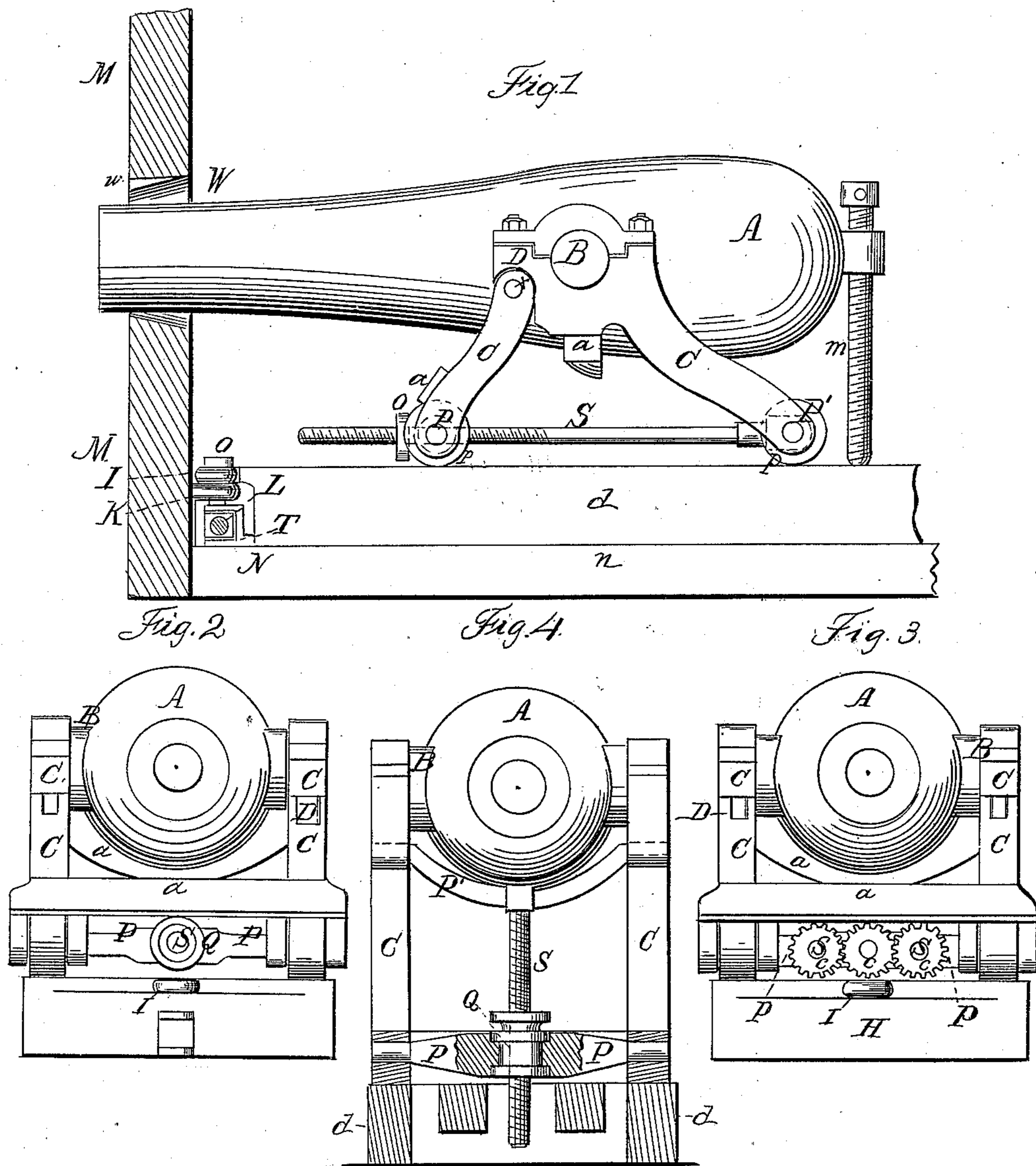


M. WAPPICH.

Gun-Carriage.

No. 37,882.

Patented Mar. 10, 1863.



Witnesses:  
*Gustave Dietrich*  
*May 13*

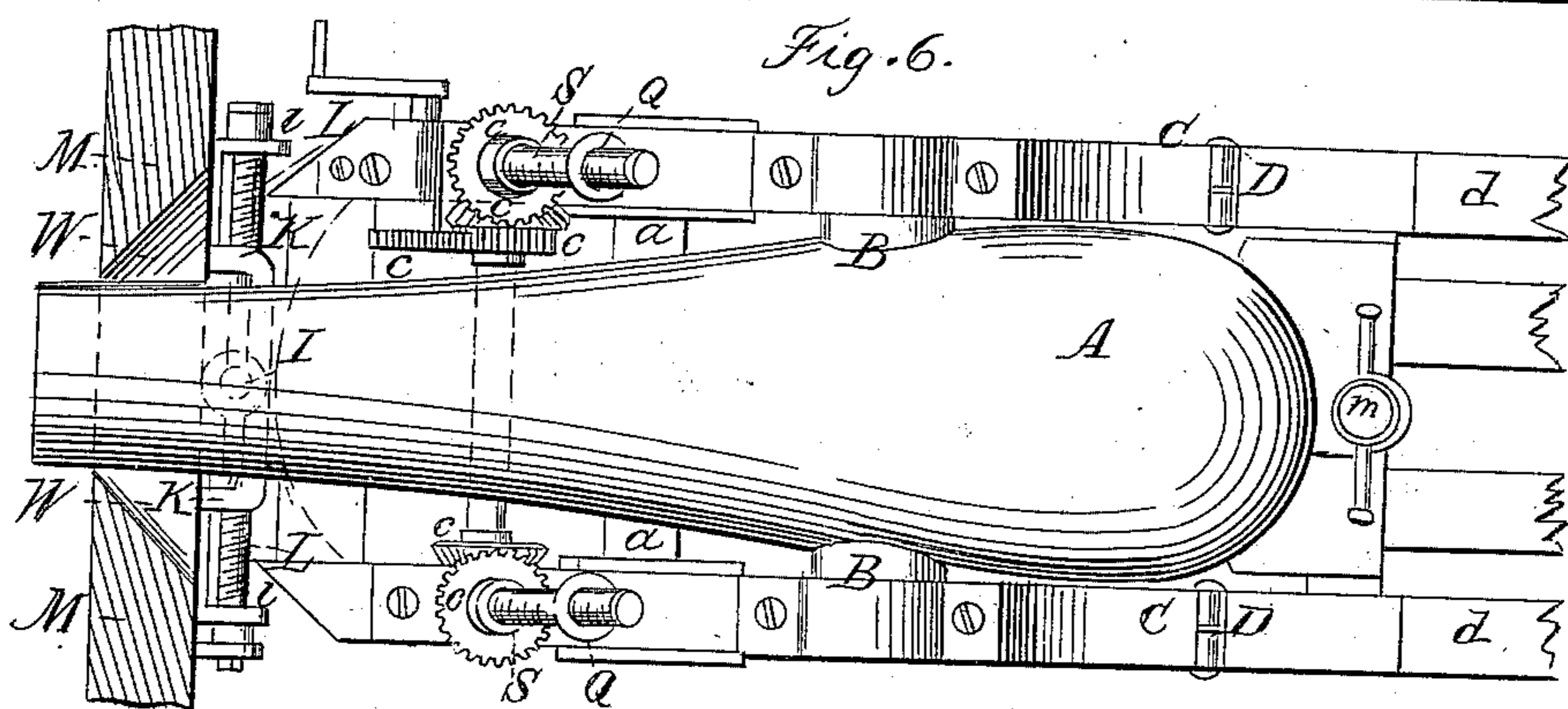
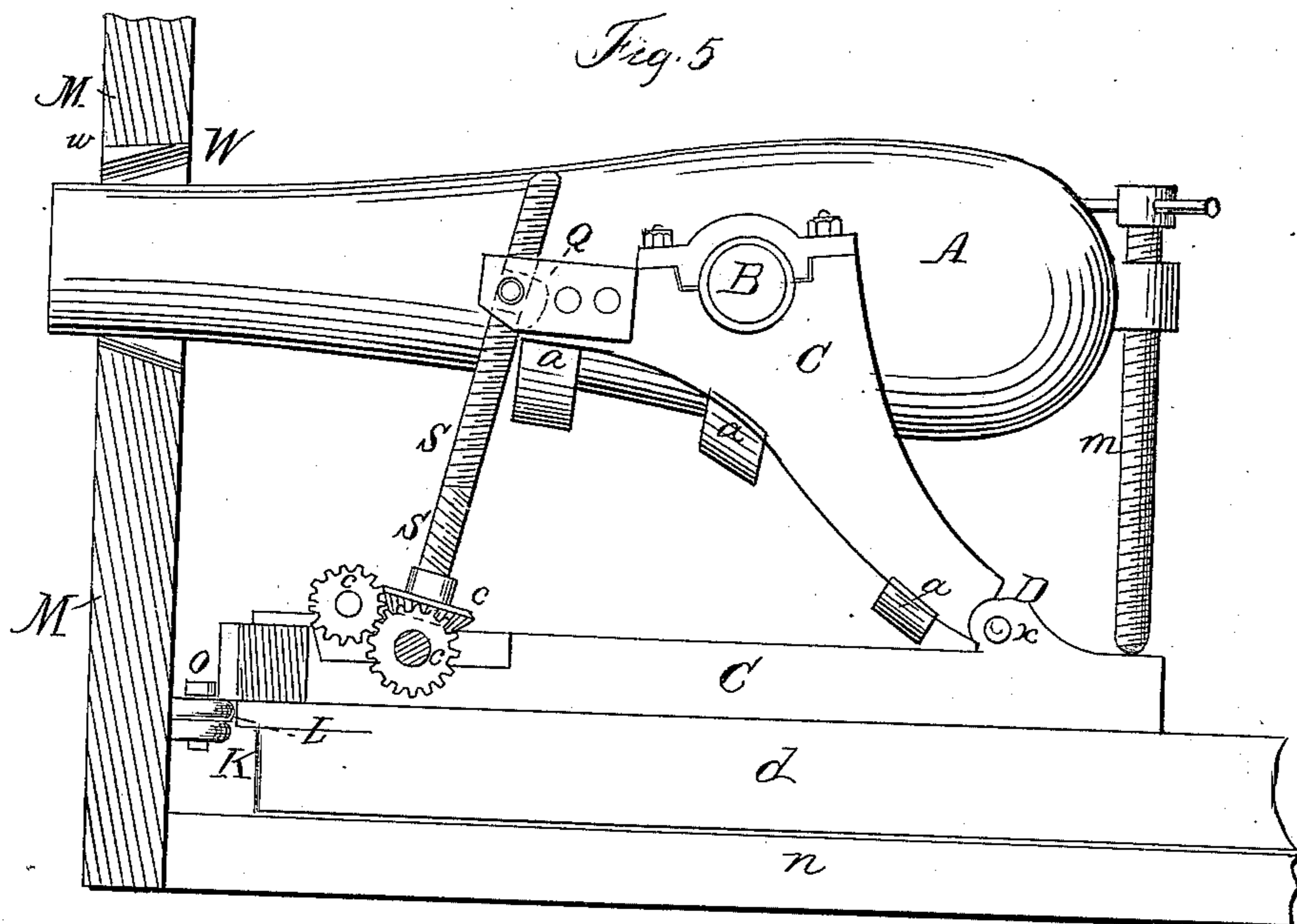
Inventor:  
*Maximilian Wappich.*

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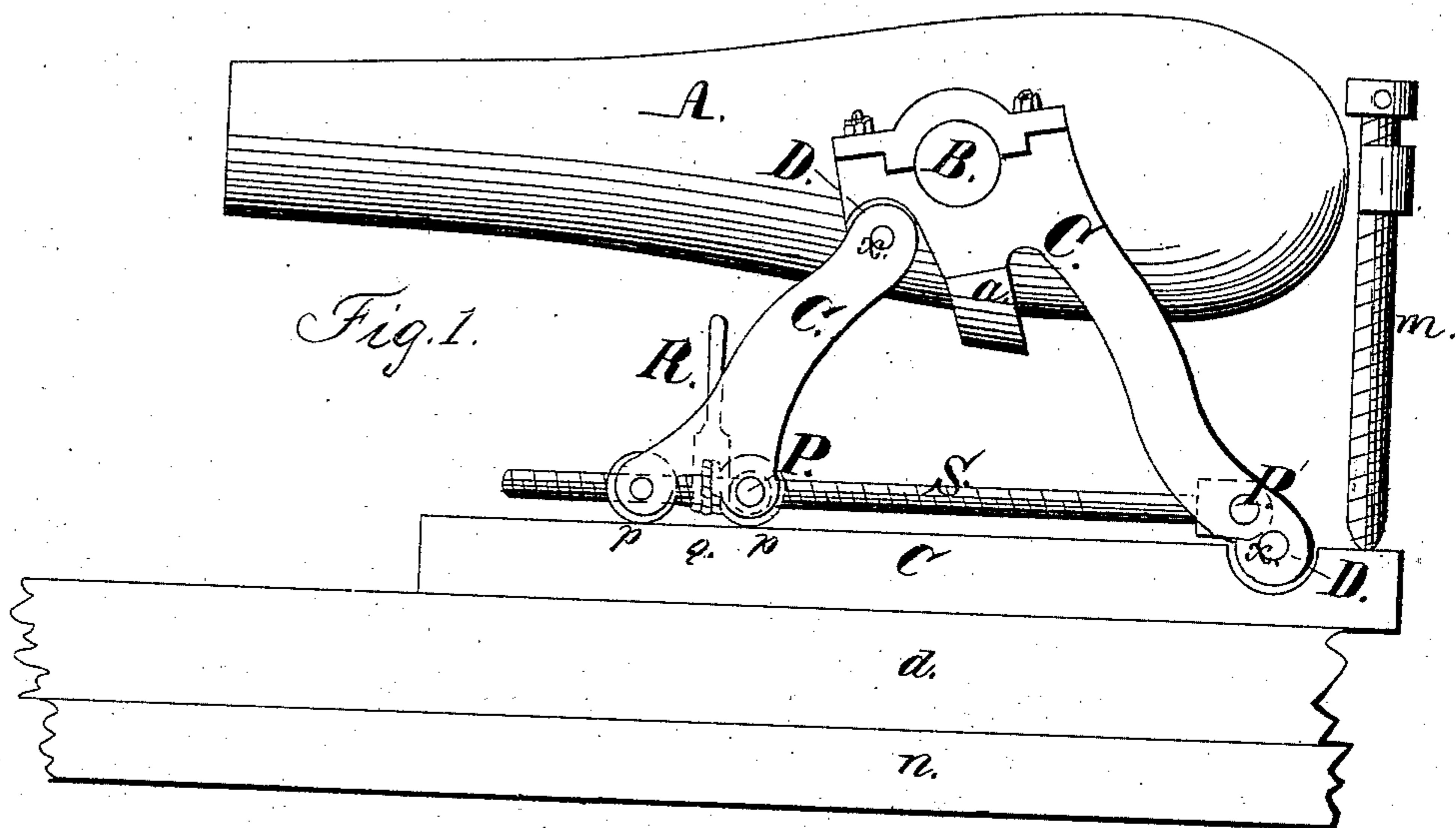
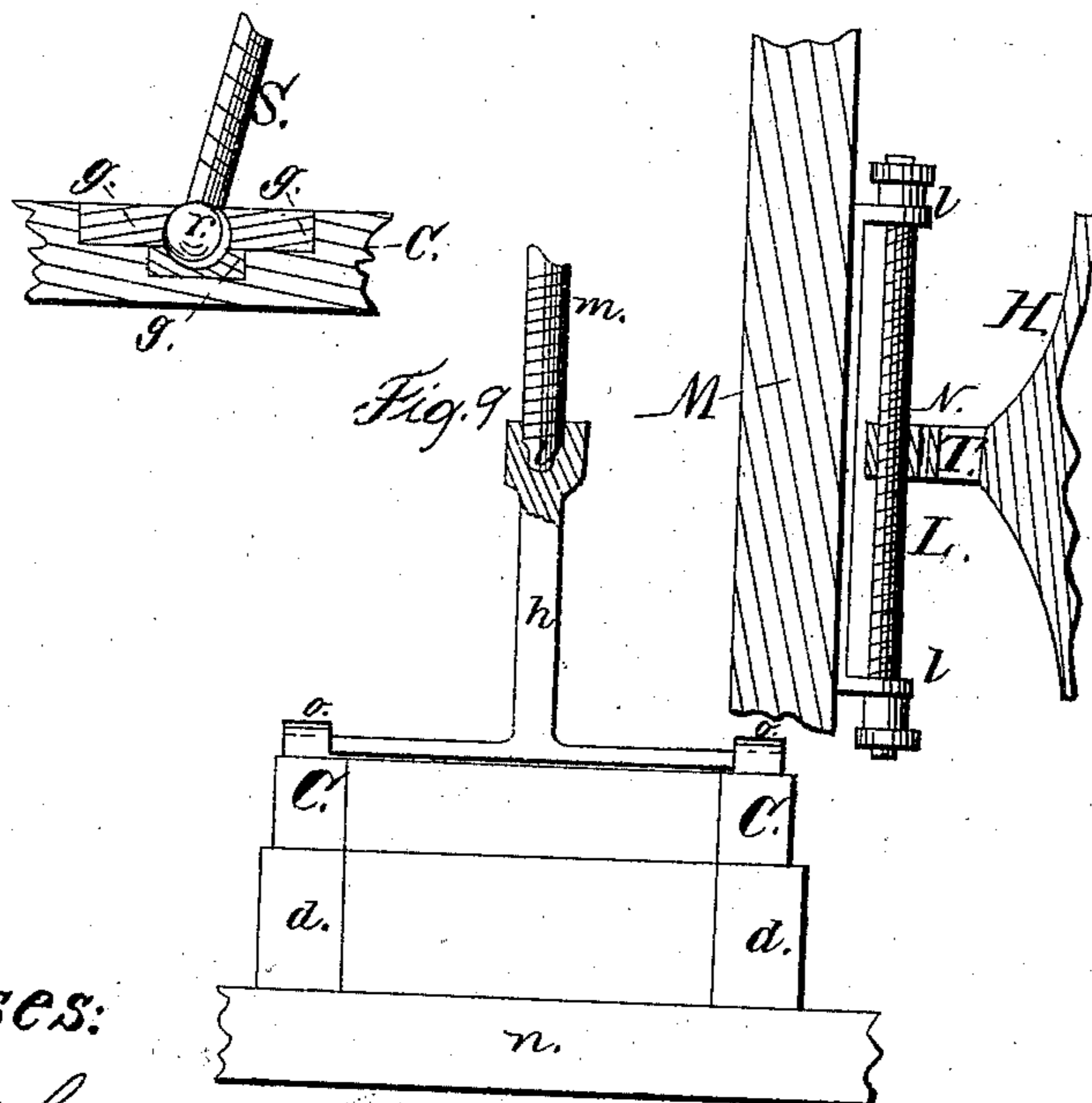


Fig. 8.

Fig. 10.



Witnesses:  
Gustave Dieterich  
M. Day Jr.

Inventor.  
Maximilian Wappich

# UNITED STATES PATENT OFFICE.

MAXIMILIAN WAPPICH, OF SACRAMENTO, CALIFORNIA.

## IMPROVEMENT IN GUN-CARRIAGES.

Specification forming part of Letters Patent No. 37,882, dated March 10, 1863.

*To all whom it may concern:*

Be it known that I, MAXIMILIAN WAPPICH, of Sacramento city, in the county of Sacramento and State of California, have invented a new and useful Improvement in Gun-Carriages, whereby the size of port-holes of war-vessels, casemates, &c., may be reduced; 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, forming part of this specification, in which—

Figure 1 is a side view, and Fig. 2 an end view, of my invention as applied in a vessel. Fig. 3 is an end view, showing a modification of the gearing. Fig. 4 is a cross-section and partial elevation, showing another modification of the gearing. Fig. 5 is a side view and partial section, showing a modification of the invention and the gearing. Fig. 6 is a plan view of the same. Fig. 7 is a side elevation, showing another modification of the invention. Figs. 8, 9, and 10 are details used and proposed for use with my invention.

Similar letters of reference in the several figures indicate corresponding parts.

My invention relates to the elevation and depression of guns, and also to the horizontal training of the same; and the nature of my improvements consist, first, in effecting the elevation and depression of the gun with its trunnions through the agency of a carriage which is capable of folding and expanding in a manner to increase and decrease its height; second, in the manner shown of constructing the cheek-plates of the gun-carriage to act as levers for the elevation of the gun by its trunnions; third, it consists in a novel manner of applying screws for the purpose of adjusting the gun-carriage; fourth, in bringing the muzzle of the gun in line with the port-hole by horizontal training, as will be hereinafter described.

To enable others to perform my invention, I will proceed to describe the same with reference to the drawings.

Having reference to Figs. 1 and 2 of the drawings, A designates the gun, B B the trunnions, and C C the gun-carriage, with a strong hinge-joint, D, supported by a strong pintle, *x*. The carriage has small wheels *p p*, and is braced laterally by means of strong shafts P P' and

longitudinally by means of a strong screw, S. The screw has its fulcrum and support on the shafts P P', and occupies a position centrally under the gun. The carriage is further braced laterally by means of strong main braces *a a*, which tie and secure the adjustable parts of the carriage together. Such braces, in order to give rigidity and firmness to the carriage, may be increased in number and be applied at other points than those shown. The cannon thus mounted is free to turn on its trunnions B, and the ordinary breech-supporting screw, *m*, may be used, as shown. This screw *m* is only employed as a support and for any very nice adjustments that my invention may not as conveniently make in time of quick action or under peculiar circumstances. The screw S has one of its ends fitted to a screw-box, Q, which is turned by a ratchet and pawl or other suitable means, said screw-box having its bearing against the cross-shaft P. With this arrangement it is evident that when the distance between the shafts P P' is lengthened the gun A will be lowered with its trunnions by reason of the lever-arm C extending its arc, and when the screw S or the distance between the shafts P P' is shortened, the gun will be elevated by reason of a reverse operation of the lever-arm, while at the same time the muzzle of the gun remains at the same height that it stood before the adjustments were made, thus obtaining the greatest possible degree of vertical range, and admitting of the reduction of the port-hole W in the ship's side M to a size vertically a very little greater than the vertical diameter of that portion of the gun which is generally extended through or brought in close relation to the port-hole in firing.

To produce the training of the gun, the ordinary "chassis" may be employed for the movement in the path of a horizontal circle; but, instead of having the front pintle, O, immovable, I have constructed this connection as follows: To the front transom, H, of the chassis *d d* a strong eye, I, and an open bracket or yoke piece, T, are firmly fastened. From the inner side of the ship a long stop, K, of loop form, is extended, and below this loop there extends out from the side of the ship an angular support, *l l*, as shown. In the yoke-piece T a screw-box, N, is secured

by means of journals on its upper and lower ends. Now, the pintle *O* is passed down through the eye *I* and the oblong stop-loop *K*, and although a connection with the ship's side of the chassis is effected through these means, yet the pintle has a chance to move laterally in the oblong loop. A horizontal screw, *L*, is now passed through the support *l l* and the screw-box *N*, the ends of the screw being shouldered, so that it (the screw) shall not move forward when it is turned. Beyond the shoulder of the screw, ratchets or other means through which to impart motion to the screw may be provided. With this arrangement I secure the ordinary training of the gun on the front pintle in the path of a horizontal circle, and also the additional training in a straight lateral direction, and thus the muzzle of the gun can be made to always range in line with the small or reduced port-hole *W* no matter what may be the angle at which the gun may have been trained in the path of a horizontal circle, and thus the gun in its recoil will not strike on the sides of such a port-hole. This lateral movement is effected by turning the screw *L* from one or the other of its ends, accordingly as the gun has previously been trained in the path of a horizontal circle. This screw holds the chassis with the gun securely in place and in range with the port-hole after the lateral training has been effected by it.

It is evident that as the screw *L* is turned it moves the front part of the chassis by acting on the screw-box *N* in line with the training of the gun and with the port-hole. It will also be seen that the recoil of the gun will be received by the pintle *O*, and the screw-box and screw thus be relieved therefrom; but if this is not wholly the case the bearings *l l* may have india-rubber springs before and behind them for their relief.

By having a square head or end as the termini of the screw, a single ratchet and pawl would answer for both ends of the screw, as the ratchet could be shipped off of one end and placed on the other. On the one a ratchet might be used to turn the screw backward by simply turning its outer face inward, so as to reverse the run or bevel of the teeth. With this auxiliary adjusting device the gun can be trained so as to be efficient even at forty-five degrees each way, and also be run out, although the port-hole *W* is reduced horizontally to about the size or diameter of that portion of the gun which is gradually brought into use at the port-hole.

In order to facilitate the sighting of the gun when a small port-hole, *W*, is used, I cut a notch, *w*, in the upper arch of the port-hole *W*, as illustrated in Fig. 1.

In training the gun, the gunner, while he is sighting it, gives command to his assistants in what direction to turn the screws *S* and *L*, and he, (the gunner,) with his hand on the screw *m*, makes any very nice adjustments of

the elevation that his assistant may not have made with the screw *S*. The port-hole will allow of these adjustments with the screw *m*, as is evident from Fig. 1 of the drawings.

The deck of the ship on which the chassis rests is designated by the letter *n*.

In Fig. 3 I have shown two geared screws, *S' S'*, for elevating the gun with its trunnions. Three pinions, *c c c*, producing equal motions in the screws, are employed, instead of simply a ratchet and pawl.

In Fig. 4 the screw *S* works perpendicularly, and is fitted to a cylindric screw-box, *Q*, and connected to cross-shafts *P P'*, which have a rocking movement. This arrangement is especially adapted for use in turrets.

In Figs. 5 and 6 two upright or nearly upright screws moved by pinions *c c c* are adopted. In this arrangement the hinge *D* is shifted, and so, also, is the rocking box *Q*, and the screws *S S* take the place of the lever-arms shown in Fig. 1. The principle of operation in this plan is same as Fig. 1.

In Fig. 7 the same arrangement as in Fig. 1 is shown, excepting that the rear lever-arms *C C* have an unchanging fulcrum, *D*, and the front lever-arms *C C* have each two branches, *p p'*, as shown. With this arrangement, when the lever-arm *C* has elevated the gun as high as branch *p* will allow, the lever-branch *p'* commences to operate. This action is equivalent to that of a compensating-lever or a progressive lever. For obtaining a very high elevation, this is a very good plan, as it is stable and quick in its action. The small rollers or wheels shown on the branches serve as resting-points and to ease the movement of the lever-arms. There might be more than two branches arranged to come into action successively on the principle described.

In Fig. 8 I have shown the ball-and-socket joint which is used at the lower ends of the screws *S S*, Figs. 5 and 6.

In Fig. 9 I have shown an adjustable socket-standard, *h*, which may be used in connection with the screw *m* in this manner. If a very great elevation is required, and the extent of the screw should be run out, the screw is run back to its original position, the standard *h* thrown up from a horizontal position, and the screw forced down into the socket *i*. The elevation of the gun can now be continued. The standard *h* is hung in boxes *o o*, so as to swing up and down as a hinge operates. The main advantage of this device is the reduction in the length of the screw in such places as length would be an objection.

As I am the first inventor of the principle of elevating guns by the trunnions, I will describe such modifications of the construction of the means employed as might be practical.

The screw *S* is shown in Fig. 1 as screwed up by the screw-box on the first part of the gun-carriage, yet it may be screwed up from the rear part of the carriage.

Instead of the screw-box *Q* being turned,

the screw S might be turned and a rocking screw-box, Q, Fig. 5, be used.

Instead of a screw-box with journals, a ball screw-box may be used.

The screw or screws S may act through the axles of the carriage, as shown, or they may have separate shafts or supports through which to impart motion to the lever-arms of the carriage.

Right-handed screw S S, as shown in Fig. 3, or right and left screws S S, as shown in Figs. 5 and 6, may be used.

The screw or screws S S may have a right-handed thread on one end and a left-handed thread on the other end for rapid operation. In this case the screw would have a right-and-left screw-box.

The drawings show that one or more screws may be used, and that the screws may work horizontal and vertical; but I think they may be set at any degree through the sector.

The screws may be placed either forward of the trunnions or aft thereof and underneath the cannon. The screw-box Q might be made cylindric and be fitted in a rock-shaft, as shown in Fig. 4, so as to possess great strength.

The gun-carriage may have one or more hinge-joints, as shown in Fig. 7, and both legs of each cheek-plate C, Fig. 1, may be provided with compensating-rests  $p$   $p'$ , instead of only one leg, as in Fig. 7.

The hinge-joint D may be in any other practical part of the gun-carriage.

The gun-carriage may have hinge-joints and truck-wheels combined, as in Fig. 1, or the truck-wheels may be separated from the adjustable parts of the carriage.

The cheek-plates of the carriage may be free to move on wheels at both ends, or the front ends thereof may run on wheels and the rear ends turn on joints, as shown in Figs. 5 and 7.

The lever cheek-plates may act either as compensating or progressive levers or as common levers.

The braces  $a$   $a$   $a$  should be placed where they give the greatest strength or support and offer the least hinderance to the working of the gun.

The folding and expanding carriage may be worked with any kind of friction-brakes to counteract the recoil of the gun.

My invention may be worked on the deck of a "man-of-war," with regular broadsides, upon a rotating platform or pivot, or center pintle or front pintle, in cupolas, towers, turrets, floating battery, land-battery, casemate, and other war structures.

The screw L may be placed above or below the pintle O, and in place of the screw any other equivalent means may be used.

The gun may be run out of the port-hole and fired; or the muzzle may be flush with

the outside of the vessel; or the muzzle may project out at an angle at one side, and be flush with the outside on the other, or the gun may be fired while its muzzle is on the inside of the ship, but in range with the port-hole.

The carriage may be made of iron, wood, or any other durable material. The parts on which the strain especially comes should in all cases be of metal.

The advantages of this invention are—

First. The reduction of the size of the port-hole.

Second. The gun will lie two feet lower and near the water-line. From the fact that the elevation is effected by depressing the carriage without affecting the muzzle, the port-hole will be as high above the water-line as in ordinary vessels.

Third. The deck of the vessel may be two feet lower, thus reducing two feet of exposed broadside surface all round the vessel, and to this extent lessening the chances of being hit.

Fourth. Two feet less of armor around the vessel will be required, thus reducing the top weight and the draft and cost of the vessel and increasing the carrying capacity and efficiency of the same.

Fifth. In sailing, the guns will be lower and nearer the center of buoyancy, and in a storm the guns can be lowered nearly down to the deck.

Sixth. The port-hole will be stronger and better secured, and the strength of the vessel will be thus enormously increased, as no large port-holes are required to be cut along the broadside of the vessel.

Having thus described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. Elevating and depressing guns by their trunnions through the agency of a folding and expanding carriage or its equivalent, substantially as and for the purpose set forth.

2. The construction of the cheek-plates of a gun-carriage, so that they operate as levers, substantially as set forth.

3. The application of the screw or screws S, in the manner and for the purpose substantially as set forth.

4. The training of the gun horizontally by a combination of circular and straight movements, substantially as and for the purpose set forth.

5. Adapting a gun which requires elevation and depression and horizontal training for use in connection with a port-hole which is in size very little greater than the muzzle of the gun, substantially as set forth.

MAXIMILIAN WAPPICH.

Witnesses:

GUSTAVE DIETERICH,  
JOSEPH SHORT.