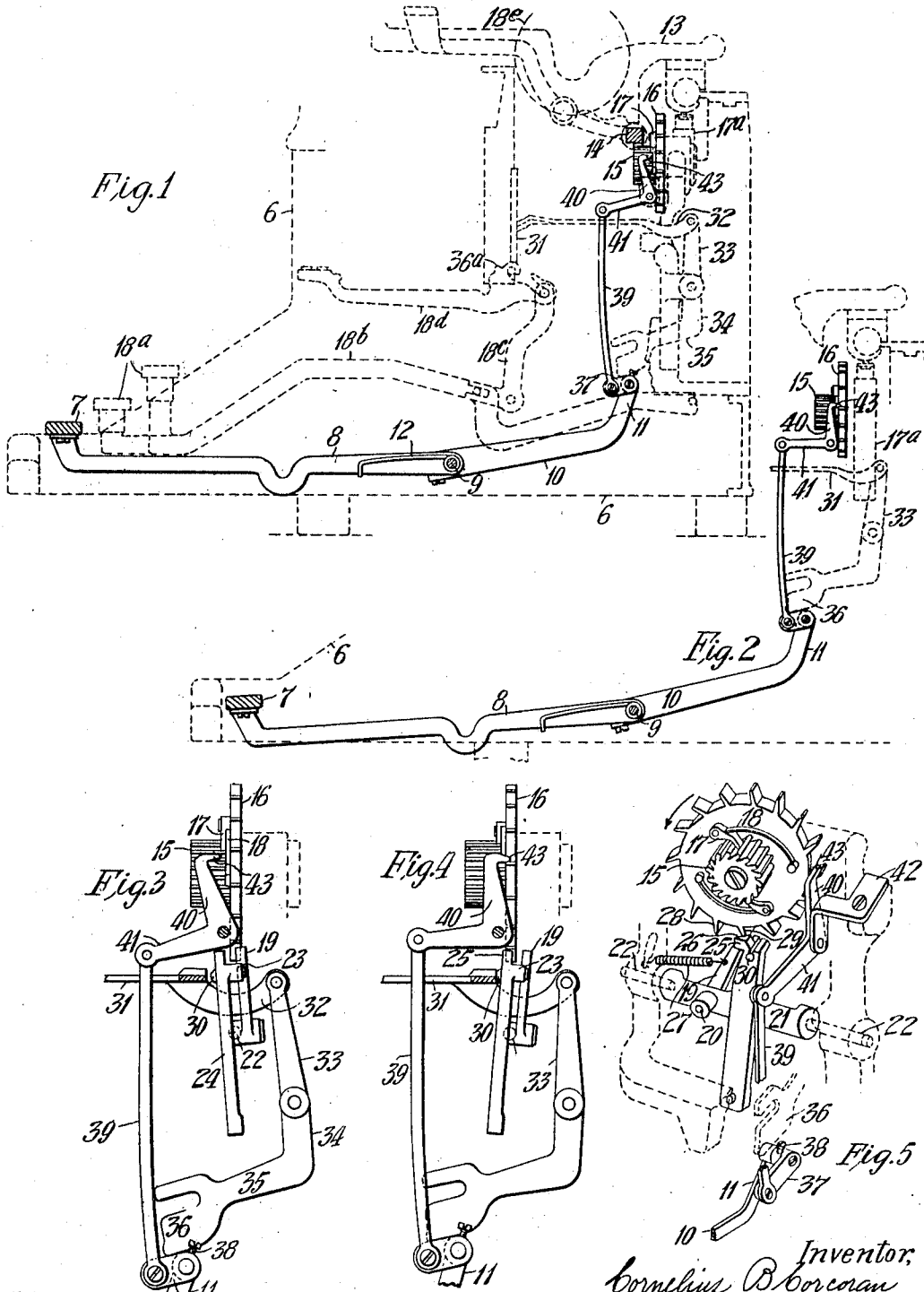


C. B. CORCORAN.
TYPE WRITING MACHINE.
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TYPE-WRITING MACHINE.

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To all whom it may concern:

Be it known that I, CORNELIUS B. CORCORAN, a citizen of the United States, residing in the borough of Bronx, city of New York, in the county of New York and State of New York, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

This invention relates to the escapement devices of typewriters, and is illustrated in connection with an escapement wheel which is connected with the rack of the carriage, and which tends to rotate by reason of the tension which is exerted upon the carriage by a driving spring.

In the Underwood machine, there is a rocking detent dog upon which there is pivoted a spacing pawl, and this dog and pawl are arranged side by side, so that either the dog or the pawl may be rocked into engagement with the teeth of the escapement or star wheel. Normally the spacing pawl is in engagement with the star wheel, but when the universal bar is actuated, the spacing pawl is moved out of engagement and the detent dog is moved into engagement with the wheel, and the spacing pawl is advanced to the next wheel tooth. When the universal bar returns, the spacing pawl engages with the forward side of the next tooth, the detent dog moves away from the wheel, and the tension on the carriage then rotates the star wheel through one tooth space, as permitted by the spacing pawl. In other words, the detent dog affords means for holding the star wheel momentarily while the pawl is being displaced and brought into engagement with the next tooth. The detent dog usually has a bevel or cam at the point where it engages the teeth of the star wheel, as this greatly facilitates rapidity of action of the escapement when the type keys are being operated. However, on account of the presence of this cam, the star wheel sometimes forces the dog laterally upon its rocking axis, so that the escapement will be let out by more than one tooth space for one depression of a key. This is particularly likely to happen with the space key, owing to the fact that said key is usually connected to operate the dogs by a long thin lever which springs or yields under the camming action of the dogs. Moreover the operator's stroke on said space key is usually lighter than the

stroke on the type keys, so the finger of the operator is not infrequently involuntarily vibrated by the cam face of said dog. A type key rarely allows such skipping when depressed, because of the weight of the type bars. In other words, the device may skip a tooth at times when the space key is being operated.

The object of this invention is to prevent the possibility of the escapement being let out through more than one tooth space when the space key is depressed.

In the accompanying drawings, Figure 1 is a vertical section through the space key or bar and through the machine in a front and rear direction, showing the principal parts of my improvement in side elevation. In this view the feed rack is shown in cross section; and in dotted outline I have represented parts of the frame and mechanism. This view shows the parts in their normal positions, the spacing bar being elevated. Fig. 2 is a view similar to Fig. 1, but showing my device in the relation assumed by the parts when the space bar is depressed and the star wheel held against skipping. Fig. 3 is a detail view upon an enlarged scale taken in the same plane with Figs. 1 and 2, and showing the parts in normal position, with the safety pawl out of engagement with the star wheel. Fig. 4 is a view similar to Fig. 3, showing the escapement in the act of being operated, and illustrating how the safety pawl engages the star wheel to prevent skipping. Fig. 5 is a detail perspective showing part of the connection between the space key and the safety pawl, and the relation between the safety pawl and the escapement mechanism.

The frame 6 of the machine is shown in dotted outline. In this frame, in the usual manner, there is mounted a space bar 7 at the keyboard; this bar is supported on levers 8, mounted on a horizontal fulcrum bar 9. Connected to this bar 9, a rearwardly extending lever 10 is provided, the rear end of which is formed with a forwardly extending upwardly inclined neck 11. Around the fulcrum bar 9 is a returning spring 12.

The carriage 13 of the machine indicated in dotted outline, is provided with a rack 14, which extends longitudinally of the carriage in the usual manner, and this rack meshes with the teeth of a pinion 15. This

pinion is loosely mounted on the forward face of a spur wheel or star wheel 16, and on opposite sides of the pinion, pawls 17 are provided, which are held in engagement with the teeth of the pinion by springs 18, as shown. These pawls 17 permit a free reverse movement of the carriage. A suitable driving spring 17^a is connected with the carriage, tending to feed it toward the left, and in such a direction as would tend to rotate the pinion and the star wheel in the direction of the arrow shown in Fig. 5. Type keys 18^a operate levers 18^b and 18^c to swing type-bars 18^d to strike against platen 18^e. The star wheel is normally held against rotation by a spacing pawl 19, which is mounted on a pivot pin 20 on the side of a rocker or rock bar 21, as shown most clearly in Fig. 5. This rocker is mounted below the star wheel in a horizontal position, and in a position transverse to the axis of the star wheel, the ends of the rocker being supported by gudgeons 22. This pawl 19 is mounted so that it can swing substantially in the plane of rotation of the star wheel. In the normal position of the mechanism, as indicated in Figs. 3 and 5, the tip of this pawl is in engagement with one of the teeth of the star wheel, the pressure of the tooth against the pawl holding the pawl back against a stop or lug 23, formed on the side of a dog 24, which dog is formed rigidly with the rocker 21. The upper end of the dog 24 is formed into a laterally projecting head 25, and this head has an inclined or beveled edge 26, which is adapted to rock into engagement with the forward side of the teeth of the star wheel, when the escapement is actuated. To the spacing pawl 19, a coiled spring 27 is attached which extends in an inclined position above the axis of the rocker 21, and this spring pulls the pawl over into engagement with the next tooth 28 when it is liberated from the engaged tooth 29.

In the body of the lug 23, an adjusting pin or screw is mounted, the forward end of which projects so as to be operated by a universal bar 31. The forward part of this universal bar 31 is supported in any suitable manner and the rear end is formed with a rigid arm 32, to which is pivotally attached the upper arm 33 of a bell crank lever 34, mounted to swing in a vertical plane in the rear of the typewriter. This bell crank lever has a forwardly extending lower arm 35, terminating in a fork 36 in the usual manner. It will be understood that the universal bar 31 may be moved rearwardly by means of heels 36^a on the type-bars 18^d, and in moving rearwardly, the edge of the universal bar presses against the pin 30, and rocks the dog 24 and pawl 19 over into the position shown in Fig. 4. In other words, the rocker 21 is rocked on

its axis, and the beveled edge 26 comes into contact with the forward side of the engaged tooth 29, while the spacing pawl 19 is liberated from the tooth. Spring 27 pulls the pawl 19 into engagement with the next tooth 28, so that, as the universal bar recedes, the star wheel 16 rotates through one tooth space, forcing the pawl 19 back against the stop 23.

As suggested above, on account of the beveled edge 26, it sometimes happens in the operation of the space key 7, particularly when the tension on the carriage is great, that the tooth engaged by the dog will force the dog laterally and liberate the star wheel temporarily, permitting it to rotate through more than one tooth space. This action is what I have designated as skipping, and it is this defect that my device overcomes.

The upper end of the arm 11 of the space key or bar rests against the under side of fork 36, in such position as to rock the bell crank lever 34 toward the right. For convenience, I provide the extremity of arm 11 with a short arm 37, which is adjustably secured by means of a suitable set screw 38, and to this arm 37 a link 39 is attached extending upwardly in a nearly vertical position, and to the upper end of this link 39, a safety pawl 40 is attached, said pawl being disposed in a vertical plane and having a horizontal tail or arm 41. However, the arm 37 may be omitted in some cases, and the pawl 40 may be otherwise formed and operated. This pawl may be pivoted on a bracket plate 42 attached on the typewriter frame, as indicated in Fig. 5. The upper end of this pawl 40 is provided with a laterally projecting pallet 43, which normally lies near the path of the teeth of the star wheel and which may project into their path, so as to prevent the rotation of the star wheel as indicated in Figs. 4 and 5.

The mode of operation of my improvement is as follows: When the space bar 7 is depressed, the arm 10 rocks the bell crank lever 34 in a right hand direction, so as to actuate the universal bar 31, and operates the escapement which comprises the star wheel, the dog 24 and the pawl 19. When the beveled edge 26 moves into engagement with the engaged tooth 29, the arm 10 operates simultaneously through the link 39 to rock the pawl 40, so as to bring the pallet 43 into engagement with the forward side of an adjacent tooth, as shown in Fig. 4. In this way, the safety pawl 40 positively prevents the rotation of the star wheel until the spacing pawl 19 has engaged with the next tooth; and when the space bar 7 is released and allowed to return, the pawl 40 falls back out of the way of the teeth of the star wheel and permits the star wheel to rotate. The star wheel then rotates through one tooth space. In this manner, the pawl 40 performs

an auxiliary function to prevent the defect referred to above. For this reason, it may be considered as a safety pawl or guard to render the action of the escapement device more positive.

The invention may be applied to other kinds of escapement mechanism, and variations may be resorted to within the scope thereof.

Having thus described my invention, I claim:

1. In a typewriter, in combination, a spur wheel, a pair of detents cooperating therewith in the escapement movement, a space key, and a separately operated safety pawl mounted to rock in a plane substantially at right angles to the plane of said spur wheel, and connected to said space key to be projected into the path of the teeth of said spur wheel.

2. In a typewriter, in combination, a spur wheel, a pair of detent pawls cooperating therewith in the escapement movement, a separately operated safety pawl mounted to rock in a plane substantially at right angles to the plane of said spur wheel, and adapted to project into the path of the teeth of said spur wheel so as to allow said wheel to turn substantially the distance between two spurs, and means for simultaneously actuating all of said pawls.

3. In a typewriter, the combination with a toothed escapement member, of a pair of pawls cooperating therewith comprising one pawl having a face adapted to slip easily off said member, a key operating said pawls, and a separately operated pawl arranged at each depression of said key to be interposed in the path of a tooth in said escapement member to hold said member as it is arrested by the pawl which is adapted to slip.

4. In a typewriter, the combination with a toothed escapement member, of a pair of pawls cooperating therewith, keys arranged to operate type and said escapement, and a space key arranged to operate said escapement and also arranged to thrust a third pawl into the path of said escapement member to positively arrest said member as one of the first pawls moves across said escapement member.

5. In a typewriter, the combination with a toothed escapement member, of two pawls controlling said member, said pawls mounted on one bar, one of said pawls comprising a cam face, and a third separately operated pawl comprising a flat face arranged to positively arrest said escapement member.

6. In a typewriter, the combination with a toothed escapement member and pawls controlling said escapement member, of alphabet keys controlling said escapement member, a space key also controlling said escapement member, and a pawl holding said escapement member operated by said space key but not by said type keys for cooperating with the first pawls.

7. In a typewriter, the combination with a locking pawl having a cam face, and a spacing pawl having a flat face, of a toothed escapement member controlled by said pawls, and a second locking pawl having a flat face cooperating with said escapement member to hold it after it has fed forward substantially one tooth.

8. In a typewriting machine, the combination with a type key and an escapement device operated thereby, of a space key operating said device, and a separate locking dog operated by said space key.

9. In a typewriting machine, the combination with a type key and a typewriter carriage, of a spacing dog and a holding dog operated by said key, a space key also operating said dogs, and a third pawl or dog for holding said escapement operated by said space key.

10. In a typewriting machine, the combination with a carriage and an escapement device therefor, including teeth, of two pawls arranged to alternately engage said teeth, keys operating said pawls, a third pawl, and a key connected to operate said first pawls and to throw said third pawl between said teeth so as to positively arrest said carriage after it is fed by said first pawls the space of substantially one tooth.

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