

W.B. Pollock. Sheet 1, 2 Sheets.

Paper Ruling Mach.

N<sup>o</sup> 68,571.

Patented Sept. 3. 1867.

Fig. 1

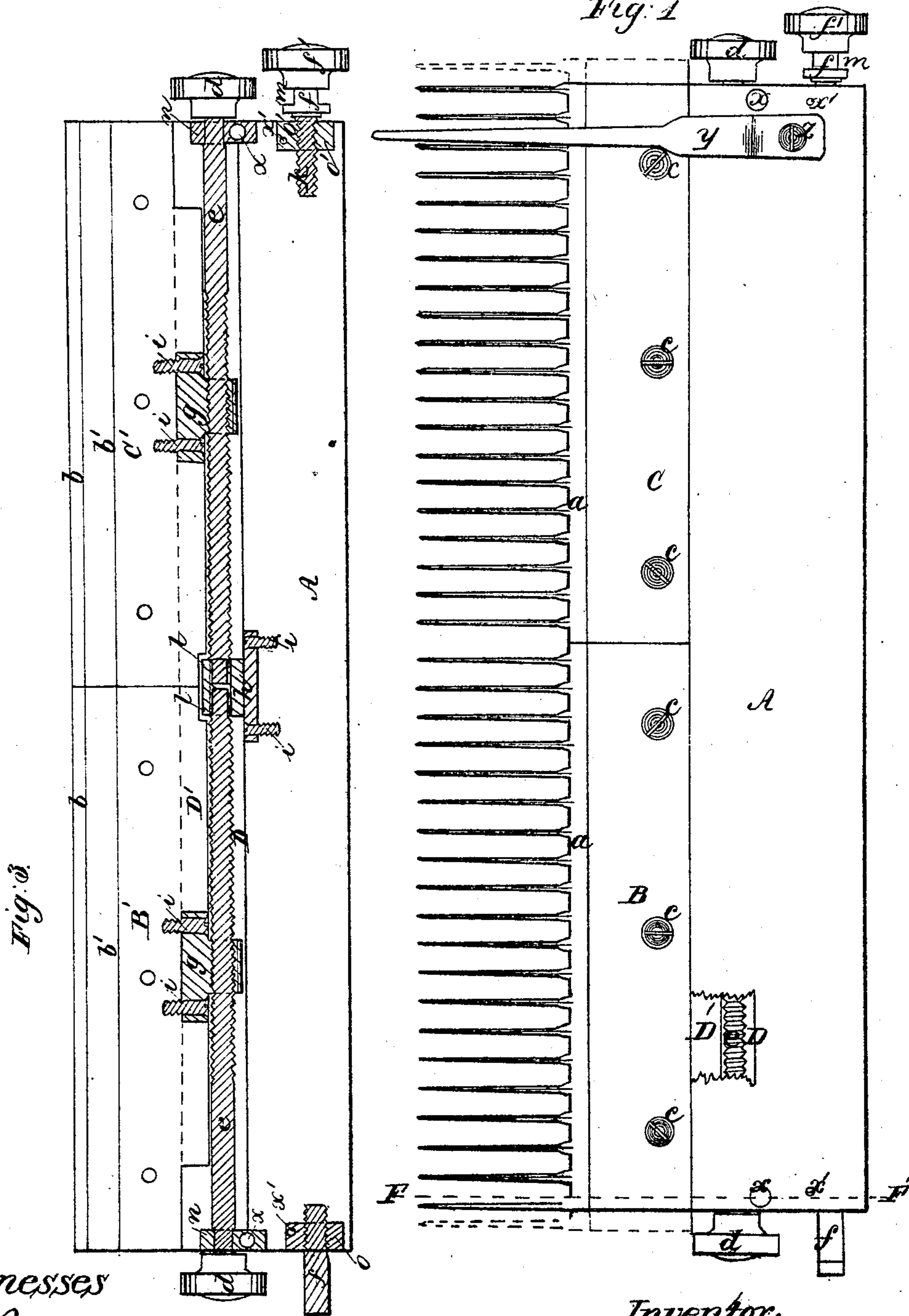


Fig. 2

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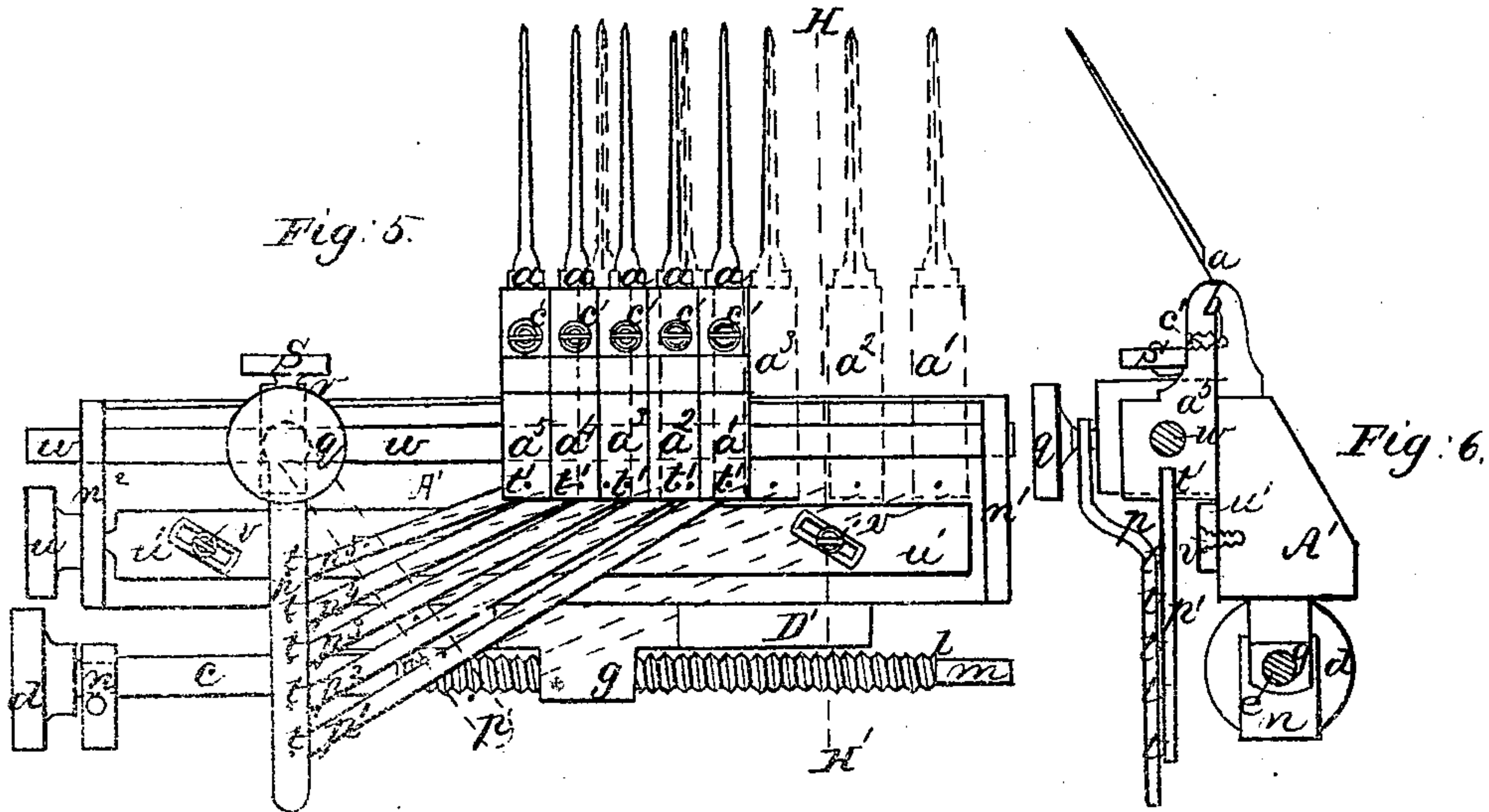
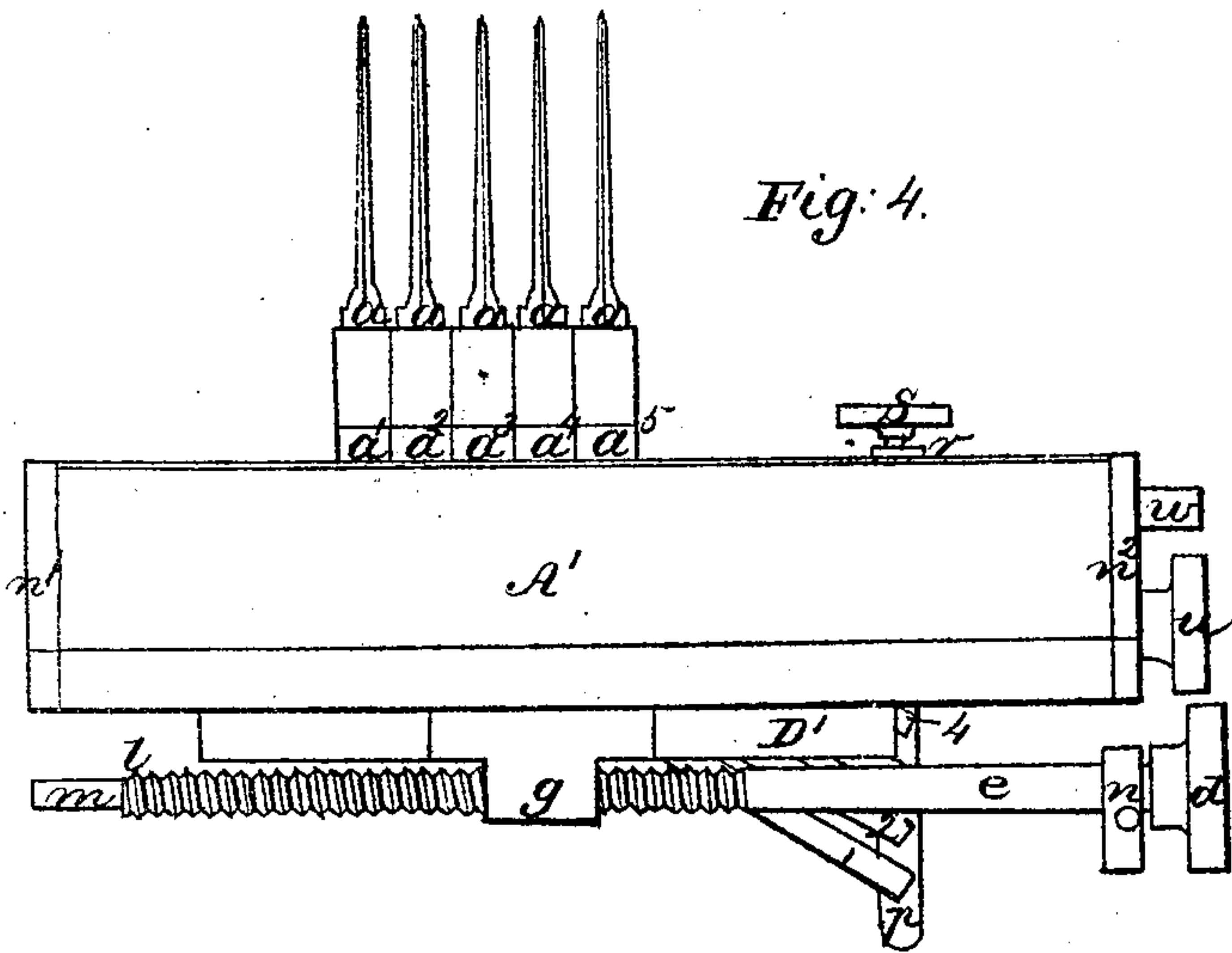
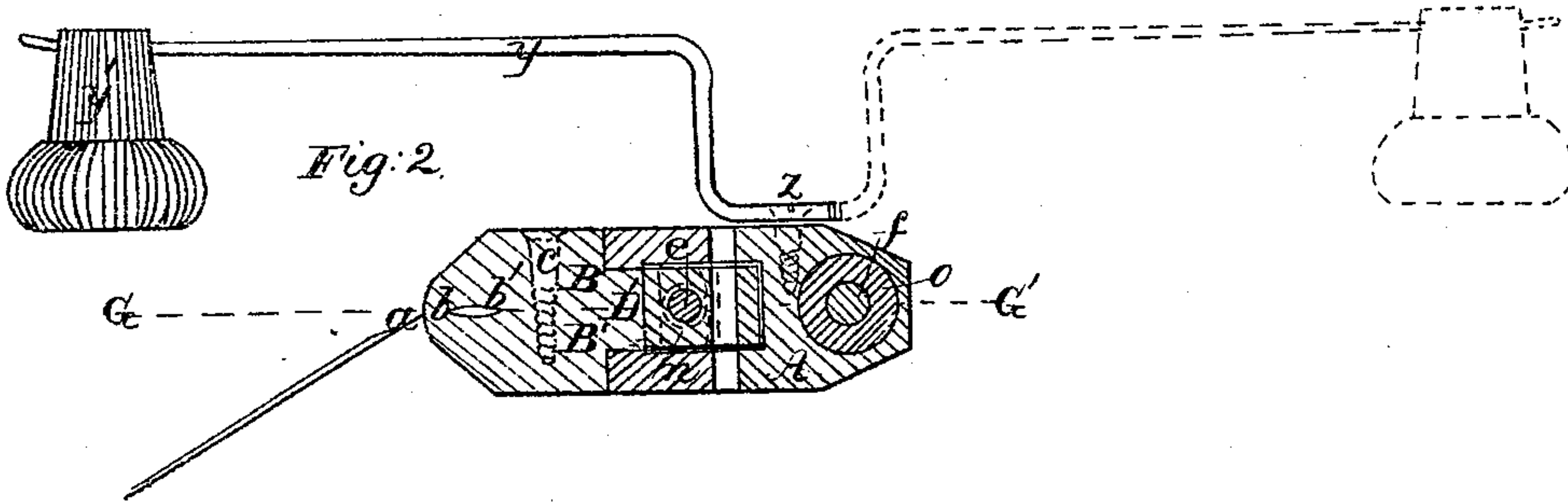
Inventor;  
William B. Pollock

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*Inventor;*  
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# United States Patent Office.

WILLIAM B. POLLOCK, OF HOLYOKE, MASSACHUSETTS.

*Letters Patent No. 68,571, dated September 3, 1867.*

## IMPROVEMENT IN PAPER-RULING MACHINES.

*The Schedule referred to in these Letters Patent and making part of the same.*

### TO ALL WHOM IT MAY CONCERN:

Be it known that I, WILLIAM B. POLLOCK, of Holyoke, in the county of Hampden, and Commonwealth of Massachusetts, have invented a new and useful Improvement in Paper-Ruling Machinery; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, making a part of this specification, and to the letters of reference marked thereon, whereof—

Figure 1 is a plan, having a small portion shown as broken away at D D'.

Figure 2 is a vertical transverse section made by a plane passing through F F', fig. 1.

Figure 3 is a longitudinal horizontal section through G G', fig. 2.

Figure 4 is a plan of a "clamp" fitted with adjustable pens.

Figure 5 is a reverse plan of the same.

Figure 6 is a vertical transverse section through H H', fig. 5.

The paper-ruling machinery now in use in manufactories of fine paper, and book-binderies, consists mainly of a system of cylinders and endless tapes supported in a frame and moved in such manner as to allow the paper to be ruled to be passed sheet after sheet beneath a clamp filled with pens, which is attached to the upper part of the frame. A reservoir filled with ink of the color desired is also attached to the machine in the rear of the clamp, and small strips of cloth or wick are used to conduct the ink from the reservoir to the points of the pens, each pen being furnished with a strip or wick. The pens in general use are of the kind shown, and are manufactured in cards or "combs" of a few inches in length and of different "sizes," the term "size" having reference, however, to the distance of the pens apart and not to their relative fineness of point. The ruling machine is generally constructed of a width sufficient to allow the ruling of two sheets of paper at the same time, so that two courses of paper are constantly passing side by side beneath the pens. The clamp in which these cards of pens are placed is, in its simplest and usual form, constructed of two strips of hard wood, fastened together face to face by screws. Cards of pens are inserted between the strips and secured by turning the screws. A pin or shaft projects from each end of the ordinary clamp and rests in bearings set at each side of the machine. A screw-thread is cut on each shaft, and a nut with a milled head turns on each shaft. The bearings being of such form as to allow the clamp to be moved laterally in them, it is adjusted so as to bring the pens to the desired position over the paper by turning up one of the nuts and "slackening" off the other. It is obvious that with a clamp constructed as described it will be difficult to adjust all the pens so as to rule both of the courses of moving paper correctly, and that while one course of pens may be ruling properly it may be necessary to loosen the screws in the clamp and change the position of the pens which are ruling the other course, and that during this adjustment the machine must be stopped, the clamp removed from the bearings, and that the section of pens which was before ruling correctly may be displaced in the operation. This adjustment is especially frequent in ruling the side of a sheet of paper, of which the other side has been already ruled, in order to make the ruling "register," or to make one line directly over the other, so that in looking through the sheet toward the light the lines on the opposite sides of the sheet will coincide in position, and appear as one line.

The nature of my invention consists, first, in constructing that portion of the clamp in which the pens are confined in two parts, and giving each of these parts an independent lateral adjustment, so that either part may be moved laterally, and thus bring the pens contained in it into any desired position over the paper to be ruled, without stopping the machine or removing the clamp from its bearings; second, in substituting, in place of a nut on the shaft at each end of the clamp, a single nut at one end only, and by means of a groove formed in this nut, which takes in the bearing, controlling the lateral adjustment of the whole clamp at one end of the machine; third, in using, instead of cards of pens, if desired, detached pens, so regulated and moved by a lever that the pens can be readily set at such distances apart as to rule in any plain style required, and changed from one style to another without stopping the machine; fourth, in attaching one or two adjustable counterpoises to the clamp to cause the pens to press more or less heavily on the paper to be ruled, or to raise them entirely from the paper, if required.

The construction of my invention is as follows: A strip of wood, A, figs. 1, 2, and 3, of suitable length to correspond with the width of the ruling machine, has a shaft, f, inserted in each end. One of these is screwed firmly into a seat or nut, o; the other has a screw-thread cut upon it and turns in a nut, o', which is fastened



in the strip A by the pin  $x'$ . This revolving shaft is also enlarged at the end, so as to form the milled head  $f'$ , and a groove,  $m$ , is turned in the enlarged part inside of the milled portion. The bearing which supports the strip A on the machine is of sufficient thickness to fill the width of this groove in the shaft, and therefore will prevent the shaft from moving laterally in the bearing. Consequently, if the shaft is turned by means of the milled head upon it, the clamp will be drawn toward the bearing or moved away from it by the action of the screw-thread  $k$  and nut  $o'$ , and the operator can control the motion of the strip A and remain at one side of the machine. A groove, D, is cut in one side of A, extending from end to end. At the middle point of the length of this groove is set a metal bearing,  $h$ , which is fastened to A by the screws  $i i$ . This strip A, so supported on the shafts  $f f$ , is not designed to be removed from the machine, but is intended to receive and support the clamps now to be described. These clamps I construct of two kinds, one for using the common cards or combs of pens, figs. 1 and 2, and another for using detached and adjustable pens, figs. 4, 5, and 6. The first-named clamp is constructed of two pieces of wood, B B', fastened together face to face by common wood-screws  $c$ . The screws are loosened and the cards of pens are inserted between the strips B B' in number sufficient to form a continuous row of pens along the clamp. A shallow groove is cut in B and in B', as shown at  $b'$ , to facilitate the setting of the cards of pens. The strips B B' are then drawn together by turning the screws  $c$ , and the clamp is ready to be applied to A. As this supporting strip A has a lateral movement in its bearings it is also desirable that each of the clamps contained in it should have an independent lateral motion to adjust the pens in each clamp to the course of paper which is passing under it. Each clamp, therefore, has upon the back side a projection, D', which enters the groove D in A and slides in it. To this projection D' a nut,  $g$ , is fastened, and a rod,  $e$ , having a screw-thread cut upon it, passes through this nut and turns in it. At its inner end the rod  $e$  rests in the before-mentioned metal bearing  $h$ , which is set in the strip A. Near its outer end this rod is turned down, or "necked down," and this smaller part turns in a metal bearing,  $n$ , which is fastened in A by the pin  $x$ , which can be readily removed. This rod  $e$  is turned by means of a milled head,  $d$ , at its outer end, which I denominate a register-wheel. As the rod  $e$  cannot move laterally on account of the said smaller part being confined in the bearing  $n$ , it is evident that when the rod is turned by means of the register-wheel the clamp B will, by the action of the screw-thread cut on the rod  $e$  in the nut  $g$ , be moved to or from the register-wheel. The two clamps, which are supported in A, are constructed alike, except that the position of the rod  $e$  and its adjuncts, as shown attached to B, are reversed upon the clamp C, so that one clamp can be adjusted at one side of the machine and the other clamp at the opposite side. The construction of the clamp for detached pens, figs. 4, 5, and 6, is more complicated, and is as follows: A piece of wood, A', has a projection, D', and a nut,  $g$ , upon its rear edge, of the same form as in the clamps B and C already described, and the lateral movement of it is effected in precisely the same manner as in the simple clamps B and C. An end piece of metal,  $n^1 n^2$ , is attached to each end of A', and a round rod,  $w$ , is supported by these end pieces beneath A'. On this rod  $w$  the pen-holders  $a^1 a^2 a^3 a^4 a^5$  slide, each pen-holder having a round hole through it. These pen-holders are constructed of two pieces of metal, of which the upper is secured to the lower and larger piece by the screw  $c'$ . The pens  $a$  are firmly secured between these two pieces of the pen-holder at  $b$  by turning the screw  $c'$ . The pen-holders are connected, by means of rods  $p^1 p^2 p^3 p^4 p^5$ , with a lever,  $p$ , said rods being attached to the lever by the pins  $t$ , and with the pen-holders by the pins  $t'$ . The fulcrum of this lever is the set-screw  $q$ , which, if turned up, also serves to confine the lever in any position. The set-screw  $q$  turns in a rectangular piece of brass or other metal,  $r$ , through which is a round hole. The rod  $w$  passes through this hole, and the block  $r$  slides upon the rod  $w$  in like manner as the pen-holders. By sliding the block  $r$  along the rod  $w$  the whole system of pen-holders, with the lever and connecting-rods, may be moved to or from the end of the clamp. A set-screw,  $s$ , turning in the block  $r$  and against the rod  $w$ , serves to confine the block in any position on the rod. After the pen-holders have been brought to the desired position on the rod by moving the lever  $p$ , if the set-screws  $s$  and  $q$  are turned up tightly, but little movement of the pen-holders on the rod  $w$  is possible. To avoid, however, any possible variation in the position of the pen-holders an additional safeguard is attached to the clamp. This consists of a strip of metal,  $u'$ , having a round projection on one end. A screw-thread is cut upon this projection, and a round nut,  $u$ , with milled edge, turns upon it. Two oblique slots are cut in this strip of metal, and screws,  $v v$ , passing through the slots, secure the strip to the wood A'. As these slots are cut obliquely the strip  $u'$ , if drawn toward the end  $n^2$  of the clamp by turning the round nut  $u$  on the end of it, will also move in the line of the oblique slots and will act as a wedge, pressing against the pen-holders and still further confining them in any position desired. The counterpoise, figs. 1 and 2, consists of a bent strip of metal,  $y$ , secured to A by a screw, Z. A hole in the weight  $y'$  serves to hang the weight on the strip  $y$ . The weight is moved to and fro on the strip  $y$  to produce more or less pressure of the pens upon the paper beneath. If, after moving the weight  $y'$  inward as far as possible, there is still too much pressure the strip  $y$  may be turned so as to occupy the position shown by the red lines, and the weight  $y'$  moved along it, as in the former position of  $y$ , or the strip  $y$  may be turned in the direction of the bearings of the strip of wood A, if not needed.

The operation of my invention is as follows: In using the clamps B and C, (for cards of pens,) fig. 1, two clamps containing the proper size of pens are selected from the stock of clamps, which may advantageously be large enough to contain a pair of clamps for each style of ruling, or if the pens are to be inserted in the clamps at the time of using them suitable cards are selected, the screws in the clamps loosened, the cards inserted, and secured in the clamp by turning up the screws. The rod  $e$  is then passed through the nut  $g$  and the clamp is ready to be attached to A, which is supposed to remain on the machine. The projection D' is inserted in the groove in A, and the clamp is moved along the groove until the rod  $e$  enters the bearing  $h$ . The block  $n$  is then inserted in its place in the end of A, the pin  $x$  inserted, and the clamp is securely fastened upon A, and can be moved laterally along the front edge of A by turning the register-wheel  $d$ . The manner in which the lateral movement of the strip A itself is controlled by turning the milled head  $f'$  has already been described.



If, however, the location of the ruling machine should make it necessary to control the movement of A from that side of the machine opposite to the side herein shown it is obvious that the shafts  $f f$  may be interchanged so as to bring the milled head  $f'$  at the other side of the machine. In operating the clamps for using detached pens the number of pen-holders upon the rod  $w$  will vary with the width of the machine, and the style of work for which the ruling machine is to be used. "Double pens," or pens making two lines near together, may be inserted in one or more of the pen-holders in place of the single ones shown in the drawings. When the style of ruling in any case is decided, the operator loosens the set-screws  $s$ ,  $q$ , and  $u$  and slides the block  $r$  along the rod  $w$  until the pens are over or nearly over the course of paper to be ruled. The set-screw  $s$  is then tightened and the lever  $p$  moved until the pens stand at the proper distance apart. From the manner in which the connecting-rods  $p^1 p^2 p^3 p^4 p^5$  are attached to the lever  $p$ , so that the successive distances of  $t$  in  $p^5$ ,  $t$  in  $p^4$ , &c., from the fulcrum  $q$  constantly increase by a common difference, it is evident that the pen-holders will always remain at equal distances apart. When the proper position of the pens has been obtained the set-screw  $q$  is tightened, the nut  $u$  turned up, and the clamp applied to A in the same manner as the clamps B and C already shown. All the described adjustment of the pens may, however, be performed after the clamp is attached to A. Two of these last-mentioned clamps may be used upon A, or one may be used in connection with one of the simple clamps B or C. Any parts of my invention shown as constructed of wood may, if desired, be constructed of suitable metal.

What I therefore claim in the premises, and desire to secure by Letters Patent, is—

1. The combination of the middle bearing  $h$ , end bearings  $n n$ , and rod  $e$ , with the strip A, substantially as described.
2. The simple clamp B or C, constructed as described, with the projection  $D'$ , in combination with the nut  $g$ , bearing  $n$ , rod  $e$ , and its register-wheel  $d$ .
3. The clamp for using detached pens, when constructed and operating substantially as described.
4. The combination of two simple clamps, or of two clamps for using detached pens, or of one clamp of each kind, with the strip A, the whole and each part thereof constructed and operating substantially as described.
5. The use, in a paper-ruling machine, of two clamps or series of pens, each clamp or series having an independent lateral adjustment, in combination with a supporting strip.

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Witnesses:

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