(No Model.) 2 Sheets—Sheet 1.

D. C. WILLIAMSON.

TYPE WRITING MACHINE.

No. 544,337. Patented Aug. 13, 1895.

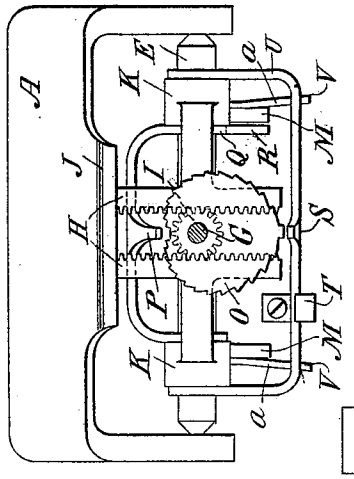

FIG. 2.

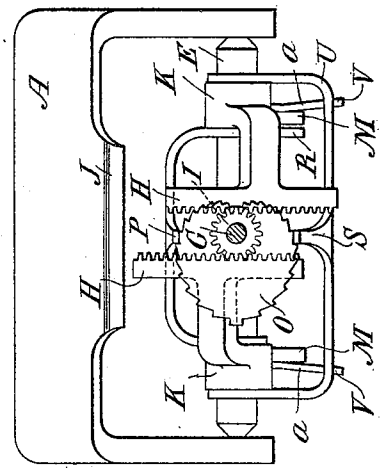

FIG. 4.

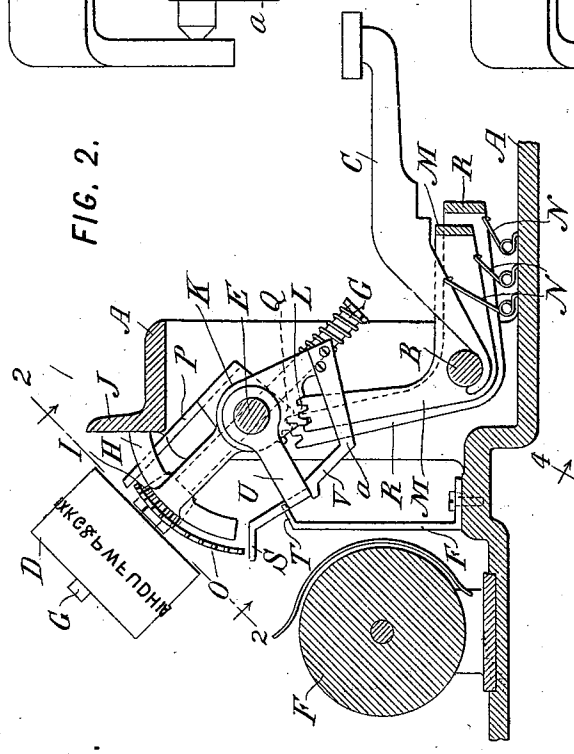

FIG. 1.

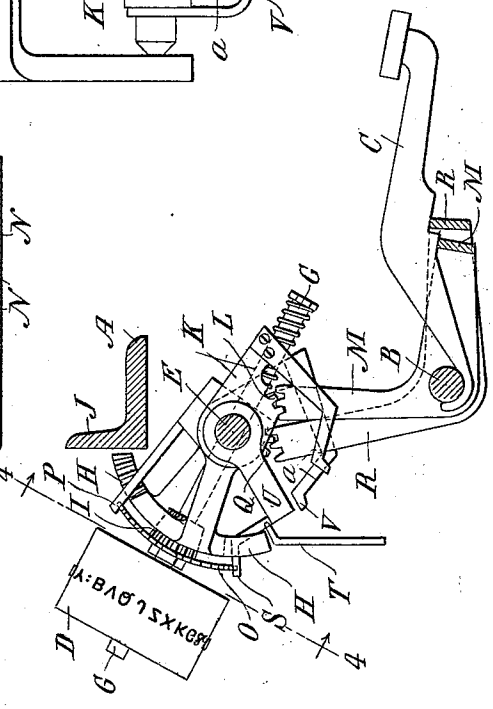

FIG. 3.

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J. W. Lloyd

INVENTOR:

David Charles Williamson,

By his Attorneys,

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(No Model.) 2 Sheets—Sheet 2.

D. C. WILLIAMSON.

TYPE WRITING MACHINE.

No. 544,337. Patented Aug. 13, 1895.

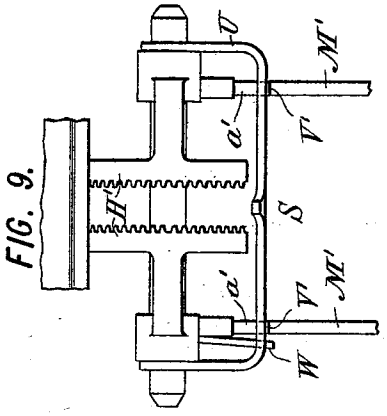

FIG. 9.

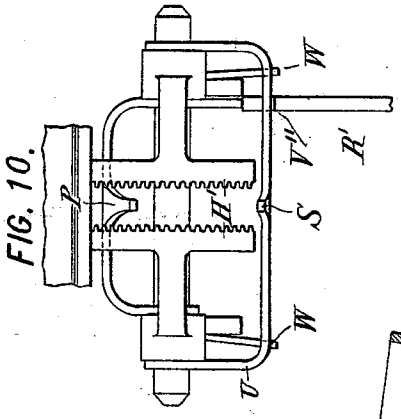

FIG. 10.

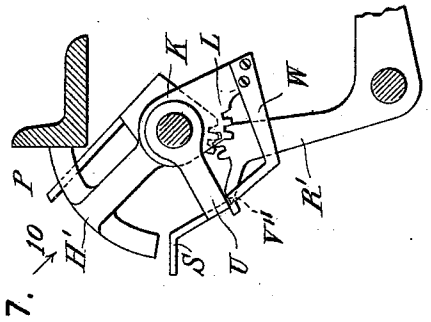

FIG. 7.

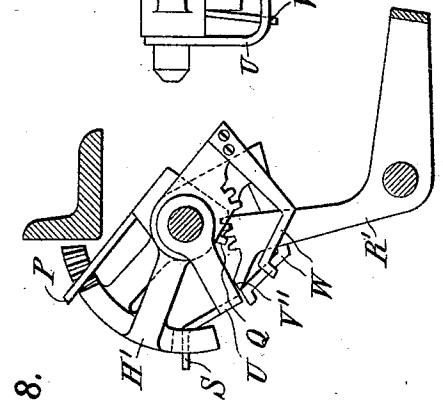

FIG. 8.

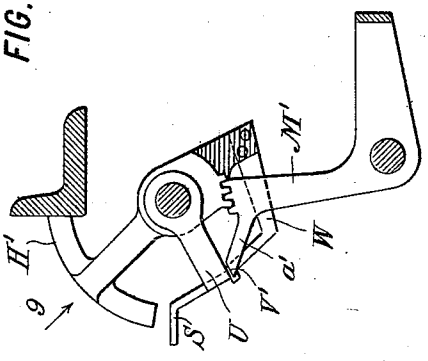

FIG. 5.

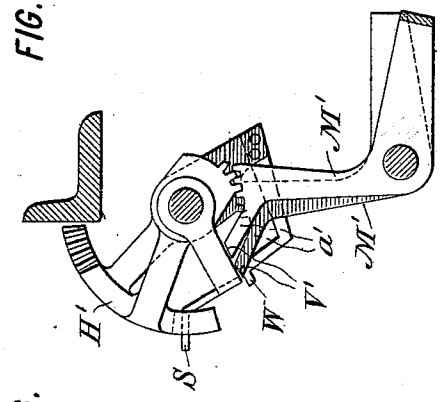

FIG. 6.

WITNESSES:

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INVENTOR:

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UNITED STATES PATENT OFFICE.

DAVID CHARLES WILLIAMSON, OF NEW YORK, N. Y.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 544,337, dated August 13, 1895.

Application filed March 7, 1895. Serial No. 540,864. (No model.)

To all whom it may concern:

Be it known that I, DAVID CHARLES WILLIAMSON, a citizen of the United States, residing in the city, county, and State of New York, have invented certain new and useful Improvements in Catches or Stops for Type-Writers or other Machines, of which the following is a specification.

This invention relates to machines—such as type-writing machines—of the class having a type-wheel having two movements, and aims to provide an improved stop or catch for arresting the part of the machine having two movements, catching it or preventing its rebound as its movements change.

The invention will be described in connection with a well-known form of type-writing machine having a rotary type-wheel rotated to the printing position, then arrested and moved against a platen by a second movement; but it will be understood that the invention is not limited in its use to this particular character of machine.

Heretofore it has been customary in machines of this character to rotate the type member until the desired type is in the printing position, then arrest its rotation by the sudden movement of a dog into a tooth connected to the member, and immediately move the wheel radially toward the platen. The sudden checking of the rotation of the wheel during rapid work tends to create a rebound, which before the type strikes the platen may so displace it as to impair the impression or even to bring an adjacent letter against the platen. To prevent this, detent-catches have been provided consisting of a finger adjacent to a rack fixed to the type member, maintaining a stationary position relatively thereto during the rotation, approached by the rack at the beginning of the printing stroke, then engaging therewith, and thereafter moving with the radial movement of the wheel. To insure engagement of such catches a spring or equivalent tension device has been employed holding them toward the rack, and when the latter engaged the detent the tension of the spring has been added to the resistance to the printing stroke. This tension makes a material difference in the operation of such machine, greatly increasing the force required for the full depression of the keys.

My present improvements aim to provide a catch or detent which shall offer no resistance, or a very slight resistance at most, to the operation of the machine and shall be wholly effective in its function as a catch or as a rebound preventive.

To this end I construct my improved catch as a substantially passive member, or one devoid of material resistance to the movement of the type-wheel or analogous parts, and preferably one which at the instant prior to engagement with the wheel-rack is an unsupported member held in position opposite the rack merely by its own inertia and engaged by the rack before this inertia is overcome by gravitation, so that thereafter the rack in its movement with the detent has nothing to overcome other than the inertia of the latter; and I provide certain improvements in the means for holding the detent while it is inactive.

In the accompanying drawings, which illustrate my improvements in connection with a well-known form of type-writing machine, Figure 1 is a fragmentary vertical section showing diagrammatically the working parts of a type-writing machine provided with my improvements and in the inactive position. Fig. 2 is a fragmentary sectional view thereof cut on the line 2 2 in Fig. 1 and looking downwardly in the direction of the arrow. Fig. 3 is a view similar to Fig. 1 and showing the parts in the position occupied at the starting of the printing stroke. Fig. 4 is a view corresponding to Fig. 2, but showing the parts in the position occupied in Fig. 3 and cut on the line 4 4 in the latter figure. Fig. 5 is a fragmentary view corresponding to Fig. 1 and illustrating a modification. Fig. 6 is a similar view of the same construction showing the parts in a position corresponding to Fig. 3. Figs. 7 and 8 are similar views showing another modification; and Figs. 9 and 10 are respectively views of Figs. 5 and 7, looking in the direction of the arrows 9 and 10 in these figures.

Referring to Figs. 1 to 4, let A indicate the frame of a type-writer; B, the key-shaft thereof; C, the keys; D, the type-wheel; E, the wheel-shaft, and F the platen or roller.

In machines of this class the type-wheel carries on its periphery the type or charac-

ters to be printed, rotating from an initial position to bring the type desired to the printing position and then moving against the platen. The type-wheel is carried by an arm G, traversing the shaft E and engaged by a boss. Rotary motion is imparted to the wheel by either of two movable sectors H on opposite sides of a pinion I fixed to the shaft G, which sectors bear at their upper ends against a rest J of the frame of the machine when in the initial or inactive position. Each sector has a hub K, movably journaled on the shaft E and having gear-teeth L, engaged by like teeth on sector-bails M, fulcrumed on the shaft B and engaged at their other ends by the corresponding keys C of the keyboard. Springs N act against the keys and bails to throw them to the initial position. On the shaft G is a snail or rack O, rotating with the shaft and moving therewith. Opposite this snail is a snail-stop P, which is movably fulcrumed on the shaft E and has teeth Q engaged by a snail stop-bail R fulcrumed on the shaft B, normally held in the initial position by one of the springs N, and engaged at its other end by any of the corresponding series of keys of the keyboard.

In operation the depression of the key C first tilts the corresponding bail M, the teeth of which, by meshing with those of the corresponding sector H, cause the latter to swing downwardly. This movement rotates the pinion I on the other sector, thus rotating the wheel D to the position corresponding to the key depressed. As soon as this position is reached the wheel D should be locked against rotation and begin movement radially on the printing stroke. This is accomplished by depressing the stop-bail R at this moment, so that its teeth, engaging with the teeth Q of the stop P, tilt the latter toward the rack or snail O, the parts being so adjusted that the stop will fall into the corresponding tooth or notch in the perimeter of the snail and lock the wheel with the type corresponding to the key opposed to the platen. The instant that the wheel is thus locked further depression of the key will cause it and both the sectors to move radially toward the platen. As soon as the key is released the parts will restore themselves to the initial position under the tension of the springs. One sector rotates the wheel substantially a half-revolution in one direction and the other substantially a half-revolution in the other direction. The stop P is stationary during this rotation, occupying a fixed position relatively to the perimeter of the snail, until the time arrives for it to engage the latter and stop rotation. For this purpose the snail is constructed of substantially cycloidal curves, so that its perimeter shall preserve proper proximity to the stop as the wheel rotates therefrom.

In slow or moderate operation little difficulty is experienced in accurately stopping the type-wheel, but during rapid work the concussion as the stop engages the snail causes a rebound, sometimes sufficient to displace the wheel several letters from that corresponding to the key depressed. To prevent this the rebound catch or stop S is provided, which is opposed to the snail O, preferably opposite the stop P, and normally maintains a fixed position adjacent to the perimeter of the snail; but as soon as the latter is caught and its radial movement begins it is designed to then engage the stop S and be thereby restrained from rebounding, or otherwise suitably held during a part or the whole of the printing operation.

Heretofore the stop S has been held toward the snail by any suitable tension device, usually a spring, and an arm T, resisting the tension while the detent-stop S was inactive, has been employed. The spring held the stop S against the arm T until the snail moved into engagement with the stop, and then the snail and stop moved downwardly together, overcoming the tension of the spring during the printing operation. The necessary resistance of the spring was so great when transmitted through the mechanism to the key that it impaired the facility of operation of the machine. To overcome this many attempts at employing diminishing-tension devices for the stop S have been made. In all such constructions the stop has been constructed, as shown in the drawings, as a finger or detent projecting from a bail or other frame U fulcrumed and swinging on the type-shaft E.

My invention provides an improved stop or catch and improved means for operating and controlling it. In their preferred forms these improvements are constructed as shown in Figs. 1 to 4, wherein the stop is a passive or substantially passive member, freely suspended relatively to the type member and its rack or snail O and in operation freely movable therewith during the down or printing stroke, or part of this stroke; and when inactive the stop or catch is maintained in proper position by one or more suitable supports, movable at the proper time to permit its free movement with the type member.

The improved stop is preferably entirely free from springs or other counterbalancing devices exerting either tension to support it or opposition to its movement with the member it engages. It is normally held in position to the snail O by a support V, which support at the instant required is removed from beneath the snail, so that the latter is supported only by its own inertia. At this time the ordinary stop P engages the snail, thus instantly converting the motion of the type member and snail from a rotary into a radial movement. This radial movement, being a forced movement, throws the snail and type member down so rapidly that the rebound stop or catch S is overtaken and engaged by the proper tooth of the snail before the latter catch has effected any material downward movement under its own weight and before the rebound tendency of the type member

has exerted itself to displace the latter. Then the snail is locked between the stop P and catch S, and is so held during the printing stroke, and preferably until the return stroke is so far completed that one of the sectors engages the part J of the machine-frame. In the return stroke the catch S may rise with the snail until it is arrested by the arm T, or it may fall from the snail during the printing operation and be raised independently thereof by any suitable means, as, for example, by the member serving to support it when inactive, the latter being done in the construction shown.

The releasing of the catch S is done at the proper time relatively to the catching of the stop P and the inauguration of the radial movement of the printing member to insure that the catch shall be overtaken by the snail at the proper moment. For this purpose the support V is properly constructed and adjusted to leave the catch S unsupported, or substantially so, when desired, so that, after catching, the resistance of the stop to the movement of the printing member shall be limited only to the inertia of the stop or catch S.

The support for the catch S may be variously constructed, but I prefer to form it as a portion of one of the actuating parts of the machine—as, for example, shown in Fig. 1, wherein two supports are used, each consisting of a finger or part *a*, carried by or connected to the sectors H and moving therewith. One finger is connected to one sector and the other to the other, and each engages the bail or frame U of the catch S during the inactive position of the parts. When either sector is depressed its finger moves with it from beneath the catch S until the sector ceases to move independently of the other, and during this time the finger of the other sector supports the catch. At the instant the type-wheel is locked by the stop P both sectors move together, the type-wheel moving with them, and the finger then supporting the catch S starts to move down with its sector. The movement of all is so sudden at this time that the catch is left suspended in the air without support and sustained only by its own inertia. Before this inertia is overcome by gravitation the catch is overtaken by the snail, locking the latter against rebound, and is carried down thereby until the printing is effected. At this moment the parts occupy the position shown in Fig. 3, one of the supports being slightly beneath the bail of the catch S and the other removed from it to the extent to which its sector moved in bringing the type-wheel to the desired position. On the return stroke the catch either rises still in engagement with the snail until it is stopped by the arm T or it falls from the snail and is caught by the finger of the nearest support V and raised by the latter to the normal position.

It will be seen that my invention provides an improved catch or equivalent device for moving parts which can be employed without adding any material opposition to the movement of the part with which it is used, and it will be understood that it is not limited in its application nor in its construction to the particular character of machine set forth nor to the particular details of construction and operation described, since it can be employed for any analogous function to that described and in any machine having the same general principles of operation, and the details of construction of the stop and its support may be varied as circumstances or the judgment of those skilled in the art may dictate.

One modification of the invention is shown in Figs. 5 and 6, in which the supports, instead of being connected to the sectors, (here lettered H′,) are formed on the sector-bails, (here lettered M′,) having rearwardly-extending fingers *a′*, having supporting ends V′ taking beneath the bail U of the catch S. In this construction the finger of one bail M′ passes from beneath the catch S as its sector is depressed, and the finger of the other bail M′ remains beneath the catch S and supports it until the instant or immediately after the downward movement begins, at substantially which time it also passes beneath or away from the catch, thus leaving it unsupported. In these figures the usual arm T is omitted. In all constructions this arm is not essential to the operation of the device, although it is usually desirable.

In the construction shown in Figs. 7, 8, and 10 only one support for the catch S is provided. This support (here lettered V″) consists of a finger carried by or connected to the snail stop-bail, (here lettered R′.) This finger is adjusted to free the catch S immediately at or shortly after operating the stop P to check the rotation of the snail.

With either of the constructions shown in Figs. 5 to 10, inclusive, it is necessary to provide means for restoring the catch S to its normal position. Any suitable means for this purpose can be employed, but I prefer in each instance to provide on one or both of the sectors a projecting arm W, which, as the sectors rise, shall take under the bail of the catch or otherwise engage it to restore it. In Figs. 5, 6, and 9 one such arm is shown on one sector only, and in Figs. 7, 8, and 10 one is shown on each of the two sectors.

It is not essential that the member operated on by the catch S shall have both a rotary and a radial movement, as the catch can be used with any member which is subject to two movements the change from one to the other of which is sudden or in any instance where it is desired that a catch or equivalent device shall interpose no resistance of a material character to the movement of the member.

What I claim is, in catches or stops for typewriters or other machines, the following-defined novel features and combinations, substantially as hereinbefore set forth, namely:

1. In catches and analogous devices, a mov-

able member, and a catch adjacent thereto, said member movable toward said catch, and said catch movable away from and normally supported in juxtaposition to said member, and a removable support for said catch holding it toward said member and in its normal position and freeing it when moved, said catch substantially unsupported when thus freed, and then movable with said member.

2. In catches and like devices, a movable member, and a catch free to move therewith, opposed to said member, said member moving toward said catch, and a removable support for said catch, normally maintaining the latter toward and in position relatively to said member, and when the latter moves toward said catch freeing said catch and leaving it unsupported.

3. In catches and like devices, a movable member, and a catch in the path of movement thereof and movable freely and unresistingly therewith when engaged thereby, swinging on an axis and unsupported during part of the movement of said member toward it.

4. In typewriters or analogous instruments, a member D, a sector H, a rack O, a stop P, a catch S, means for operating said sector to rotate said member and to move it radially toward said catch, and a support V for said catch, substantially as and for the purpose set forth.

5. In typewriters and analogous machines a member D, a sector H, a rack O, a catch S, a support for the latter, means for operating said sector to rotate said member and to move it radially, means for releasing said support to permit movement of said catch with said member, and means for restoring said catch to its initial position after such movement, substantially as and for the purpose set forth.

In witness whereof I have hereunto signed my name in the presence of two subscribing witnesses.

DAVID CHARLES WILLIAMSON.

Witnesses:
GEORGE H. FRASER,
THOMAS F. WALLACE.