No. 703,082. Patented June 24, 1902.

C. J. PAULSON.

TYPE WRITER.

(Application filed May 15, 1901.)

(No Model.)

Fig. 1.

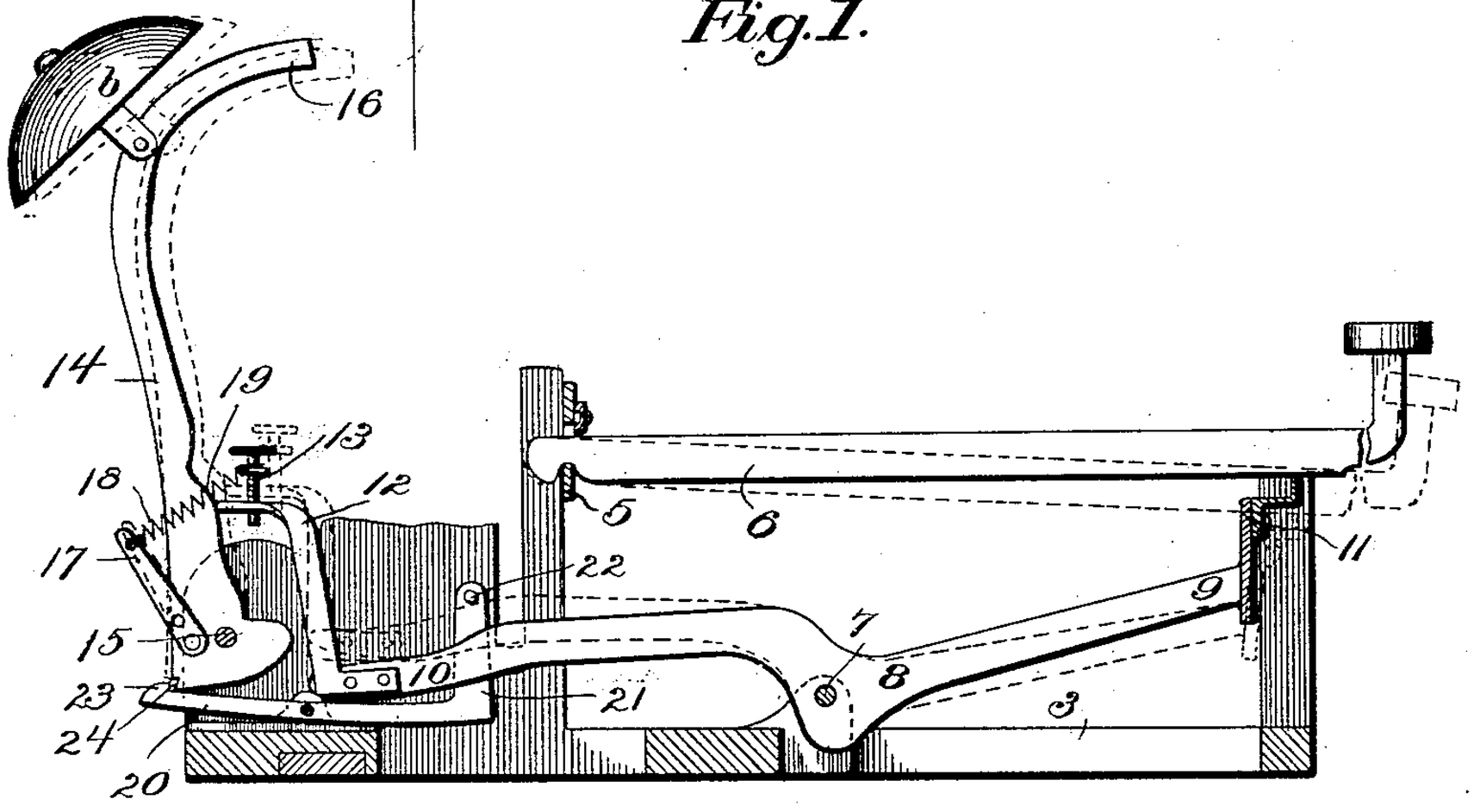
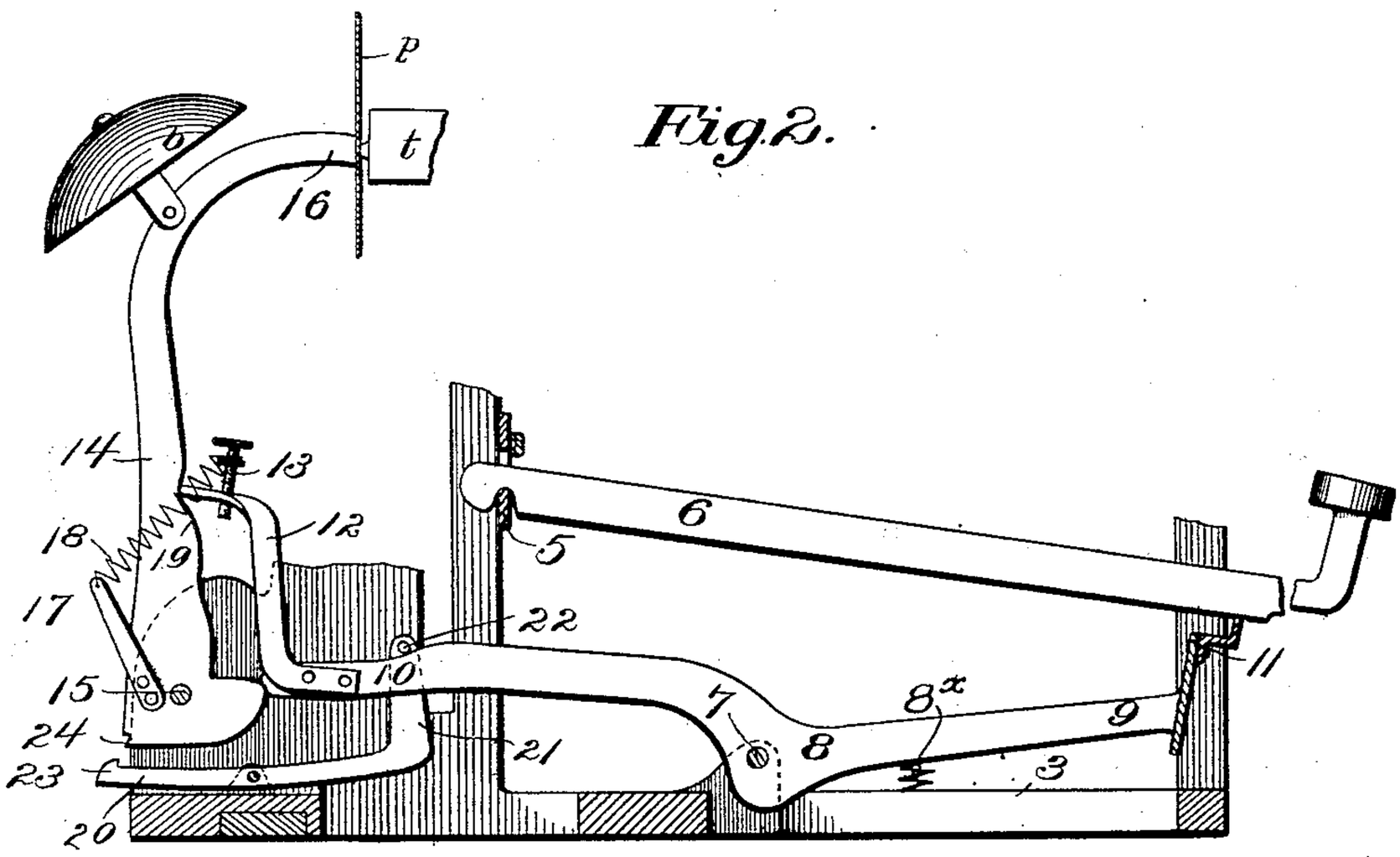


Fig. 2.



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TYPE-WRITER.

SPECIFICATION forming part of Letters Patent No. 703,082, dated June 24, 1902.

Application filed May 15, 1901. Serial No. 60,300. (No model.)

To all whom it may concern:

Be it known that I, CHARLES J. PAULSON, a subject of the King of Sweden and Norway, residing in Brooklyn, in the county of Kings and State of New York, have invented certain new and useful Improvements in Type-Writers, of which the following is a specification.

This invention relates to type-writing or impression machines, and more particularly to that class of machines having hammer-and-anvil action. It has for its main object to provide mechanism for operating the hammer to cause it to give a blow of predetermined force irrespective of the amount of force or the rapidity of the stroke applied to the operating devices or finger-keys.

In carrying out my invention I employ a hammer adapted to give a blow for producing impressions and which is restrained from giving the blow until the power for that particular blow has been imparted and held in reserve to be suddenly released upon the hammer.

This invention is directed to a device to regulate the force of the blow given in producing impressions, so that upon proper adjustment the blows may have substantially uniform force. If finger-keys are employed for operating the hammer, a slow or unsteady fingering will when conveyed by the hammer be as clear and uniform as that produced by a practiced hand, and a quick or heavy stroke on the finger-key will convey a blow substantially no harder than the former. The paper or other object on which the impressions are made is thus saved from rupture by a too-hard blow and the printing will be uniform, because the hammer gives the same blow, irrespective of the amount of energy expended on the operating means.

The impression characters or devices are given a longer life, not being subject to be battered down by violent use.

My invention is adapted to be applied to any form of impression-machine of this general class, and in carrying out my invention any suitable means may be employed in practice as desired—as, for instance, a lever operated by finger-keys or other suitable means, and which upon being operated actuates a spring connected with the hammer, and after a predetermined amount of force has been imparted to the spring the lever actuates mechanism to release the hammer, permitting it under the influence of the spring to give blows of substantially uniform power, regulated by the tension applied to the spring by some convenient device.

Although various forms and organizations of the various parts may be employed in carrying out my invention, I have shown in the accompanying drawings one form of such parts as applied to the frame of a type-writer, having left off all the mechanism not directly appertaining to or coöperating with the parts embodying my invention which may be the preferred form if desired.

In the drawings accompanying and forming part of this specification, Figure 1 represents a side view of a part of a type-writer, showing my invention applied thereto, the full lines representing the parts in their normal position and the dotted lines showing the parts in an intermediate position; and Fig. 2 is a view of the same, showing the parts in the position in which the hammer gives its blow.

Like characters of reference designate corresponding parts in both figures of the drawings, wherein is shown a type-writer-machine frame of any convenient construction 3, having an upward projection, on which is carried a slotted bar 5, forming the fulcrum-point for the key-levers, one only being shown here, as 6. Under the key-levers and pivoted to the frame of the machine at 7 is provided a lever 8, having ends 9 and 10, the end 9 being upturned at 11 to be engaged by the key-levers, the end 10 of which lever has an extending end 12, carrying a tension-screw 13. Said portion 11 (shown in cross-section) extends transversely beneath the key-levers. The hammer 14 is here represented as pivoted to the frame of the machine at 15, its printing or striking end 16 being curved or of any suitable formation, as desired or found expedient in practice. On the opposite or lower end of the hammer operates in any convenient manner a spring, the hammer being here shown as having an arm 17, connected by a spiral spring 18 with the tension-screw 13. The hammer is provided along its front edge with a cam-face 19, adapted to be normally in engagement with the upturned end 12 of the lever 8. Below the hammer and the lever

8 is pivoted a bell-crank lever 20, having an overbalanced end provided with an upwardly-projecting arm 21, provided with a pin 22, projecting above and in the path of the lever 8, the opposite end of said bell-crank lever being provided with a pawl 23, adapted to engage a notch 24 in the lower end of the hammer, but normally located out of engagement therewith.

The impression-line of the device is here represented at *p*, which may be paper or any other article on which an impression is to be made, and a broken-away part of a type-shuttle *t*. Of course the type may be placed on the hammer and a platen provided to receive the impact of the blow.

The operation of the device, as illustrated in the drawings, is as follows: When any of the keys 6 is depressed, the transverse bar 11 is forced down and the rear end 10 of its lever is lifted, thereby tensioning the spring 18, so that the hammer is brought up to the position shown in dotted lines at Fig. 1, where it is arrested by the trigger 20, whose weighted forward end gives the tooth 23 a constant upward tendency. During the succeeding portion of the downstroke of the key and while the hammer remains stationary the spring 18 is further distended, thus putting the hammer under considerable tension, and at the last part of the key-stroke the portion 10 of the lever 8 strikes the contact-point 22 upon the trigger and causes the latter to release the hammer, so that the latter flies forward under the tension of the spring 18 to make the impression, Fig. 2, and the paper *p* is forced against the type *t*. Upon releasing the finger from the finger-key the parts will assume their normal position, the hammer, cam, and lever coming in engagement immediately after the blow is struck and the lever released, the hammer being returned positively by the end of the lever acting upon its cam-face, said lever being provided for this purpose with any suitable returning-spring—as, for instance, a compression-spring $8^{\times}$. It will be observed that by the action of the part 12 upon the cam-face 19 the hammer is returned to its dotted-line locking position before the key is fully returned to normal position, so that a succeeding key may be immediately operated without waiting for the complete return of the first operated key to a normal position, thus conducing to speed and ease of operation. So far as certain features of my invention are concerned, however, the parts may be so proportioned that the hammer will become relocked by the trigger at the terminal portion of the upstroke of the key. One of the main advantages of my invention resides in putting the hammer under control by a key-tensioned spring, releasing the hammer at the last portion of the key-stroke and positively returning the hammer to locking position, whereby the machine may be operated at high speed and uniform type-impressions produced.

Although but one embodiment of my invention is illustrated in the drawings, yet any convenient form may be adopted as in practice may be found convenient, and although finger-keys are represented yet any other actuating means may be employed, either manual or mechanical, without departing from the spirit of my invention.

Having described my invention, I claim—

1. The combination with keys, of a member common to said keys and actuated thereby; a type-hammer pivoted at one end and connected to said member by a spring; a trigger for restraining said hammer, said trigger being releasable by said member; and means for causing said member, when released by the keys, to force the type-hammer to swing back to locking position.

2. The combination with keys, of a lever actuable by any of said keys; a type-hammer pivoted at its lower end and having its striker at its upper end and also having a yielding connection to said lever; a trigger for restraining said type-hammer, said trigger being controlled by said lever; and means for causing said lever to force said type-hammer to swing back to locking position.

3. The combination with keys, of a transverse device, as 11, actuable by any of said keys; a pivot 7 whereon said transverse device swings; a type-hammer pivoted at one end and having a striking-head at the other end and also having a spring connection to said transverse device; an arm 12 rigid with said transverse device; a trigger for restraining said type-hammer, said trigger being releasable at the terminal portion of the initial movement of said transverse device 11; and means for causing said arm 12 to swing back said hammer to its locking position.

4. The combination with keys, of a lever actuable by any of said keys; a type-hammer swinging upon a pivot and having a striking-head at its free end and also having a yielding connection to said lever; a trigger releasable by said lever and adapted to restrain said type-hammer when tensioned by said lever; and means for causing said lever to force said hammer to swing back to locking position.

5. The combination with keys, of a member which is moved at each key-stroke; a type-hammer mounted upon a pivot; an adjustable spring connecting said type-hammer to said member; a trigger releasable by said member and adapted to restrain said hammer; and means for causing said member to swing back said hammer to locking position.

6. In a type-writing machine, the combination of a type; a type-hammer mounted upon a pivot; a key; a spring tensioned by said key and tending to swing said hammer to the impression-point; a trigger restraining said hammer and releasable by said key; and a spring operating at the swing back of said key to return the hammer to locking position.

7. In a type-writing machine, the combina-

tion of a type; a type-hammer mounted upon a pivot; a key; a spring tensioned by said key and tending to swing said hammer to the impression-point; a trigger restraining said hammer and releasable by said key; and a spring operating at the return of said key to swing back the hammer to locking position, said hammer-tensioning spring being adjustably connected to said key.

8. In a type-writing machine, the combination with keys and a type-hammer, of a spring for moving said hammer to the printing-point; a trigger for restraining said hammer; and means controlled by said keys for retracting said hammer to locking position during the upstroke of the keys and materially before the complete return of the keys to normal position.

9. The combination with keys, of a hammer-spring tensioned by said keys; a trigger for said hammer; means for enabling said keys to release said trigger; and means for positively returning said hammer to locking position during the return of the keys and at a material interval before they reach normal position.

10. The combination with keys, of a member common to said keys and actuated thereby; a type-hammer connected to said member by a spring; a trigger for restraining said hammer, said trigger being also releasable by said common member; and means for causing said member to force the type-hammer back to normal position during the return of the keys and at a material interval before they reach normal position.

11. The combination with keys, of a lever actuable by any of said keys; a type-hammer having a yielding connection to said lever; a trigger for restraining said type-hammer, said trigger being controlled by said lever; and means for causing said lever to force said type-hammer back to locking position during the return of the keys and at a material interval before they reach normal position.

12. The combination with keys, of a transverse device, as 11, actuable by any of said keys; a pivot 7 whereon said transverse device swings; a type-hammer connected by a spring to said device 11; an arm 12 rigid with said device 11; a trigger for restraining said type-hammer, said trigger being releasable at the terminal portion of the movement of said device 11; and means for causing said member 12 to restore said lever to its locking position during the return of the keys and materially before they reach normal position.

13. The combination with keys, of a lever actuable by any of said keys; a type-hammer having a yielding connection to said lever; a trigger releasable by said lever and adapted to restrain said type-hammer when tensioned by said lever; and means for causing said lever to force said hammer back to locking position during the return of the keys and materially before they reach normal position.

14. The combination with keys, of a type-hammer; an adjustable spring connecting said type-hammer to a member which is moved at each key-stroke; a trigger releasable by said member and adapted to restrain said hammer; and means for causing said member to restore said hammer to locking position during the return of the keys and materially before they reach normal position.

15. In a type-writing machine, the combination of a type; a type-hammer; a key; a spring tensioned by said key and tending to move said hammer to the impression-point; a trigger restraining said hammer and releasable by said key; and a spring operating to restore the hammer to locking position during the return of the key and at a material interval before the latter reaches normal position.

16. In a type-writing machine, the combination of a type; a type-hammer; a key; a spring tensioned by said key and tending to move said hammer to the impression-point; a trigger restraining said hammer and releasable by said key; and a spring operating to restore the hammer to locking position during the return of the key and materially before the latter reaches its normal position; said hammer-tensioning spring being adjustably connected to said key.

17. In a type-writer, the combination with a pivoted hammer having a cam-face; means operative by a finger-key in engagement with the cam-face; a spring operable by said means and effective to advance the hammer against the key-operated means; and means engaging said hammer and adapted to be engaged by said key-operated means for holding and releasing said hammer.

18. In a key-operated machine, the combination with a frame, of finger-keys located thereon; a lever below said finger-keys and operable thereby; a pivoted hammer having a cam-face adapted to be in engagement with said lever during part of the movement thereof; a spring connecting said lever and hammer; a bell-crank lever having a pin in the upward path of said lever; and a pawl adapted to engage the hammer after it has been partially advanced and to be tripped by the lever to release the hammer to the influence of the spring after the lever has passed over the cam-face of the hammer.

19. In a machine of the class specified, the combination with a pivoted hammer; a cam-face in connection with the hammer; and a lever adapted to engage said cam-face and control the forward movement of the hammer up to a period just prior to its blow and to again engage said cam-face for the purpose of returning the hammer to its normal position.

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