Dec. 27, 1932. J. J. KITTEL 1,891,991

TYPEWRITING MACHINE

Filed May 25, 1931 4 Sheets-Sheet 1

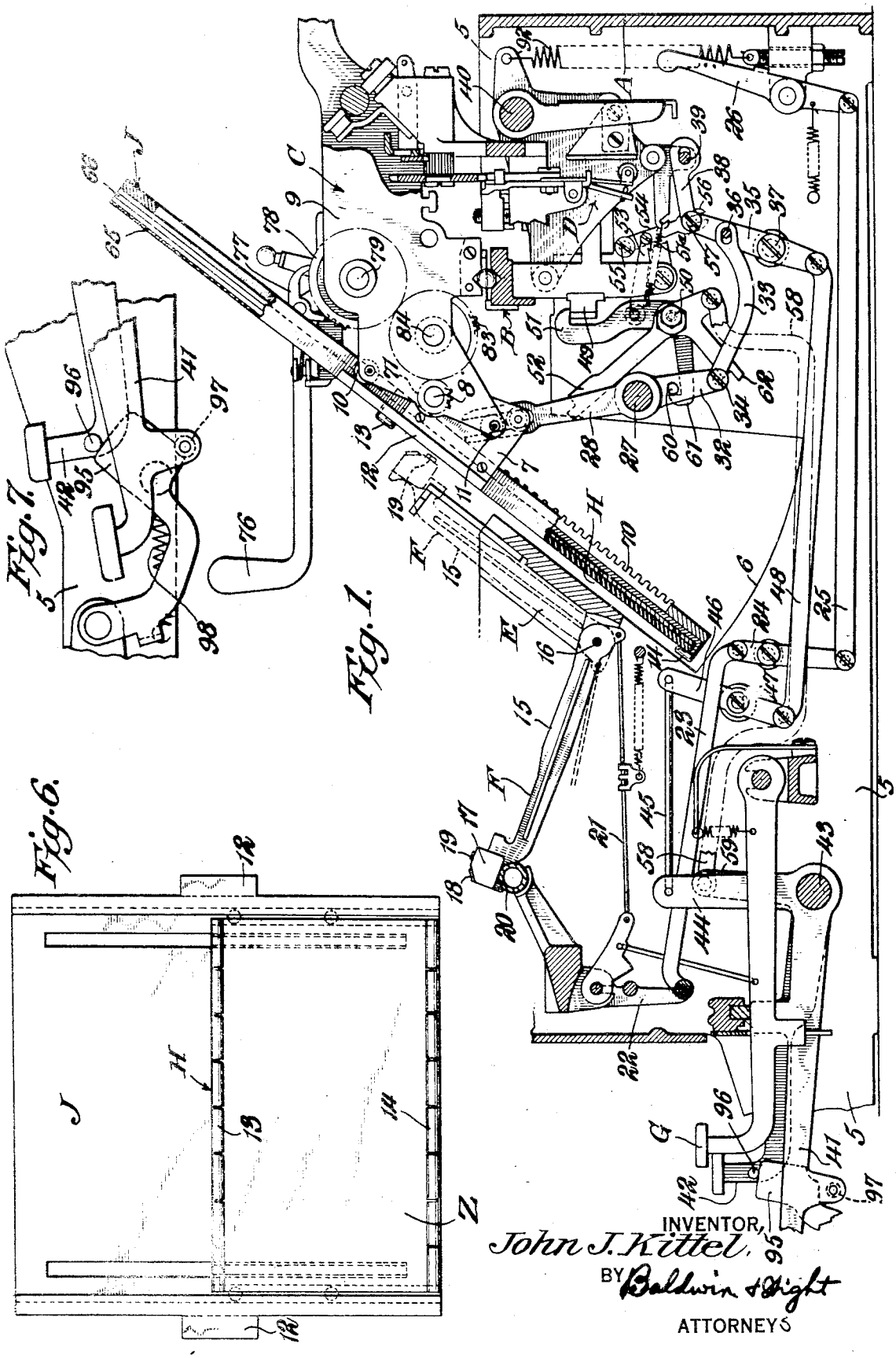


Fig. 1.

Fig. 7.

Fig. 6.

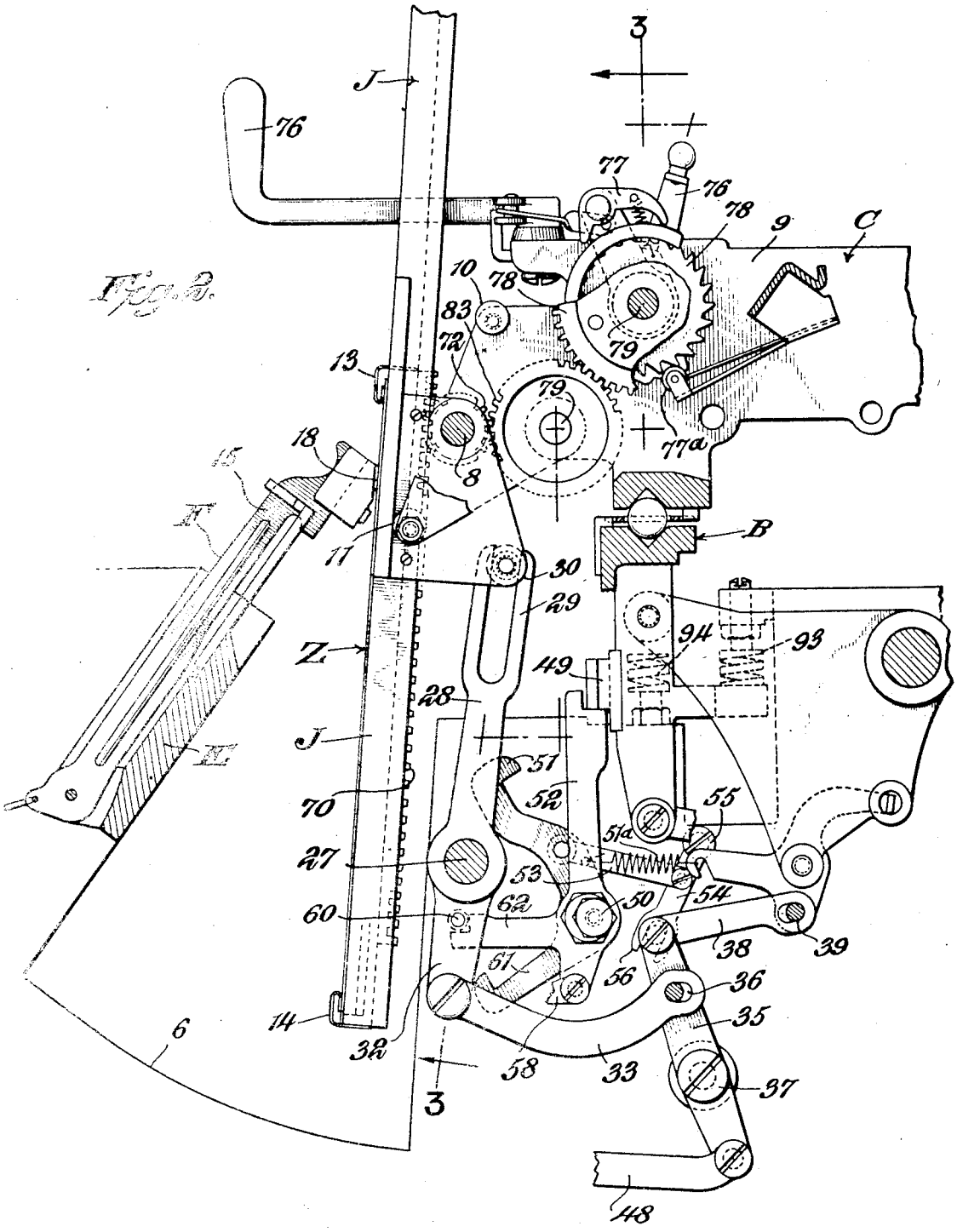
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Fig. 2.



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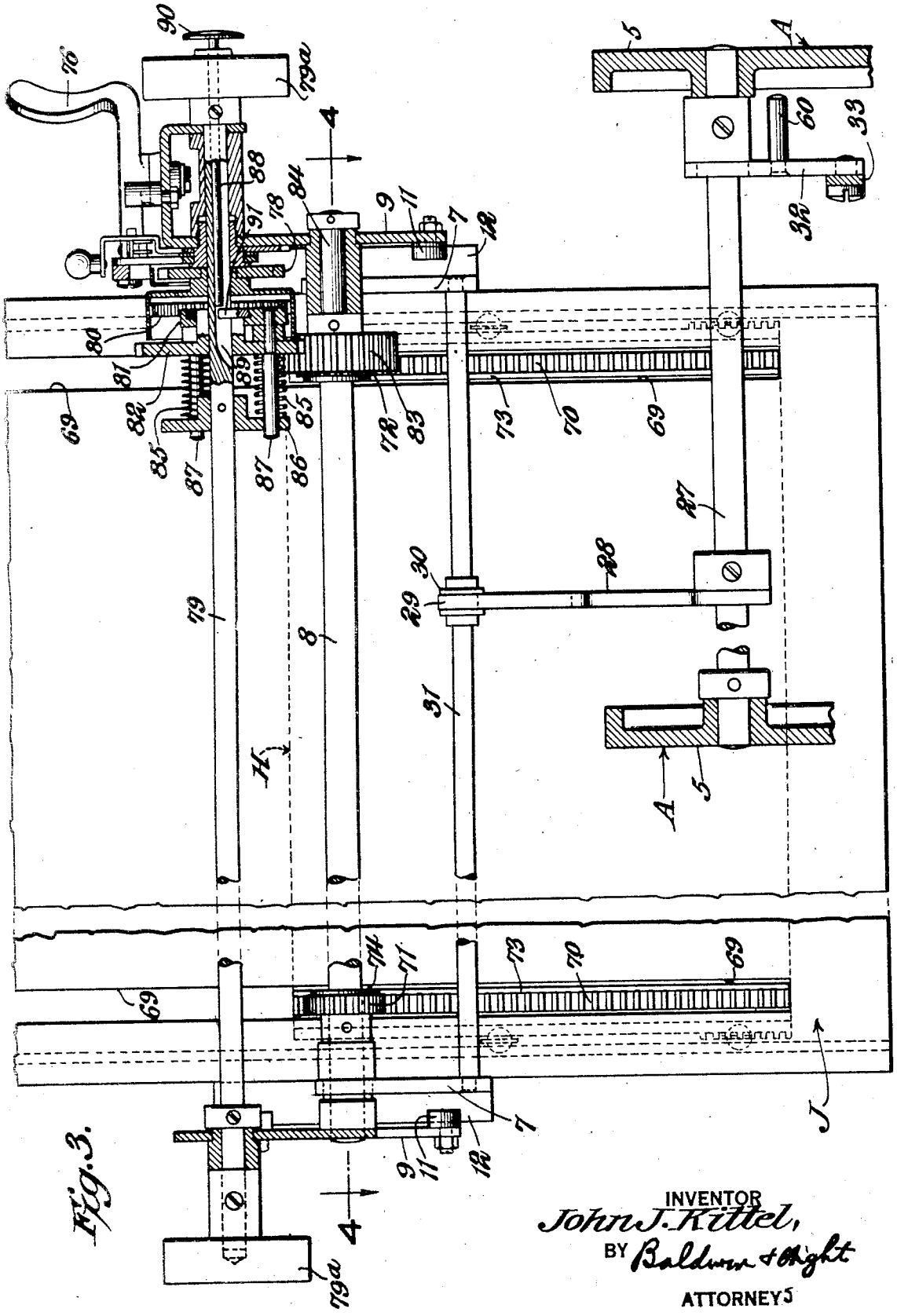


Fig. 3.

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Fig. 4.

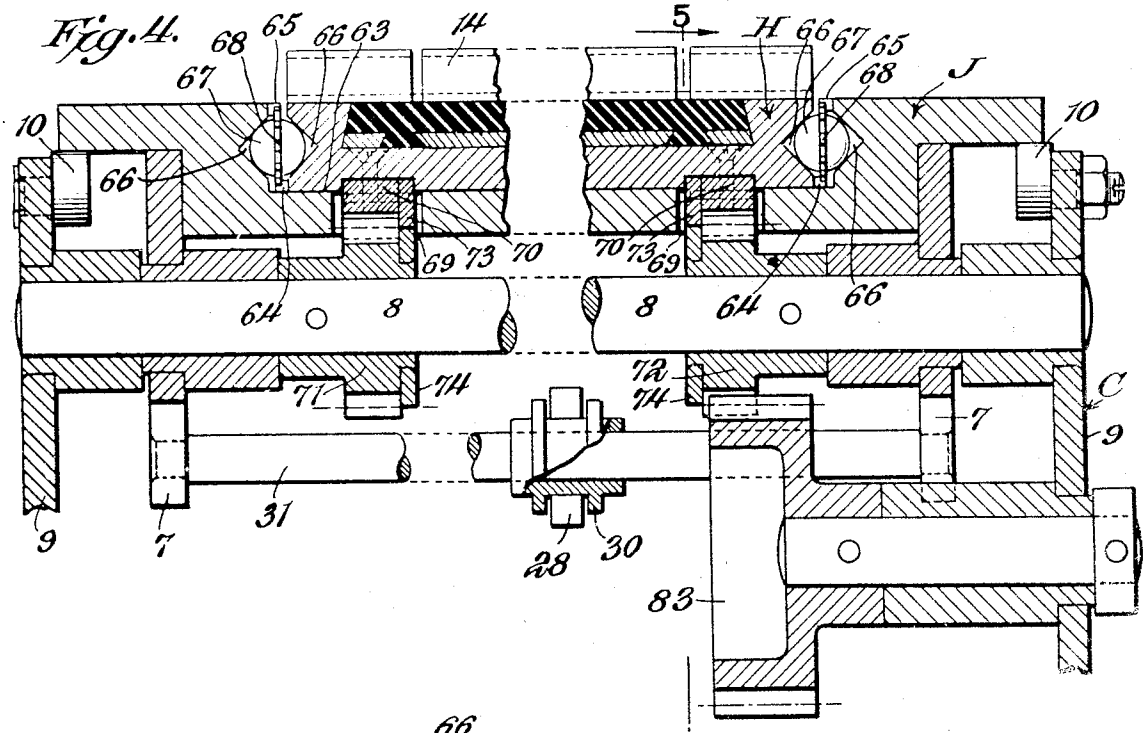
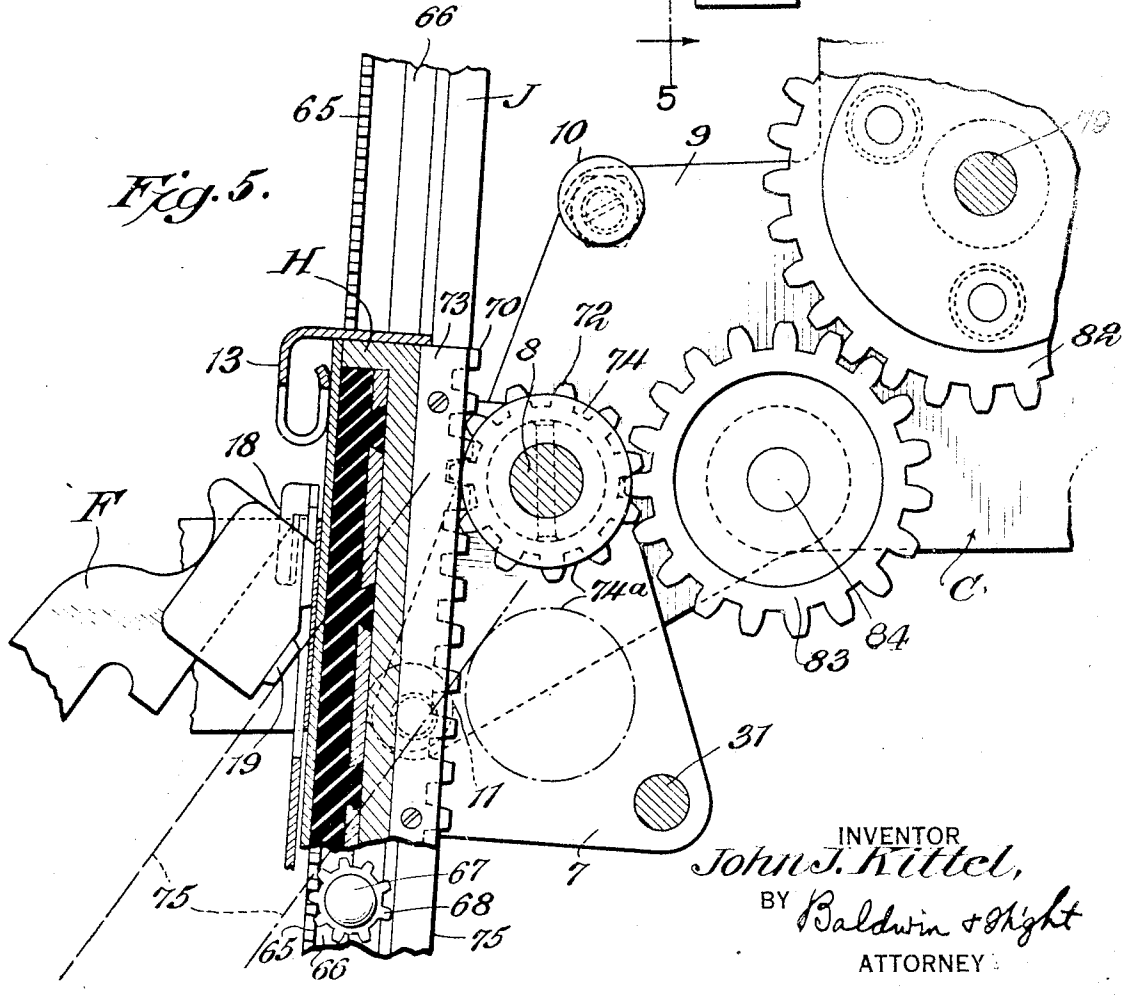


Fig. 5.



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Patented Dec. 27, 1932

1,891,991

UNITED STATES PATENT OFFICE

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TYPEWRITING MACHINE

Application filed May 25, 1931. Serial No. 539,919.

This invention relates to new and useful improvements in typewriting machines generally, although more particularly to typewriting machines for writing on cards or other flat work sheets, and embodies certain improvements on the co-pending application of Edward B. Hess, Serial No. 506,807, filed Jan. 5, 1931.

In the Hess application, a flat work-supporting platen is swingable about a horizontal axis, type carriers which cooperate with the platen are each provided with flat upper and lower case types arranged at an angle to each other, means supports the platen in a plane parallel to the printing face of the lower case type when the latter is in printing position, and means is provided for moving the platen into parallelism with the face of the upper case type when the latter is in printing position and for elevating the platen together with the card whereby the same printing line on the car will be presented to the upper case type.

Among the several objects of the present invention are to provide means for locking the platen in one printing position against swinging movement toward the other printing position; to provide means for locking the platen in both upper and lower case positions; to provide key operated means for releasing both locks prior to either shifting movement of the platen; to provide means for line spacing the platen; to provide means for fractional line spacing of the platen, and to provide means for letter spacing the platen.

In the drawings:—

Figure 1 is a vertical sectional view of a typewriting machine constructed in accordance with my invention, the view showing the platen in lower case position,

Figure 2 is an enlarged vertical section, showing the platen in upper case position.

Figure 3 is a rear elevation of the platen supporting frame, and the line spacing mechanism for the platen, certain of the parts being shown in section, the view being taken on the irregular line 3—3 of Figure 2,

Figure 4 is an enlarged sectional view taken on the line 4—4 of Figure 3,

Figure 5 is a cross section taken on the line 5—5 of Figure 4,

Figure 6 is a front elevation of the platen and the platen supporting frame, and

Figure 7 is a detail side elevation showing the shift key locked in its depressed position.

Referring to the accompanying drawings, the machine includes generally a main frame A, a shift frame B, a carriage C which is supported on the shift frame, an escapement mechanism D for the carriage, a segment E supported on the main frame, a plurality of type carriers F, and a plurality of key levers G for actuating the type carriers.

The main frame includes side plates 5, 5 which are formed with downwardly extending passages or slots 6 arranged in registry in a transverse plane directly in rear of the segment E.

A flat platen H is supported on a flat platen-supporting frame J which is provided at its sides with rearwardly extending brackets 7, 7 which are pivotally mounted on a rotary shaft 8 which is journaled in the end plates 9, 9 of the carriage, thus providing means to support the platen for swinging movements about a horizontal axis. The platen H and the platen-supporting frame J are normally disposed in a plane extending upwardly and rearwardly with the lower portions thereof disposed directly in rear of the segment E and in registry with the passages or slots 6 of the main frame so as to permit the platen and its supporting frame to pass through the side walls 5 of the main frame when the carriage is moved in opposite directions. The platen H and the supporting frame J are swingable in unison about the pivot shaft 8, and the platen is mounted on the frame for relative vertical line spacing movements. The swinging movement of the frame J is limited by upper and lower eccentrically mounted stops 10 and 11 which are mounted on the end plates of the carriage for cooperation with laterally extending wings 12, 12 of the brackets 7, said stops being respectively disposed in rear of and in front of the vertical plane containing the longitudinal axis of the pivot shaft 8.

Upper and lower spring clips 13 and 14 are secured to the platen H for the purpose of engaging either the upper or lower edge of a work sheet or a card Z, or both edges thereof, so as to retain the work sheet or card in flat relation against the printing or impact receiving surface of the platen.

Each type carrier F comprises a type bar 15 which is pivoted as at 16 and includes a head 17 having flat upper and lower case types 18 and 19 respectively, whose printing faces are in planes at an obtuse angle to each other. The printing face of the lower case type 19 is disposed in parallelism with the longitudinal axis of the type bar. The type bars in their normal position are supported by a head rest 20 secured to the main frame. Each type bar is connected to a key lever through the medium of the usual links indicated as a whole by the reference numeral 21. The platen H is normally upwardly and rearwardly inclined as shown in Figure 1 and is therefore normally disposed in parallelism with the printing face of the lower case type 19 when the latter is in printing position, while, at this time the printing face of the upper case type 18 is in a plane at an acute angle to the platen and consequently the upper case type will not print when the lower case type is printing.

The escapement mechanism D is actuated from each type bar action through the medium of a universal frame 22, a link 23, a lever 24, a link 25, and a lever 26, all of which are clearly shown in the Hess copending application Serial No. 506,807 referred to above.

In order to swing the platen-supporting frame J from one extreme printing position to the other, I have journaled a rock shaft 27 on the side plates 5, 5 of the main frame. Fixed to this shaft is a lever arm 28 which extends upwardly and is provided with a fork 29 at its upper end which embraces a grooved roller 30 loosely mounted on a tie rod 31 which extends between the brackets 7, 7 and is connected at its ends thereto. Also fixed to the rock shaft 27 is a depending lever arm 32 to which the forward end of a rearwardly extending link 33 is pivotally connected as at 34. The rear end of the link 33 is connected to the upper arm of a lever 35 by a pin and slot connection 36, the lever being fulcrumed intermediate its ends as at 37 to the adjacent side plate 5 of the main frame. The upper end of the lever 35 is pivotally connected to the forward end of a rearwardly extending link 38, the rear end of said link having a pin and slot connection 39 with the shift frame B which is pivoted as at 40 on the main frame. Consequently when the lever 35 is rocked so as to exert a forward pull on the link 38 the shift frame B, together with the platen H and supporting frame J, will be raised from its normal lower case position to its upper case position, and concomitantly the platen-supporting frame J will be rocked from its lower case printing position shown in Figure 1 to its upper case printing position shown in Figure 2.

In order to elevate the shift frame B and the parts mounted thereon to upper case position, I have provided the usual shift key lever 41 and associated therewith in the usual manner is a shift lock lever 42, both levers being fulcrumed on a cross shaft 43. The shift key lever 41 is provided with an upstanding arm 44 to which is connected a rearwardly extending link 45 which is connected to the upper end of a lever 46 fulcrumed as at 47 to the adjacent side plate 5 of the main frame. A rearwardly extending link 48 is connected at its forward end to the lower end of the lever 46, and the rear end of the link 48 is connected to the lower end of the lever 35. Thus upon depression of the shift key lever 41, the link 48 will be moved rearwardly and the link 38 will be moved forwardly, thus elevating the shift frame B to upper case position.

It is desirable to lock the shift frame B in its lower case position and also in its upper case position. To this end, the shift frame is provided with a lug 49, and pivotally mounted on the side plate 5 of the main frame as at 50 are latches 51 and 52. These latches are alternately movable into engagement with the lug 49, the latch 51 engaging the top of the lug to retain the shift frame in its lower case position whereas the latch 52 engages the bottom of the lug to retain the shift frame in its upper case position. The latch 51 is retained in its normal position by a spring 51*a*. The latch 51 is connected by a link 53 with a lever arm 54 which is pivoted as at 55 to the adjacent side plate 5 of the main frame and has its other end provided with a fork 56 which has slidable and pivotal connection with the pivot 57 which connects the lever 35 and link 38. Thus when the lever 35 is rocked, the latch 51 will be moved into and out of engagement with the top of the lug 49. The latch 52 is fulcrumed intermediate its ends on the pivot 50 and its lower arm is connected to a forwardly extending link 58 which in turn is connected to an upstanding arm 59 of the shift lock lever 42. Thus upon depression of the shift lock lever 42 the shift key lever 41 will be depressed, and the first part of the depression movement of the shift key lever the latch 51 will be released from the lug 49 on the shift frame due to the loose connection 39, and upon further depression of the shift key lever the shift frame will be elevated to its upper case position and simultaneously the platen H and its supporting frame J will be swung from the extreme printing position shown in Figure 1 to the other extreme printing position shown in Figure 2. At the same

time, the depression of the shift lock lever 42 will swing the latch 52 rearwardly to a position under the lug 49 to thereby lock the shift frame in its upper case position. Upon release of the shift lock lever 42, said lever and the shift key lever 41 will return to the normal positions under the influence of the usual springs, the latch 52 will be swung forwardly out of engagement with the lug 49, the shift frame will be lowered, the latch 51 will be reengaged with the lug 49, and the platen H and supporting frame J will be swung to their normal positions, as shown in Figure 2.

It is also desirable to lock the platen supporting frame J in each of its extreme printing positions of inclination whereby the frame will be held against swinging movement towards the other inclined printing position. To this end, the lever arm 32 is provided with a lock pin 60, the latch 51 is provided with a latch arm 61 for engaging the front side of the pin 60, and the latch 52 is provided with a latch arm 62 for engaging the rear side of the pin 60. It will be observed that when the latch 51 is released from the lug 49 the latch arm 61 will be released from the pin 60, and that when the latch 52 is released from the lug 49 the latch arm 62 will be released from the pin 60. Thus in the normal or lower case position of the frame J, as shown in Figure 1, the latch arm 61 cooperates with the pin 60 to lock the frame against swinging movement toward the upper case printing position, whereas the latch arm 62 cooperates with the pin 60 to lock the frame against swinging movement toward the lower case printing position as shown in Figure 2.

It will be observed that when each key lever G is depressed, the carriage C will be moved the distance of one letter space, and during this movement of the carriage the platen frame swinging means will remain in operative relation to the frame by reason of the tie rod 31 sliding through the grooved roller 30 with which the upper end of the lever 28 has sliding engagement.

My invention also comprises means for line spacing the platen H in either printing position thereof, the platen being movable vertically relative to the supporting frame J. The platen is mounted in a recess 63 formed in the front face of the frame J. Fixed to the side edges of the platen are racks 64, 64 and fixed to the side walls of the recess 63 are racks 65, 65. Ball races 66, 66 are conjointly formed in the side edges of the platen and the side walls of the recess, and located in said races are anti-friction balls 67 surrounding which are gear pinions 68 engaging the racks 64, 65 on each side of the platen. By means of the gear pinions and racks, the balls are not only retained in spaced relation but are held against gravitating. Therefore for the purpose of line spacing the frame J is provided with spaced vertical slots 69, 69 which extend above and below the shaft 8. Rack bars 70, 70 which are secured to the rear face of the platen H, project rearwardly into the slots 69, 69 with the teeth of the bars projecting slightly beyond the rear face of the frame J. The slots 69 are about twice the length of the rack bars 70, and the upper and lower ends of the slots are adapted to be engaged by the upper and lower ends of the rack bars and thereby limit the upward and downward movement of the platen H. Pinions 71, 72 which are fixed to the shaft 8 are in constant mesh with the rack bars 70, 70. As previously stated, the platen frame J is mounted to swing about the shaft 8 as an axis, and therefore I have provided means for permitting the swinging of the platen frame without creating any binding action between the pinions 71, 72 and the rack bars 70, 70. To this end, I have secured guide bars 73, 73 to the side faces of the rack bars 70, 70 and have provided the pinions 71, 72 with disc guides 74, 74 which have rolling contact with the rear edges of the guide bars. The line of contact between the guide bars and the disc guides is on the pitch line 75 and consequently the load will be borne by the guide bars and disc guides, and not by the teeth of the rack bars and pinions. Thus an involute curve will be formed during the swinging of the platen frame from one printing position to the other, and consequently the pitch line 75 of the rack will always lie in a direction tangent to the pitch line 74*a* of the pinion axis. In other words, the rear guiding edge of each flange 73 is disposed in registry with the pitch line of the rack teeth, and the periphery of each disc guide 74 is disposed in registry with the pitch line of the pinion teeth and in rolling contact with the guiding edge of the flange. A line spacing lever 76 which is pivoted on the carriage operates a spring pawl 77 which actuates a ratchet wheel 78 loose on a shaft 79 journaled in the end plates 9, 9 of the carriage and provided with a hand wheel 79*a*. Fixed to the ratchet wheel is a driving clutch member 80 which is normally in clutched engagement with a driven clutch member 81 keyed to the shaft 79 for movements longitudinally therealong. Fixed to the driven clutch member 81 is a gear 82 which is in constant mesh with a relatively wide idler gear 83 journaled on a shaft 84 fixed to the adjacent end plate 9 of the carriage, the idler gear 83 being in constant mesh with the pinion gear 72. Thus when the driven clutch member 81 is moved back and forth along the shaft 79 to couple and uncouple the member with the driving clutch member 80, the gear 82 will remain in mesh with the relatively wide idler gear 83 and thereby the shaft 79 will remain in operative driving relation with the rack bars

70, 70 of the platen H. The driven clutch member 81 is normally held in engagement with the driving clutch member 80 by coil springs 85 which are disposed between a collar 86 fixed to the shaft 79 and the gear 82, the springs respectively surrounding guide pins 87 which are fixed at one end to the gear 82 and have their free ends slidable in guide openings formed in the collar 86. By means of the roll detent 77*a* engaging the ratchet wheel 78, the platen is retained against dropping by gravity in any line space position thereof. In order to separate the clutch members 80 and 81, and thereby not only permit the platen H to gravitate to its normal or lowermost position with the lower ends of the rack bars 70 resting on the ends of the slots 69 of the platen frame J, but also permit of the platen H being fractionally line spaced, I have mounted a plunger 88 in a longitudinal groove 89 in the shaft 79 and have provided a finger-piece 90 on the plunger at the outer end thereof and adjacent the hand wheel 79*a*. The driven clutch member 81 is provided with a tongue 91 which projects into the groove 89 of the shaft 79, whereby upon inward movement of the plunger 88 the driven clutch member 81 will be separated from the driving clutch member 80. Upon release of the plunger 88, the springs 85 will return the parts to their normal positions.

From the foregoing, it will be observed that the platen H in its normal or lower case printing position is shown in Figure 1; that in this position the carriage is locked against upward movement by the latch 51 cooperating with the lug 49 on the shift frame; that the platen frame J is locked against swinging movements toward the other inclined printing position by the latch arm 61 engaging the pin 60; that the face of the platen H lies in parallelism with the face of the lower case type 19 when the type bar is in printing position; that upon depression of the shift lock key 42 or shift key lever 41 the latch 51 will be released from the lug 49, the latch arm 61 will be released from the pin 60, the shift frame B together with the carriage C, platen frame J and platen H will be raised to upper case position and the platen frame swung to the other inclined printing position wherein the platen face will line in parallelism with the face of the upper case type 18 when the type bar is in printing position, the latch 52 will engage with the lug 49 to lock the carriage in upper case position, and the latch arm 62 will engage the pin 60 to lock the platen against swinging movement towards the other inclined printing position; that the platen is movable in letter space direction without interfering with the means for swinging the platen; that the platen may be readily line spaced upwardly along the supporting frame J by the lever 76; that the platen is retained in any line space position by means of the roll detent 77*a* and ratchet wheel 78, and that the clutch in the line spacing operating mechanism may be readily opened to permit the platen to gravitate to its initial position or to permit of the platen being fractionally line spaced.

The shift frame B together with the carriage C and other parts which are mounted on the frame, are counter-balanced by springs 92, as shown in Figure 1. Upper and lower cushion stops 93 and 94 are associated with the shift frame to limit the upper and lower movements thereof, as shown in Figure 2.

In order to lock the shift frame in its upper case position, I have pivotally mounted a lock arm 95 on the main frame for cooperation with pins 96 and 97 which are respectively fixed to the shift lock key 42 and the shift key lever 41, and have connected a release spring 98 to the lock arm and main frame, the construction being similar to that shown in the patent to Handley 1,244,729, Oct. 30, 1917.

Claims directed to the flat platen line spacing device embody the subject matter of my co-pending application Serial No. 592,799, filed Feb. 13, 1932; claims directed to the flat platen typewriter generally form the subject matter of my co-pending application Serial No. 632,451, filed Sept. 9, 1932, and claims directed to the case shift mechanism form the subject matter of my co-pending application Ser. No. 632,452, filed Sept. 9, 1932.

I claim:—

1. In a typewriting machine, the combination with a type carrier, of flat types mounted on said carrier and having printing faces disposed at an angle to each other, a flat platen normally disposed in a plane parallel to the printing face of one type when said type is in printing position and movable into another plane disposed in parallelism with the printing face of the other type when said other type is in printing position, means for moving the platen from one position to the other, and means for locking the platen against movement in one printing position thereof.

2. In a typewriting machine, the combination with a type carrier, of flat types mounted on said carrier and having printing faces disposed at an angle to each other, a flat platen normally disposed in a plane parallel to the printing face of one type when said type is in printing position and movable into another plane disposed in parallelism with the printing face of the other type when said other type is in printing position, means for moving the platen from one position to the other, and separate means for locking the platen against movement in either printing position thereof.

3. In a typewriting machine, the combination with a type carrier, of flat types

mounted on said carrier and having printing faces disposed at an angle to each other, a flat platen normally disposed in a plane parallel to the printing face of one type when said type is in printing position and movable into another plane disposed in parallelism with the printing face of the other type when said other type is in printing position, means for moving the platen from one position to the other, means for locking the platen against movement in one printing position thereof, and key operated means for releasing said locking means and for moving the platen to the other printing position.

4. In a typewriting machine, the combination with a type carrier, of flat types mounted on said carrier and having printing faces disposed at an angle to each other, a flat platen normally disposed in a plane parallel to the printing face of one type when said type is in printing position and movable into another plane disposed in parallelism with the printing face of the other type when said other type is in printing position, means for moving the platen from one position to the other, separate means for locking the platen against movement in either printing position thereof, and key operated means for releasing one locking means and moving the platen to the other printing position and for operating the other locking means to lock the platen in said other printing position.

5. In a typewriting machine, the combination with a type carrier, of flat types mounted on said carrier and having printing faces disposed at an angle to each other, a flat platen normally disposed in a plane parallel to the printing face of one type when said type is in printing position and movable into another plane disposed in parallelism with the printing face of the other type when said other type is in printing position, means including a lever for moving the platen from one position to the other, a pin fixed to the lever, and means cooperating with said pin for locking the platen against movement in one printing position thereof.

6. In a typewriting machine, the combination with a type carrier, of flat types mounted on said carrier and having printing faces disposed at an angle to each other, a flat platen normally disposed in a plane parallel to the printing face of one type when said type is in printing position and movable into another plane disposed in parallelism with the printing face of the other type when said other type is in printing position, means including a lever for moving the platen from one position to the other, a pin fixed to the lever, means cooperating with said pin for locking the platen against movement in one printing position thereof, and key operated means for releasing said locking means and for moving the platen to the other printing position.

7. In a typewriting machine, the combination with a flat platen supported for swinging movements about a horizontal axis from one extreme printing position to another, means for moving the platen from one position to the other, means for locking the platen in one extreme position against swinging movement toward the other printing position, and key operated means for releasing said locking means and for moving the platen to the other printing position.

8. In a typewriting machine, the combination with a flat platen supported for swinging movements about a horizontal axis from one extreme printing position to another, means for moving the platen from one position to the other, separate means for respectively locking the platen in its extreme printing positions, and key operated means for releasing one locking means and moving the platen to the other printing position and for operating the other locking means to lock the platen in said other printing position.

9. In a typewriting machine, the combination with a flat platen supported for swinging movements about a horizontal axis from one extreme printing position to another, means including a lever for moving the platen from one position to the other, a pin fixed to the lever, and means cooperating with said pin for locking the platen against movement in one printing position thereof.

10. In a typewriting machine, the combination with a flat platen supported for swinging movements about a horizontal axis from one extreme printing position to another, means including a lever for moving the platen from one position to the other, a pin fixed to the lever, means cooperating with said pin for locking the platen against movement in one printing position thereof, and key operated means for releasing said locking means and for moving the platen to the other printing position.

11. In a typewriting machine, the combination with a shift frame movable vertically from lower case position to upper case position, of a carriage supported thereon for letter space movements, a flat platen mounted on the carriage to swing about a horizontal axis from one extreme printing position to another, means for moving the platen from one position to the other, means for locking the platen in one extreme printing position against swinging movement toward the other printing position, and a shift key lever for successively releasing said locking means and for swinging the platen from one extreme position to the other concomitantly with the shifting of the frame from one case position to the other.

12. In a typewriting machine, the combination with a shift frame movable vertically

from lower case position to upper case position, of a carriage supported thereon for letter space movements, a flat platen mounted on the carriage to swing about a horizontal axis from one extreme printing position to another, means for moving the platen from one position to the other, separate means for respectively locking the platen in different extreme printing positions against swinging movement toward the other printing position, a shift key lever for swinging the platen from one extreme position to the other concomitantly with the shifting of the frame from one case position to the other, and means operated by the shift key lever for alternately rendering said separate platen locking means ineffective and effective.

13. In a typewriting machine, the combination with a shift frame movable vertically from lower case position to upper case position, of a carriage supported thereon for letter space movements, a flat platen mounted on the carriage to swing about a horizontal axis from one extreme printing position to another, means for moving the platen from one position to the other, means for locking the platen in one extreme printing position against swinging movement toward the other printing position, separate means for respectively locking the shift frame in its lower and upper case positions, a shift key lever for swinging the platen from one extreme position to the other concomitantly with the shifting of the frame from one case position to the other, means operated by the shift key lever for alternately rendering said separate platen locking means ineffective and effective, and other means operated by the shift key lever for alternately rendering said separate shift frame locking means ineffective and effective.

14. In a typewriting machine, the combination with a shift frame movable vertically from lower case position to upper case position, of a carriage supported thereon for letter space movements, a flat platen mounted on the carriage to swing about a horizontal axis from one extreme printing position to another, means including a lever for moving the platen from one position to the other, a pin fixed to the lever, means cooperating with the pin for locking the platen in one extreme printing position against swinging movement toward the other printing position, and a shift key lever for successively releasing said locking means and for swinging the platen from one extreme position to the other concomitantly with the shifting of the frame from one case position to the other.

15. In a typewriting machine, the combination with a shift frame movable vertically from lower case position to upper case position, of a carriage supported thereon for letter space movements, a flat platen mounted on the carriage to swing about a horizontal axis from one extreme printing position to another, a rod extending across the platen and bodily movable therewith during swinging movements thereof, means including a lever having a sliding pivoted connection with said rod for moving the platen from one position to the other, a pin fixed to the lever, means cooperating with the pin for locking the platen in one extreme printing position against swinging movement toward the other printing position, and a shift key lever for successively releasing said locking means and for swinging the platen from one extreme position to the other concomitantly with the shifting of the frame from one case position to the other.

16. In a typewriting machine, the combination with a type carrier, of flat types mounted on said carrier and having printing faces disposed at an angle to each other, a flat platen normally disposed in a plane parallel to the printing face of one type when said type is in printing position and swingable into another plane disposed in parallelism with the printing face of the other type when said other type is in printing position, means for supporting a work sheet on said platen, means for swinging the platen from one printing position to another, and means for effecting line spacing movements to said platen in either printing position thereof.

In testimony whereof, I have hereunto subscribed my name.

JOHN J. KITTEL.