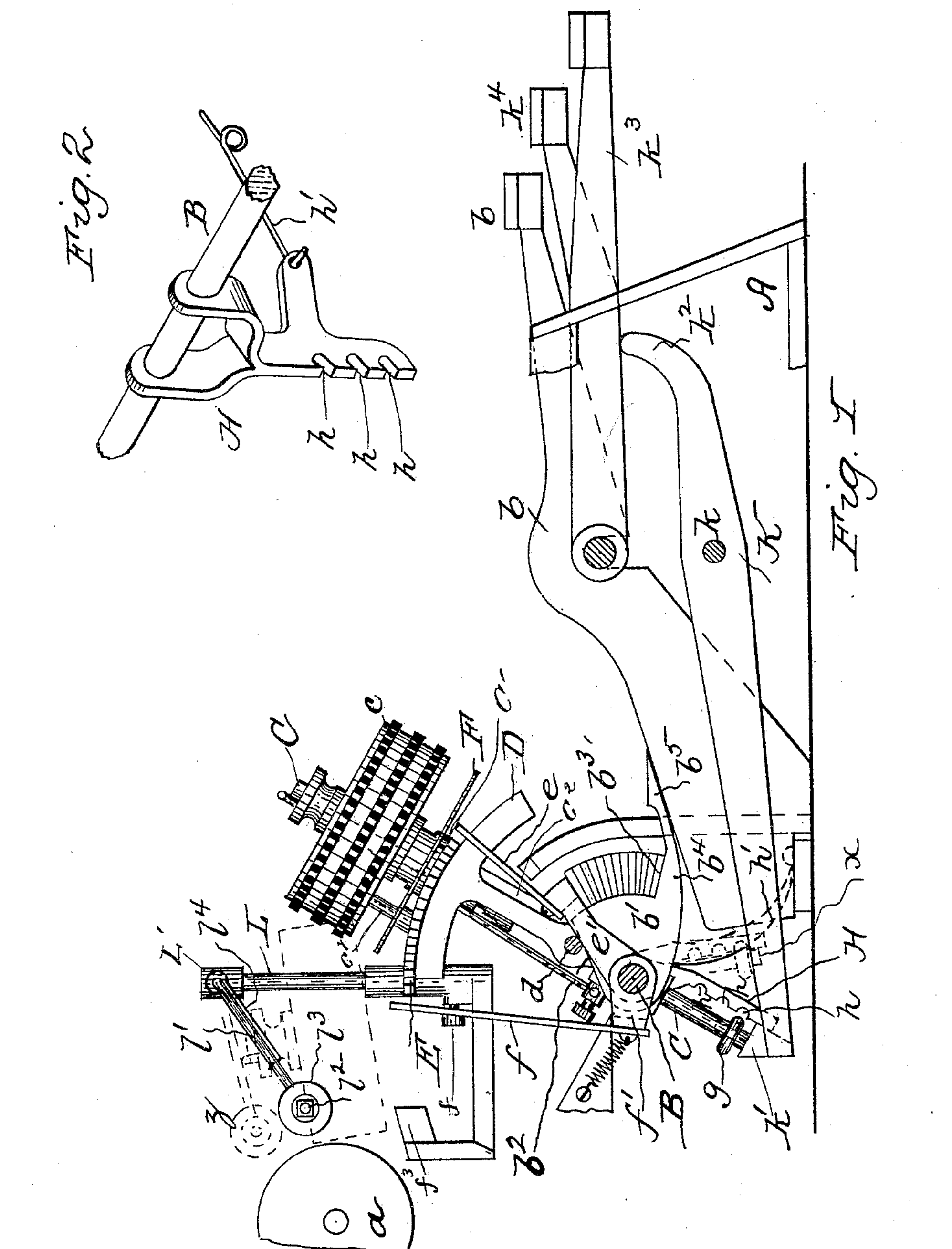
(No Model.) 3 Sheets—Sheet 1.

G. C. BLICKENSDERFER.

TYPE WRITING MACHINE.

No. 459,094. Patented Sept. 8, 1891.



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(No Model.) 3 Sheets—Sheet 2.

G. C. BLICKENSDERFER.

TYPE WRITING MACHINE.

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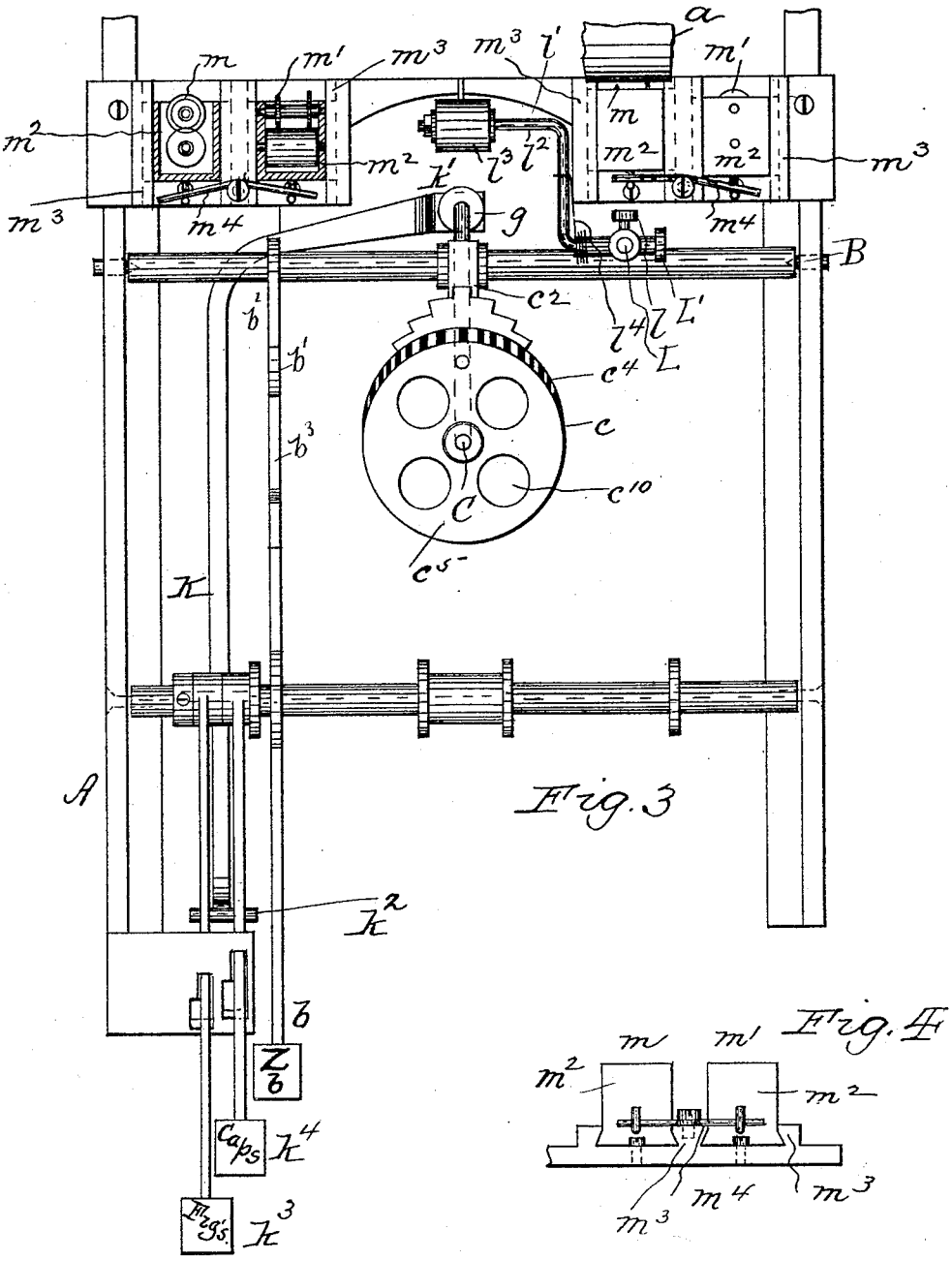

Fig. 3

Fig. 4

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(No Model.) 3 Sheets—Sheet 3.

G. C. BLICKENSDERFER.

TYPE WRITING MACHINE.

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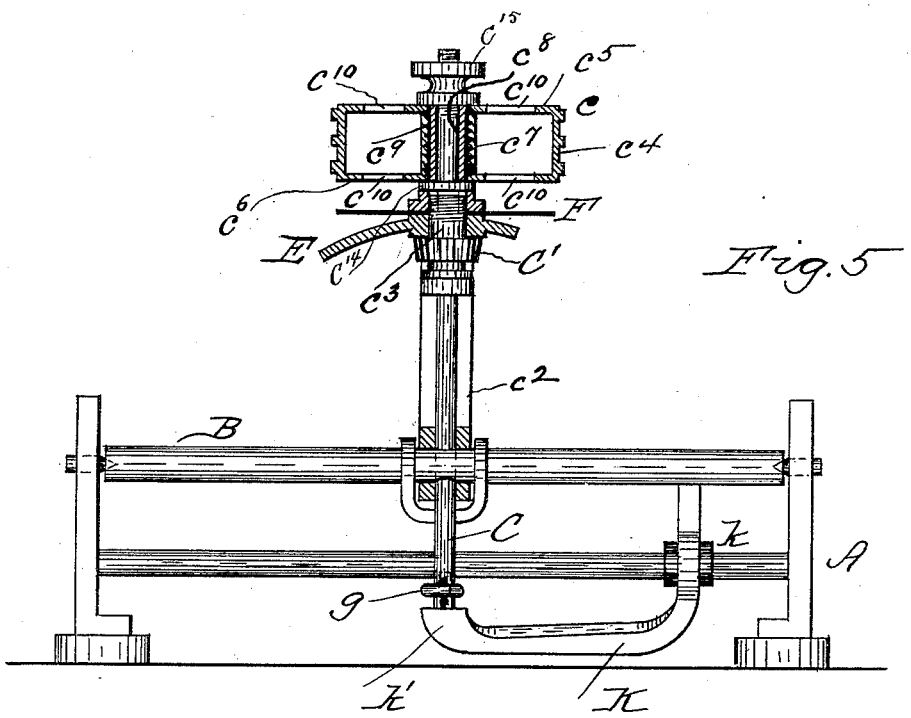

Fig. 5

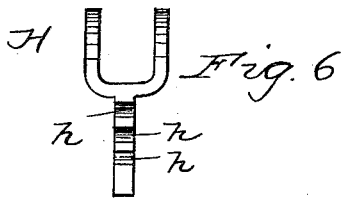

Fig. 6

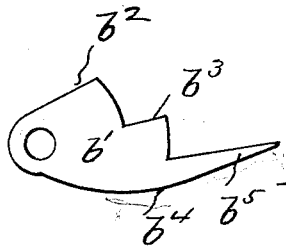

Fig. 7

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UNITED STATES PATENT OFFICE.

GEORGE C. BLICKENSDERFER, OF STAMFORD, CONNECTICUT, ASSIGNOR TO THE BLICKENSDERFER MANUFACTURING COMPANY, OF NEW YORK, N. Y.

TYPE-WRITING MACHINE.

SPECIFICATION forming part of Letters Patent No. 459,094, dated September 8, 1891.

Application filed April 25, 1891. Serial No. 390,489. (No model.)

To all whom it may concern:

Be it known that I, GEORGE C. BLICKENSDERFER, a citizen of the United States, residing at Stamford, in the county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Type-Writing Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention has relation to wheel type-writing machines of the form wherein the wheel is provided with more than one row or bank of type, and which is shifted to position a row of type and rotated to position a letter or character, and is propelled to the platen or roller to make the impression, as fully shown, described, and claimed in an application, Serial No. 390,488, filed by me the 25th day of April, 1891; and it has for its operating parts, first, mechanism under the control of separate key-levers for raising the wheel to bring any one of the different rows or banks of letters or characters into the field of action and hold or lock the wheel in such raised position as it is propelled to the platen or roller in order to maintain due and proper alignment of the impressions or writing; second, a simple form of tumbler mechanism having a changing leverage between the key-levers and the driving mechanism for the type-wheel; third, a simple construction of inking pad or roller for the type-wheel, and, fourth, a ruling device having a sliding movement toward the impression platen or roller in the direction of its length and an automatically-returning movement to its normal position.

My invention accordingly consists of the combinations, constructions, and arrangements of parts, as hereinafter more particularly described in the specification, and pointed out in the claims.

Reference is had to the accompanying drawings, wherein—

Figure 1 is a sectional side elevation of a type-writing machine embodying my improvements, only so much of the machine being shown as is required to illustrate the same. Fig. 2 is a perspective view of the swinging locking-latch for positively holding the type-wheel in its raised position as it is propelled to the roller or platen. Fig. 3 is a partial plan, partly in section. Fig. 4 is a front elevation of the ruling devices. Fig. 5 is a transverse elevation, partly in section, through the center of the type-wheel and part of the shaft for the same, the latter being represented as being in a perpendicular position. Fig. 6 is an elevation of the swinging locking-catch for the type-wheel shaft, and Fig. 7 is a plan of a tumbler intermediate between the one shown in full elevation and the last one partly shown in elevation in Fig. 1.

A represents the frame or housing for the machine; *a*, the paper-holding platen or roller; B, the cross-shaft for supporting the type-wheel and its actuating mechanism; *b*, the key-levers; *b'*, the tumblers; C, the type-wheel shaft; *c*, the type-wheel; C', the pinion, and D and D' the segmental racks meshing with said pinion for rotating the type-wheel; *d*, the frames of said racks; E, an arresting or stopping ratchet for the type-wheel; F, the steadying-ratchet for the type-wheel after its motion has been arrested; *e*, the front arresting-pawl on frame *e'*, which is loosely hung upon cross-shaft B, and *f* the rear arresting-pawl on frame *f'*, also hung loosely upon cross-shaft B.

The tumblers *b'* are loosely journaled on the cross-shaft B and are of any desired configuration, having striking faces b^2 and b^3 in front of the cross-shaft B. The face b^2 is normally in contact with one of the segmental rack-frames *d*, and the faces b^3 of the several tumblers vary in distance from pawl-frame *e*, as shown more plainly in Figs. 1 and 7, so that said tumblers will be moved unequal distances before striking said pawl-frame. For example, the tumbler shown in full elevation in Fig. 1 would have to be moved a greater distance than the tumbler shown in Fig. 7 before its striking-face b^3 would come in contact with the pawl-frame *e*, as said face b^3 on the first-mentioned tumbler is a greater distance from said frame *e* than the face b^3 on the second-mentioned tumbler. The bottom edge of the tumblers *b* for that portion of the same extending from in front of the shaft B to near the outer or front end is of the form of a cam, as at b^4, and terminates in a straight

edge b^5 at the front of the tumbler, which normally rests upon the top of the key-lever b, while the cam part b^4 is normally out of contact with the key-lever. As soon as a key-lever is depressed it raises the tumblers by the long leverage afforded by its extending front straight end or face b^5 and causes the edge b^2 to operate against the frame d to overcome the inertia of the type-wheel and its attached parts, such as the shaft, its frame or support, and all the parts carried on the same. This long leverage changes to a shorter one in a gradual manner as soon as the cam b^4 of the tumbler comes into contact with the key-lever.

When one of the frames d is acted upon by the face b^2 of one of the tumblers, its rack moves forward and revolves the pinion C′ and consequently the type-wheel to position a letter. At the same time that the face b^2 is acting upon frame d the face b^3 is moving forward to engage with the pawl-frame e' to force the pawl e into engagement with the proper tooth of the stopping-pawl E to arrest the axial but not the forward movement of the type-wheel, said forward movement being initially imparted by the moving rack rolling the pinion C′ upon the stationary (for the time being) rack. On or about the time that the pawl e strikes the tooth on the stopping-ratchet the pawl f engages with a tooth of said ratchet on the side opposite to that with which the pawl e is engaged to prevent the type-wheel rebounding by reason of the sudden arresting of its axial movement. In other words, the pawls e and f lock the type-wheel against further axial movement, but do not prevent said wheel while so locked from being moved ahead by the key-levers to make an impression of the positioned type upon the platen. As the type-wheel may have more or less vibration by reason of the wear and tear upon the several parts, a steadying-pawl f^3 is provided for the ratchet F. The space between the teeth on ratchet F under the positioned type embrace the pawl as the type-wheel moves toward the platen and steadies the type-wheel as the type strikes the platen, and thus prevents any blurring of the impression made by said positioned type.

Shaft B has a radial opening c^{12} registering with opening c^{13} in the frame c^2, which is rigidly secured to said shaft B. A sleeve c^3, having an opening for the type-wheel shaft C, is secured to said frame c^2 in such manner as to permit of its being rotated, but not to move longitudinally. The stopping and steadying ratchets E and F are secured to and revolve with said sleeve, which has a pinion C′, that gears with the racks D. A type-wheel shaft having a collar c^{14} is passed down through the sleeve, frame, and shaft until the collar rests upon the top of the sleeve c^3 and carries a type-wheel, which is held thereon by a nut c^{15}. The type-wheel is provided with an opening c^{16} for a pin c^{17}, that projects from the steadying-ratchet F to connect said wheel with the sleeve c^3, so that when said sleeve is rotated the type-wheel will be correspondingly rotated. The pin c^{17} is of sufficient length to permit of the vertical adjustment of the wheel to bring any of its type-fields in an operative position without separating from its propelling mechanism.

It will be observed from the foregoing that the type-wheel shaft is normally free to move longitudinally in the supporting-frame c^2, and its down movement is limited by the collar c^{10} or by a support k', which in the present device is shown as the end of a lever K, the inner arm of which projects immediately under the lower end of the shaft C, so that when the outer end of the lever K is depressed the inner end will raise the shaft and type-wheel longitudinally. When the shaft is raised, it is held against further longitudinal movement by a locking device. The preferred form of locking device is shown in Fig. 2, and designated herein as a "locking-bar" H. It is hung loose upon the shaft B, and hangs down therefrom in a position preferably parallel with the shaft C, in which position it is held by a spring h', that permits it to yield when the type-wheel and its shaft is laterally vibrated to impress a type. As before stated, the type-wheel and its attached parts in this machine are axially moved and laterally vibrated at the same time until a type has been positioned, when the axial movement is stopped; but the lateral movement is continued until the type has been impressed upon paper on the platen. The locking device H is arranged in the path of lateral movement of said shaft, which vibrates or engages and moves said locking device with it and prevents any longitudinal movement of the shaft. It is advantageous to have the bar normally out of contact with the type-wheel shaft, as said shaft can then be removed without having to disconnect any parts below, or, in fact, any parts of the machine, as I prefer to have the shaft normally free or without positive engagement with any of the parts of the machine. Ordinarily the position of the shaft or type-wheel will be determined by a projection on one of the parts attached to and vibrating with the type-wheel engaging with the locking device. In the present instance the projection is shown as a collar c^{10}, which engages with the recesses in the locking-bar and prevents any longitudinal movement of the type-wheel or its shaft. Stop k' may also be used, and when a type-wheel having two or more fields or rows of type is used the stop is formed upon the end of the lever K, as aforesaid. In such a device it is not necessary that the end of the shaft be in actual contact with the stop; but a slight contact is preferred, as the top of the stop then forms a sort of a guide for the shaft in its movement toward the locking-bar. This guiding is particularly advantageous when the type-wheel shaft is shifted to bring another field of type in position to be im-

pressed, and especially so when collars or recess or collar and recesses are used. In the present instance the collar g is on the shaft C and recess h on the bar H, so that when the type-wheel shaft is vibrated the collar g enters one or the other of the recesses h. As present arranged, the normal position of collar g is opposite the lowest recess h. When the type-wheel is raised to bring the second row of type in position, the collar g will be opposite the middle recess h, and when raised to bring the next row in position the collar g will be opposite the top recess h. When the locking-bar is held in place by a spring, the part k' also serves as a stop to prevent said bar from interfering with the longitudinal movement of the type-wheel shaft. The lever K is pivoted at k, and its forward end k' is under the control of special key-levers k^3 k^4, having different travel, so that by depressing either of them the lever K is actuated to raise the type-wheel shaft and the type-wheel more or less to bring the different fields or rows of type into position for use.

Suitably located relatively to the type-wheel c and mounted upon or forming part of the frame of the machine is a rod L, having a sleeve L', adjustable thereon by means of a set-screw l. In said sleeve is loosely mounted an arm l', which, as shown, is a right-angle arm and carries at its end l^2 a roller or inking-pad l^3 of any desired or suitable construction. This inking pad or roller l^3 is located in the path of the striking or printing movement of the type-wheel at a point or position adjacent to the platen or roller, so that a letter or character duly positioned on the type-wheel and about to make an impression previously strikes the inking-roller l^3 to receive its supply of ink, and in the act of striking such roller l^3 knocks or moves it out of the way above the type-wheel, as indicated by dotted lines z, Fig. 1. The extent of the upward movement of the inking-arm when vibrated by the type-wheel is controlled by a spring l^4, which also aids in returning the inker into the path of movement of the type-wheel.

I do not herein broadly claim an inking-roller supported in a vibrating arm in front of a wheel and actuated by frictional contact with said wheel to ink the type and move it out of the way of said wheel as said wheel is vibrated to make an impression, as such a construction forms one of the subjects-matter of application, Serial No. 390,488, filed April 25, 1891.

m m' represent the ruling devices for ruling, canceling, underscoring, or analogous purposes, inclosed in boxes or casings m^2, sliding in ways m^3 on the frame of the machine in front of the roller or platen a and having reacting springs m^4 for normally withdrawing said devices from the platen or roller after having been manually moved to and brought into action. Any suitable construction of ways or guides m^3 may be provided for the boxes or casings m^2, and the canceling or underscoring wheels or devices m m' may be provided for and be horizontally or vertically located in their boxes or casings m', as shown, or as set forth in said other pending application.

The type-wheel c is made of hard rubber blown or cast in a mold so as to have its periphery c^4, top and bottom sides c^5 c^6, and axial hub c^7 integral. Preparatory to casting or blowing the wheel a suitable metallic or other bushing c^8, having a knurled or roughened exterior surface or periphery c^9, is inserted in the mold, so that when the wheel is blown or cast the axial hub c^7 is caused to engage and solidly fasten said bushing to said hub. The top and bottom sides c^5 c^6 as the wheel comes from the mold must be solid and then are perforated, as desired, as shown at c^{10}, to decrease the weight of the wheel without impairing its strength or durability.

As the construction and arrangement of the novel features of my invention may be variously modified without departing from the spirit of the same, I do not limit myself to the exact device described and shown in the drawings.

What I claim is—

1. In a type-writing machine, the combination of a laterally-vibrating part, a longitudinally and axially moving type-wheel carried by said vibrating part, and a laterally-movable locking-bar for locking said wheel against longitudinal action and located in the path of and carried by said laterally-vibrating part.

2. In a type-writing machine, the combination, with a laterally-moving type-wheel shaft, of a type-wheel having two or more fields of type and movable longitudinally to position its fields of type and axially to position its type and vibrates laterally to impress said type, and a vibrating locking-bar for locking said shaft and holding it against longitudinal movement while it is moving laterally, which locking-bar moves laterally coincidently with said shaft.

3. In a type-writing machine, the combination, with a laterally-moving type-wheel shaft, of a type-wheel having two or more fields of type and movable longitudinally of said shaft to position its fields of type, a key-lever for so moving said wheel to position its fields of type, mechanism for moving said type-wheel axially and laterally to position any type of a field and impress the same, type-key levers for actuating said mechanism to position and impress said type, and a vibratory locking-bar for locking said wheel against longitudinal movement while it is being moved to position and impress said type, said locking-bar being moved laterally with said shaft by the action of said type-key levers.

4. In a type-writing machine, the combination, with a type-wheel shaft having an axial movement to position a type and means for moving said shaft longitudinally, of a yielding locking device which engages said shaft

at certain predetermined points and holds it against vertical movement while the shaft is being axially moved.

5. In a type-writing machine, the combination, with a type-wheel having axial movement to position a type and two or more fields or rows of type, and means for vertically adjusting said wheel to bring any of the fields or rows of type in position to be impressed, of a yielding locking-bar which holds said type-wheel against vertical movement while receiving axial movement.

6. In a type-writing machine, the combination, with a type-wheel shaft having an axial movement to position a type and a lateral movement to impress a positioned type, of a yielding locking-bar which prevents longitudinal movement of and vibrates laterally with said shaft.

7. In a type-writing machine, the combination, with a type-wheel shaft having an axial movement to position a type and a lateral movement to impress a positioned type, of a locking-bar normally out of engagement with said shaft which engages with and moves said bar laterally when vibrated.

8. In a type-writing machine, the combination, with a type-wheel shaft having an axial movement to position a type and a lateral movement to impress the positioned type, and means for longitudinally moving said shaft, of a yielding locking-bar moving laterally with said shaft to hold it against longitudinal movement while being moved laterally.

9. In a type-writing machine, the combination, with a type-wheel shaft having an axial movement to position a type and a lateral movement to impress the positioned type, and means for longitudinally moving said shaft, of a locking-bar normally out of engagement with said shaft which engages with and moves said bar laterally when vibrated.

10. In a type-writing machine, the combination, with a type-wheel shaft having a collar and means for longitudinally moving said shaft, of a movable locking-bar vibrating independently of the vibrating wheel, having recesses which engage said collar.

11. In a type-writing machine, the combination, with a type-wheel shaft having a collar and means for laterally vibrating and longitudinally moving said shaft, of a movable locking-bar vibrating independently of the vibrating wheel, having recesses which engage said collar when the shaft is laterally vibrated and hold it against longitudinal movement.

12. In a type-writing machine, the combination, with a type-wheel having an axial and longitudinal movement, of a shaft for said type-wheel having a projection, and a locking-bar vibrated independently of the type-wheel and having recesses for engaging said projections.

13. In a type-writing machine, the combination of a type-wheel shaft having a collar, mechanism for laterally vibrating said shaft, and a movable locking-bar vibrating independently of the vibrating wheel, having a recess which engages said collar when the type-wheel shaft is laterally vibrated.

14. In a type-writing machine, the combination, with a type-wheel shaft free to move longitudinally and means for moving said shaft longitudinally, of a movable locking-bar operated by a moving part of the machine and which engages said shaft to hold it against longitudinal movement while the type is being impressed.

15. In a type-writing machine, the combination, with a type-wheel shaft free to move longitudinally and means for moving said shaft longitudinally and vibrating it laterally, of a locking-bar vibrating independently of the vibrating wheel, which moves laterally with and locks said shaft against longitudinal movement.

16. In a type-writing machine, the combination of a type-wheel shaft free to move longitudinally, having a collar, mechanism for moving said shaft longitudinally and vibrating it laterally, and a movable locking-bar vibrated independently of the vibrated wheel, having recesses which engage said collar when the type-wheel is shifted longitudinally and vibrated laterally.

17. In a type-writing machine, the combination, with a laterally-vibrating type-wheel shaft and a support for the lower end of said shaft, of a locking-bar vibrated independently of the vibrated wheel, which engages said shaft when it is laterally vibrated.

18. In a type-writing machine, the combination, with a laterally-vibrated type-wheel shaft and a lever for shifting said shaft longitudinally, of a locking device vibrated independently of the vibrated wheel, engaging with said shaft when it is moved laterally and holding it against longitudinal movement.

19. In a type-writing machine, the combination, with a laterally-vibrated type-wheel shaft and a lever having one end below the lower end of said shaft for moving it longitudinally, of a locking-bar which moves laterally with and locks said shaft when it is laterally vibrated.

20. In a type-writing machine, the combination, with a laterally-vibrated type-wheel shaft and a lever having one end below and for longitudinally moving said shaft, of a yielding locking-bar for said shaft in contact with the end of said lever and in the path of the laterally-vibrated shaft.

21. In a type-writing machine, the combination, with a laterally-vibrated type-wheel shaft free to move longitudinally, of a movable locking device for said shaft in the path of the lateral movement of said shaft.

22. In a type-writing machine, the combination of a laterally-vibrated type-wheel and its attached parts having a similar movement, a vibrating locking device in the path of the lateral movements of said parts, and a stop

for limiting the movement of the locking device.

23. In a type-writing machine, the combination, with a laterally-vibrated type-wheel and a yielding locking device in the path of the lateral movement of said shaft, of a stop below the type-shaft to limit the movement of the locking device.

24. In a type-writing machine, the combination of a laterally-vibrated type-wheel shaft, a lever below and for moving said shaft longitudinally, and a yielding locking device in the path of the lateral movement of said shaft and in contact with the end of the lever.

25. In a type-writer, a printing-wheel and shaft under the control of the key-levers for printing, separate lever mechanism for moving said shaft and wheel to bring different rows or fields of letters into action, and mechanism vibrating independently of and moving with said shaft to hold it in its adjusted position, substantially as set forth.

26. The combination of vertically-moving shaft C, having collar g, movable bar H, having recesses h, lever K, and separate key-levers for operating lever K, substantially as set forth.

27. The combination of a type-writing printing-wheel shaft resting upon a lever under control of separate key-levers, and a movable locking-bar engaging with said shaft, substantially as set forth.

28. In a type-writing machine, the combination, with key-levers and a laterally-vibrating frame carrying a type-wheel and having extension or bar d, of tumblers b', having face b^2, contacting with said bar, and cam-faces b^4, and straight faces b^5, which normally rest on said key-levers.

29. In a type-writing machine, the combination of a rotating and oscillating printing or impression wheel, stopping-ratchet moving with said type-wheel, pawls f and e, tumblers b', having lower cam and straight upper faces b^2 b^3, and key-levers b normally in contact with said lower straight faces of said tumblers, substantially as set forth.

30. In a type-writing machine, the combination, with a vibrating type-wheel, a rod secured to the frame, a vibrating arm pivotally secured to the rod and having an ink-roller projected in the path of said wheel and vibrated thereby, and a spring on said rod and connected with said arm.

31. In combination with the platen or roller of a type-writing machine, the sliding underscoring devices m m', and reacting springs for returning said devices to their normal position, substantially as set forth.

32. The combination of housing or frame A, platen or roller a, ways or guides m^3 on said housing or frame, boxes or casings on said guides, and underscoring, canceling, or like devices in said boxes, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE C. BLICKENSDERFER.

Witnesses:

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S. J. VAN STAVOREN.