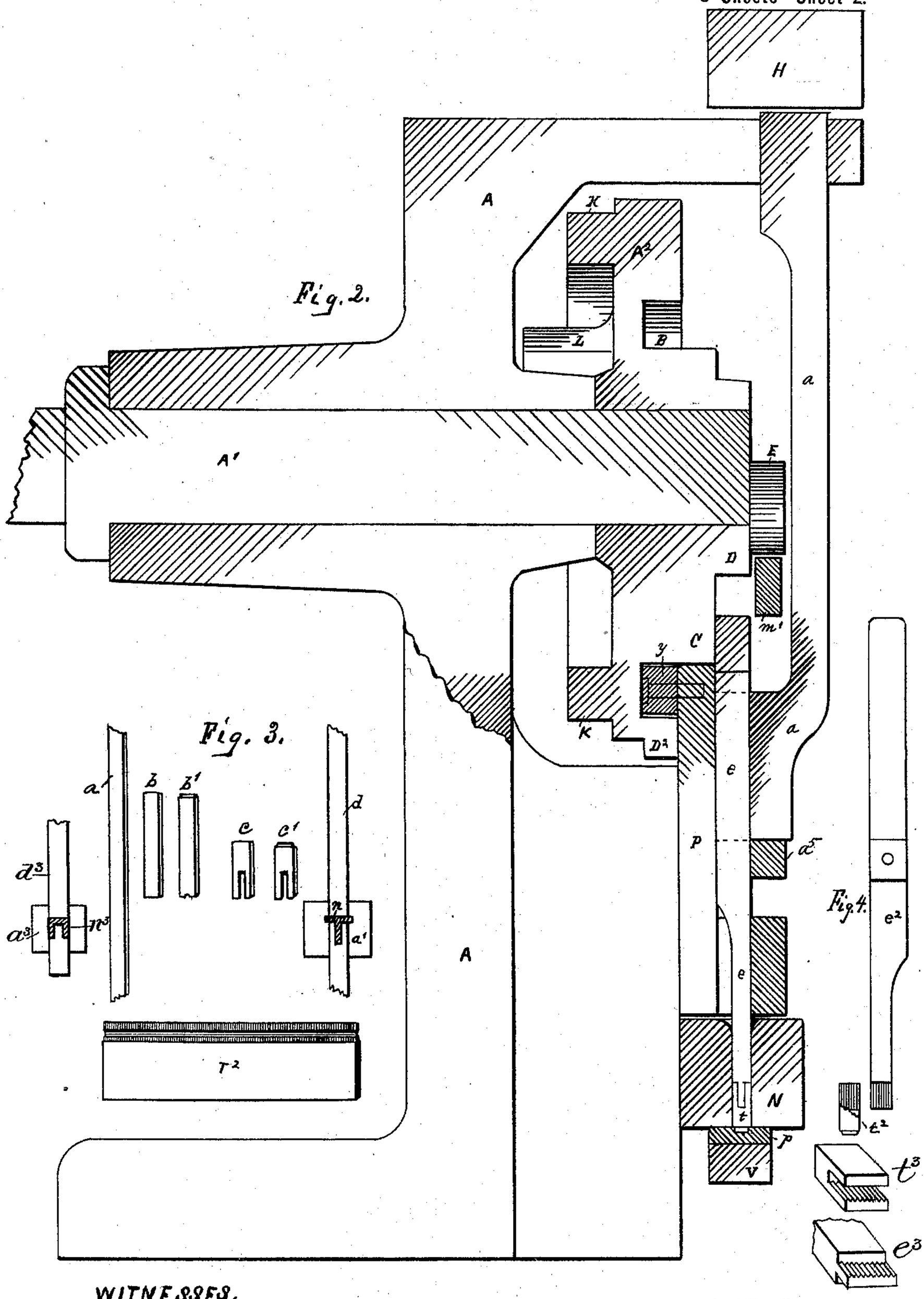

Fig. 3.

Fig. 4.

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(No Model.) 3 Sheets—Sheet 3.

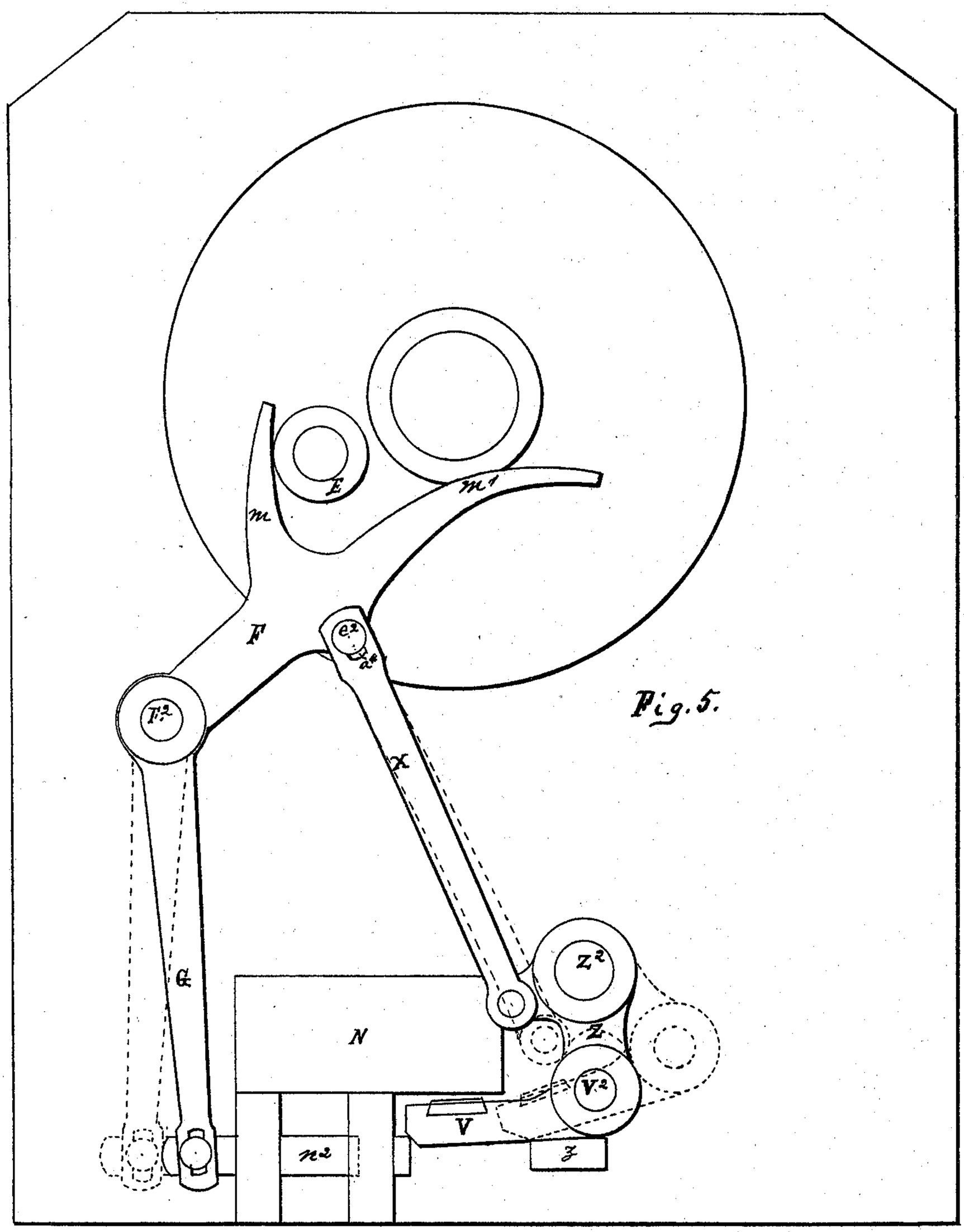

Fig. 5.

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UNITED STATES PATENT OFFICE.

MERRITT GALLY, OF NEW YORK, N. Y.

TYPE-MAKING MACHINE.

SPECIFICATION forming part of Letters Patent No. 610,231, dated September 6, 1898.

Application filed June 9, 1897. Serial No. 639,963. (No model.)

To all whom it may concern:

Be it known that I, MERRITT GALLY, a citizen of the United States, residing at New York, (Brooklyn,) in the county of Kings and State of New York, have invented certain new and useful Improvements in Type-Making, with Apparatus Therefor, of which the following is a specification.

In the accompanying drawings, Figure 1 is a front elevation of a machine for producing swaged types, showing the prepared material from which the types are being swaged, a type in the machine already swaged, and the several parts of the apparatus for doing the work. Fig. 2 is a transverse sectional view of the machine. Fig. 3 shows a piece of the prepared strip of metal to be cut into lengths by the machine, thus forming individual blanks to be swaged into types, an individual blank before swaging, the same after swaging into a type of ordinary length, a blank cut for short-bodied type and a finished short-bodied type fitted for the slug of a type-bar or linotype illustrated in same figure, the die and cutting-tool of the machine for dividing the strip of metal into blanks for the types, the cutting-tool being in cross-section. Fig. 4 is a front view of the swaging-tool, the nib serrated and a short-bodied type partly cut away to show the inner wall serrated by the tool; and Fig. 5 shows detailed parts of the die-carrier mechanism.

The principal parts of the machine, as shown in Fig. 1, are as follows:

A A is the supporting-body or framework.

A′ is the driving-shaft of the machine.

A^2 is a wheel carrying several cams by which a number of the principal movements are produced.

B is a traverse-cam in the wheel which gives movement up and down to the tool-head P, which carries the swaging-tool through a part of its movement to reach the swaging position after the cut blank has dropped to place.

C is that part of the cam which backs up the swaging-tool to produce the initial shaping of the type by pressure.

H is a spring swage-hammer for completing the swaging process by an instantaneous hammer-stroke.

D is a cam for pushing downward the swaging-tool *e* after the die-plate *p* has been withdrawn to force the finished type out of the swage-block N to be received into the raceway *g*.

F is a lever having three lever-arms *m*, *m′*, and G. The arms *m* and *m′* are operated upon by the cam-roller E on the large cam-wheel for operating, through connecting-bar X X, the bell-crank Z, which moves to and from place the die-carrier V, which holds the die-plate *p* for the face of the type. The arm G of lever F has movement for taking to and from position the die-support n^2, the beginning of its movement being initial to that of the carrier V, the upper pivot-bearing of the bar X being slotted to allow this order of movements.

S S is the strip of metal from which the types are to be made, this strip coming from a reel or other suitable support for the supplied stock.

b r is a stop operated at regular intervals by the large cam-wheel to limit the movement of the strip of metal S and gage the length of the blanks to be cut off from the strip by the cutting device J *n a′*.

I *f* is a cam-lever device for moving to cutting position the strip of metal S, the lever-arm *e* being operated by the cam L of the large cam-wheel.

d′ is a pressure-wheel for holding down and straightening the metal strip preparatory to cutting.

N is a swage-block having a cavity corresponding in its lower part to the form of the body of the type to be made, and *p* is a die-plate under the chamber of the swage-block for producing the character or type face.

The movements of the machine are as follows: In its position of rest the swaging-tool *e* is raised to its highest position, just clearing the upper face of the swage-block, the cutting-tool *n* is raised above and free from the strip S, and the hammer H is raised to its highest position, its operating-lever N^2 resting on the cam K, as shown by the dotted lines.

In order to understand the operation of the swaging-tool from the description in connection with the drawings, it will be well to bear in mind the fact that the tool in a single operation has four distinct movements, each movement for a specific and distinct result.

In the construction shown in Fig. 1 the tool-head P has a movement up and down in guideways attached to the framework of the machine, and the swaging-tool *e*, carried by the tool-head, has an independent movement up and down in a covered guideway in the body of the tool-head.

The first movement of the tool *e* downward is produced by the movement of the tool-head P, operated by its thimbled stud *y* in the traverse-camway B. The second movement of the tool is slight, only sufficient for the finish swage-stroke produced by the hammer H striking the upper end of the rod *a*, projecting upward from the tool-head to the hammer and attached firmly to the tool-head. The third movement of the tool *e* is its extended thrust downward when operated upon by the cam D to force the finished type out of the swage-block, the spring S^3 yielding to allow the movement. The fourth movement of tool *e* is its return to first position, produced by means of recoil of spring S^3 and the following action of thimbled stud of tool-head in traverse-camway B.

The first movement of the machine is produced by cam L striking lever end *l* of cam-lever-feeding device I *f* and pushing downward the metal strip S against the stop *r*. The cam C then operates the cutter *n*, cutting off a blank of a proper length for the type to be made, short or long bodied, as the case may be. The stop *r* then moves, relieving the cut-off blank, which slides down the incline *u* into the chamber of the swage-block N. This movement is produced by means of the spring *b*, to which the stop *r* is attached. This spring, being under tension in the position as shown, carries the stop out of the way when the spring is relieved by the movement of its push-pin, which operates in connection with the circumferential cam on the rim of the operating-wheel A and allows the type-blank to slide down the inclined slideway and to drop into the chamber of the swage-block. The tool-head P is then moved downward by the stud, with friction-thimble *y* working in the traverse-cam B till the tool meets the metal blank, and then the cam C presses the tool-head P, with its tool *e*, down powerfully onto the metal blank and gives it the form of the cavity of the swage-block and the intaglio of the die-plate. To complete this result and give to the type a sharpness of face that cannot be produced by simple pressure, the lever N^2 of the swaging-hammer H, which has been riding on cam K with the hammer H raised to a vertical position over its pivoted center, is relieved from the cam K, and, like the movement of a gun-lock, the hammer, by means of the tension of spring N′, acquiring great momentum, gives a forcible instantaneous blow upon the driving-bar *a*, which is connected to the head P with swaging-tool *e*, and completes the type with a smooth finish and sharply-defined face. After the type is thus completed the cam-roller E strikes the lever-arm *m*′, operating arm F, the first part of the movement operating the die-support n^2, withdrawing it from underneath the die-carrier V, while the stud on lever F moves in the slot a^4 of connecting-bar X without moving bell-crank Z. The movement of the bell-crank on its pivot Z^2 then follows after the die has dropped clear from the type-face. The carrier V is pivoted to the bell-crank Z, and after dropping to its stop-support *z* is carried by a sliding movement out of the way of the type by movement of the bell-crank Z to allow the type to fall into the raceway *g*. The cam D of the large wheel then meets the upper end of the swaging-tool *e*, and, driving it downward against the tension of the spring S^3, thus forces the finished type out of the chamber of the swage-block, when it drops into the raceway *g* below. The swaging-tool *e* slides in a slideway in the tool-head P, being confined therein by the cap *a*, the tool *e* being limited in its upward movement within the tool-head by the lug a^5 and supported by the spring S^3, one end of the spring being fastened to the lug a^5, attached to the tool, and the other to a cap which forms a part of the tool-head P and therefore moves therewith. After the finished type has been dropped into the raceway *g* the roller E strikes the lever-arm *m*, returns the die *p* and its support n^2 to place without collision of carrier with support n^2, as the die-carrier V when drawn away from the position of its first drop assumes a horizontal position, resting on the horizontal plane of support *z*, and so remains through a part of its return movement. The corner of the carrier is beveled, acting as a cam, under which the corner of the support n^2 slides in completing its return movement. The swaging-hammer then rises to its highest position, the swaging-tool *e* rises, the cutting-tool *n* takes its place free from and above the metal strip by the action of the traverse-cam B on roller *e*′, and the machine is ready to repeat its operations.

In Fig. 2 the machine is represented with its principal working parts in transverse section, showing the different vertical lines in which the several cams of the large cam-wheel, the tool-head P, the swaging-tool *e*, the cam-lever *m* and operating-roller E, swaging-hammer H, and upright bar *a* operate.

The type *t* (shown in the swage-block N in Fig. 2) is a short-bodied type (shown also at t^2, Fig. 4) constructed to be used in connection with the slug T^2, Fig. 3, for a linotype or type-bar. Although the machine is intended also to be used in making types of full-length body it is especially adapted to the making of short-bodied types for the purpose mentioned, as a single machine is able to produce, in connection with a linotype-machine, types in sufficient quantity to supply the linotype-machine in numbers of types for all characters required.

The swaging-tool *e* of the machine is arranged to be removable from the machine and

interchangeable with others, each adapted to the form of type-body to be made, whether the ordinary type end or in shape for type-bar or other purpose. The swaging-tool *e* in the machine is shown as forming a type for a rabbeted swage-locked type-bar.

In Fig. 4 the nib of the swaging-tool e^2 has its face finely serrated to produce a serrated surface on the inner surface of the forked type-body t^2, as shown enlarged at e^3 t^3. The purpose of this is to cause the types when connected to the bar T^2, Fig. 3, to hold firmly without possibility of endwise movement.

When the metal from which the types are made and that of the slug T^2 are of the same kind, it is necessary to make the serrated face in the forked type, while the counter-face of the slug may be plain, as shown by the plain right-hand part of the slug T^2, Fig. 3. The reason for this is that the swaging of the metal in making the type very much hardens the metal of the type, especially at its surface, and its compression onto the slug sets the projections of the serrated surface of the type into the metal of the slug. If, however, the metal of the slug T^2 is harder than the metal of the type, the nib of the swaging-tool *e* of the machine must be plain and the serrated surface must be on the slug T^2, as shown on a part of the slug at the left end thereof in Fig. 3, for illustration.

In Fig. 3 it will be seen that the blank *b*, cut from the strip *a*, is a little longer than the finished type *b'*. This is necessary, for the reason that the blank must be a little scant in transverse and cross section in order to fall easily to place in the swage-block N of the machine and by compression becomes shorter by spreading to fill the chamber of the block and also by being condensed by the swaging process. The proper length of blank for any given length of type must be ascertained by trial in the machine.

In Fig. 3 a plan of the cut-off die *a'* is shown and a cross-section of the cutter *a* dividing the strip of metal *d*. For plain-bodied type the cutter *n* would only be formed to cut straight across the strip and simply separate it. The cutter in the figure, as also in Fig. 1, is shown in form of a T, which produces the blank in shape, as *c*, Fig. 3, for the finished type *c'*. The cutter is operated by the reciprocating tool-head J, to which it is attached, the cutting part of the tool being raised free and somewhat removed from the tool-head to fall in line with the center of the die-plate *a'*. On one end of the tool-head J is a thimbled stud *e'*, which works in the camway B and operates the cutting-tool at proper intervals.

The step-by-step movement of the strip of material from which the type-blanks are cut is effected by the friction lever-cam I acting in connection with the cam L on the back surface of the large cam-wheel A. The lever-cam I is pivoted near its center to one end of the vibrating arm M, the opposite end of the arm M being pivoted to the framework of the machine. Near the vibrating arm is a pin-stop which limits the movement of the lever-cam away from the blank-strip by the tension of spring T. The stop *n'* limits the vibration of the lever-cam on its central pivot. An adjustable friction-foot *f* is attached to the lever-cam, allowing an adjustment to the length of material to be cut off from the strip for the desired blank by shortening or lengthening the amount of the face of the friction-foot *f*, which may have contact with the strip of material during the movement of the lever-cam I. When the cam L strikes the curved end *l* of the lever-cam, it presses the friction-foot *f* down upon the strip S, and the further movement of cam L turns the lever-cam on its pivot and pushes the strip S along a distance equal to that part of the face of foot *f* which impinges on the strip. When cam L has passed the short arm *l* of lever I, the spring T returns the lever-cam I to its first position.

The pressure-wheel *d'* is held firmly by spring S^2 against the strip of material passing under it, which straightens the strip before going to the cutting mechanism. The spring S^2 is looped around a stud projecting from the body of the machine and is held in tension by means of a stop-pin near the stud.

The spring N' for giving momentum to the swaging-hammer H is attached to a support R', projecting from the body of the framework of the machine. The spring N' is connected to the operating lever-arm N^2 of the hammer H by the connecting-rod l^2. The swaging is not done by spring-pressure, but by sudden hammer-stroke, the hammer being under great momentum, caused by the recoil of the spring N' when the lever-arm of the hammer H drops suddenly from the cam K of the large cam-wheel.

On Sheet 3 of the drawings, Fig. 5 shows the several parts of the device for operating the die-carrier V and the support n^2. The full lines of the drawings show the position of the die-carrier and the support on their return movement just as they near each other. The dotted lines show the position of the carrier V and support n^2 at the extreme of their direct movement before their return.

It will be seen that the direct movement of the support n^2 is more constant and of greater extent than that of the carrier V, on account of the lost motion of the stud e^2 in the slot of the connecting-bar X. The support n^2 makes the first movement until it is out of the way of carrier V. The carrier being pivoted to the bell-crank Z at v^2 drops slightly to release it from the die and rests on the stop *z*, which projects from the body of the machine. The bar X then operates bell-crank Z, moving the die-carrier to the position shown by the dotted lines, while the support n^2 is continuing its movement to position shown by dotted lines. The support n^2 begins its return movement before the die-carrier; but both complete

their return movement at the same time, the support n^2 and carrier V near each other, as shown in Fig. 5, when the beveled corner of the carrier acts as a cam, raising the carrier as it slides onto the support.

The lever F, with its three arms m, m', and G, is pivoted to a hub on the body of the machine at F^2.

As the rabbet member of the short-bodied type may be either the tongue or the groove of the rabbet, the body of the type-bar having the counter member, the die and cutter for the type-blank may be made to conform to either the tongue or to the groove of the rabbet, as shown in Fig. 3, n and n^3.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a type-forming machine, a chambered swage-block, open only at its ends; one end of the chamber provided with a removable die-plate for forming the character on the type, the opening at the other end for receiving a type-blank; a swaging-tool for following the blank into the chamber and in line therewith, and means for driving the swaging-tool longitudinally against the blank, to form the type.

2. In a type-forming machine, a chambered swage-block, open at its ends; one end provided with a removable die-plate for producing the character on the type, the other end open for receiving a type-blank; a swaging-tool for entering the chamber of the swage-block longitudinally with the chamber, and having one movement for compressing or swaging the type, and a secondary movement after the removal of the die-plate, for forcing the type out of the swage-block.

3. In a type-forming machine, a chambered swage-block, open at its ends; one end provided with a removable die-plate for producing the character on the type, the other end open for receiving a type-blank; a swaging-tool for entering the chamber of the swage-block longitudinally with the chamber, and having a movement for compressing the type-blank by applied pressure and a hammer for giving the type a sharp finish by means of a sudden stroke.

4. In a type-forming machine, a chambered swage-block, open at its ends; one end provided with a removable die-plate for producing the character on the type; the other end open for receiving a type-blank; a swaging-tool entering the swage-block, longitudinally with the chamber, and having a movement for compressing the blank by means of pressure mechanism for forming the type; a secondary sudden movement and hammer for producing the same, to give sharp finish to the type, and an extended movement for thrusting the type out of the swage-block.

5. In a type-forming machine, the combination with a chambered swage-block, and a swaging-tool for forming the type from a type-blank; of a drop-hammer, and a spring device for accelerating the momentum of the hammer.

6. In a type-forming machine, a chambered swage-block constructed to hold a type-blank within its chamber; a swaging-tool and a slideway leading to the chamber of the block, so inclined to a horizontal as to cause the type-blank when placed in the slideway to slide through it by gravity to the chamber of the block.

7. A device for cutting into form, from a strip of material, the type-blank of a short-bodied type for a rabbeted composite type-bar; consisting of a die and cutter and a suitable motor mechanism; the cutter being of such shape as to form on the type-blank one of the members of the rabbet.

8. In a type-forming machine a swaging-tool having a part of its surface serrated, to produce a serrated face or surface on the type.

9. A linotype or type-bar composed of short-bodied type and a body-slug, one or more of these parts being provided with a serrated face or surface.

10. In a type-forming machine, a chambered swage-block constructed to hold a type-blank within its chamber, a swaging-tool adapted to enter one end of the chamber longitudinally in line therewith; a die-plate for closing the end of the chamber opposite the end at which the tool enters; a die-carrier for the die-plate having a movable support and means for allowing the die-carrier to drop away from the finished type, and then for moving the die-carrier transversely for carrying it out of the way of the type, when the type is removed from the chamber of the swage-block.

11. In a type-forming machine; a chambered swage-block; a swaging-tool adapted to enter one end of the chamber to drive a type-blank contained in the chamber against a die placed at the other end of the chamber; a reciprocating die-carrier pivoted at one end and resting on a removable support at its other end.

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Witnesses:
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