

J. J. COOPER.
TYPE WRITING MACHINE.
APPLICATION FILED APR. 30, 1908.

931,680.

Patented Aug. 17, 1909.

2 SHEETS—SHEET 1.

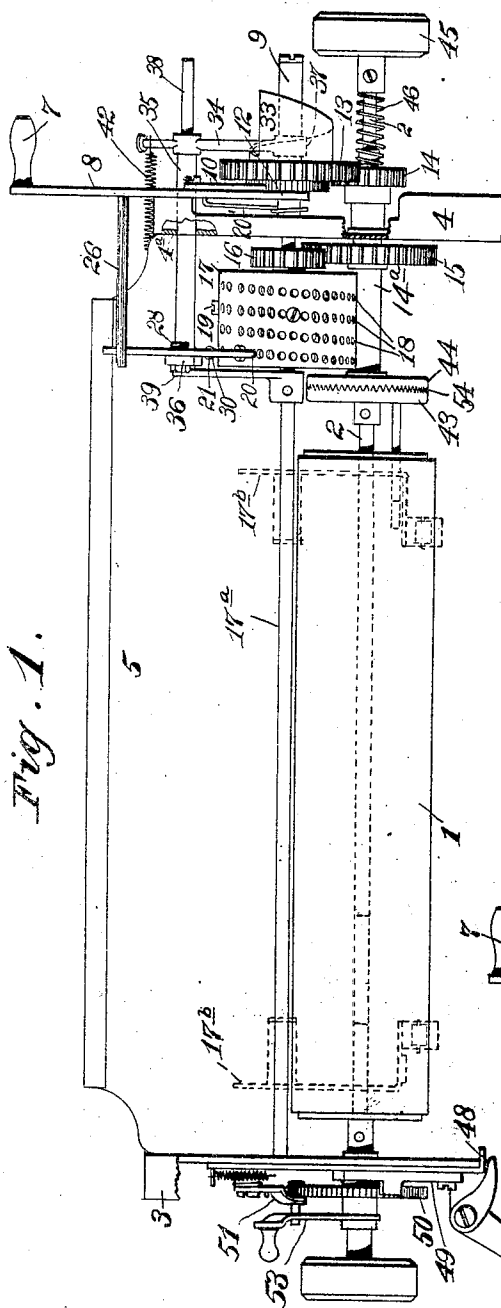


Fig. 1.

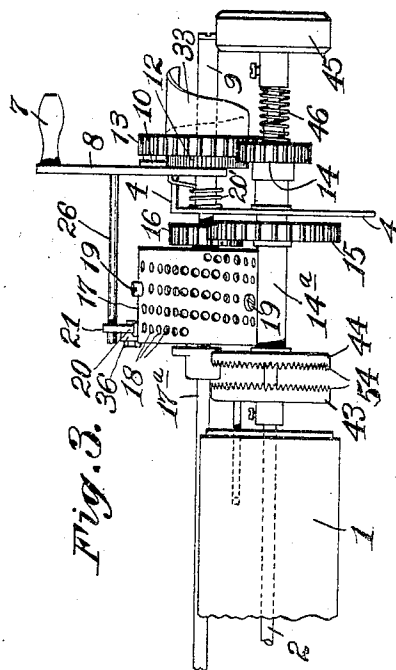


Fig. 3.

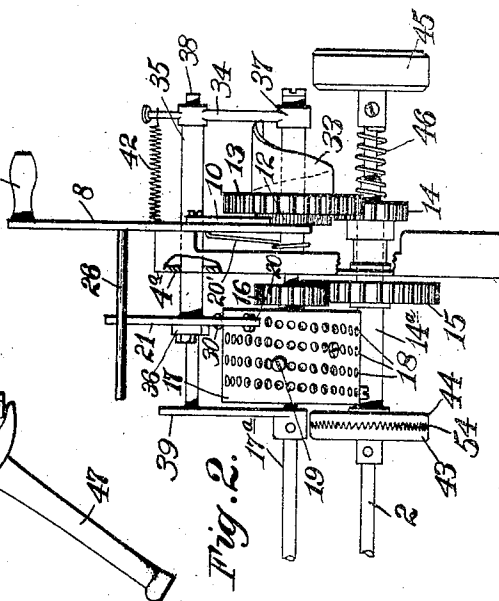


Fig. 2.

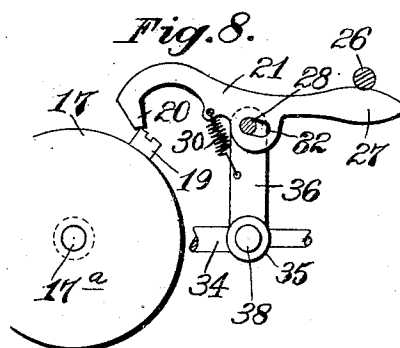
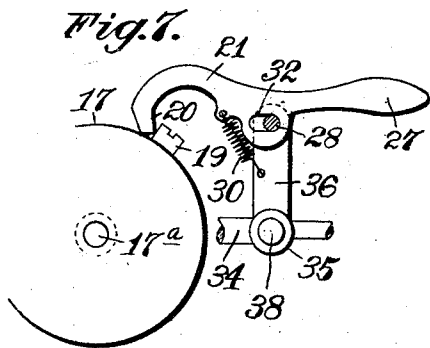
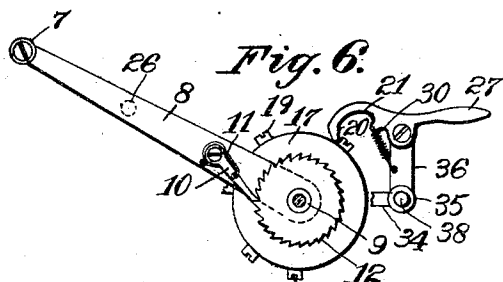
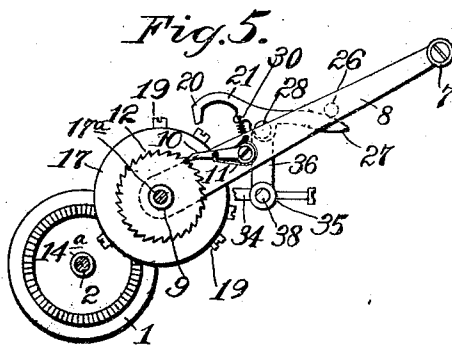
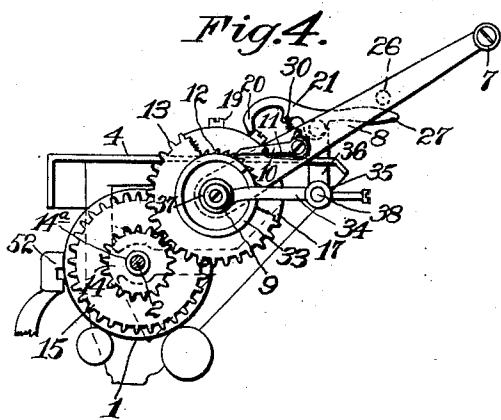
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

JOHN JOSEPH COOPER, OF LONDON, ENGLAND, ASSIGNOR TO UNDERWOOD TYPEWRITER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

TYPE-WRITING MACHINE.

No. 931,680.

Specification of Letters Patent.

Patented Aug. 17, 1909.

Application filed April 30, 1908. Serial No. 430,211.

To all whom it may concern:

Be it known that I, JOHN JOSEPH COOPER, a subject of the King of Great Britain, residing in the city of London, England, have
5 invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

This invention relates to the paper-feeding devices or revoluble platens of type-
10 writing machines, and particularly to the means whereby the paper is fed or moved in line-spacing direction.

The present invention is in the nature of an improvement upon the mechanism shown
15 in my copending application No. 413,730 filed February 1, 1908. In said application means are shown for effecting rotation of the platen step by step to any predetermined extent regular or irregular to accord with
20 the printed forms used; means being shown in said application for mechanically arresting the rotation of the platen at a succession of predetermined irregular intervals, said arresting means including a succession of
25 stops connected by gearing to the platen, and a detent upon the platen frame to cooperate with the stops *seriatim*, whereby after the leading edge of the sheet or blank is inserted, the platen can be rotated until arrested by the first of said stops, thereby advancing the sheet to the exact position to receive the first line of writing; and after such line is written, the platen is again advanced until arrested by the next stop, and
30 so on. The stops are shown arranged in a helix or spiral to control the platen movements during a plurality of its revolutions, the stops being in the form of pegs or screws inserted in a helical series of holes formed
40 upon the periphery of the barrel; the latter connected to the platen by gearing and rotating faster than the platen. The platen was rotated by a pawl and ratchet mechanism operated by a crank, and the latter also
45 operated means to release the detent after the completion of the stroke of the platen.

The objects of the present invention are to provide for compact mounting of the stop mechanism in the machine, especially with
50 a view to enabling the platen to be rotated step by step to effect regular line-spacing when desired, by means of the ordinary line-spacing mechanism, and to enable the platen to be rotated independently of said stop
55 mechanism whenever required.

The stop mechanism according to my present improvements is mounted all at one end of the platen frame, preferably the right hand end, the usual regular line-spacing mechanism being mounted at the left hand
60 end of said frame, as in the well known Underwood typewriter; and the platen may be rotated and controlled by either set of line-spacing devices at will. A releasable clutch is also arranged between the platen and the
65 special stop mechanism, so that the platen may be rotated at any time independently of such stop mechanism. The clutch comprises two members one of which is connected to the stop mechanism, and the other of which
70 is fixed upon the platen axle, and may be moved axially of the platen to effect the release.

Other features, objects and advantages will hereinafter appear.

In the accompanying drawings, Figure 1
75 is a plan of a platen frame of an Underwood front strike writing machine embodying the present improvements; the parts being shown in normal positions, and the platen clutched
80 to the special stop mechanism. Fig. 2 is a view of the special stop mechanism showing the detent as having traversed the helical series of stops. Fig. 3 is an elevation of the parts seen at the right hand of Fig. 1, the
85 platen being shown disconnected from the special stop mechanism. Fig. 4 is a side elevation illustrating the platen driving crank as having nearly completed its return stroke to normal position. Fig. 5 is an elevation
90 illustrating the manner of releasing the detent from the stops at the completion of the return stroke of the crank. Fig. 6 is a view similar to Fig. 5, but showing the crank at the completion of its platen driving stroke
95 and showing the detent engaging a stop. Fig. 7 is a detail of a stop-arresting detent on a larger scale, and corresponds with Fig. 6. Fig. 8 is a view similar to Fig. 7, but illustrating the manner of releasing the de-
100 tent.

A platen 1 is mounted by means of an axle 2 in a platen frame comprising ends 3, 4, and a paper shelf 5.

To effect irregular line-spacing, the operator pulls forward a handle 7 provided upon
105 a crank 8, which is loosely journaled on a stud 9 mounted upon the right hand platen end 4. A pawl 10 pivoted on said crank is pressed by a spring 11 into engagement with
110

the teeth of a ratchet wheel 12 mounted upon said stud. A gear 13 is fixed upon said ratchet wheel and meshes with a pinion 14 upon the platen axle 2, whereby the platen 5 is given preferably two revolutions to a single revolution of the ratchet wheel 12.

The pinion 14 is fixed upon a sleeve or hollow shaft 14^a which turns in the platen frame end 4, and contains the platen shaft 2. 10 Mounted upon said sleeve between the platen end and the end 4 of the platen frame is a gear 15. Said gear meshes with a pinion 16 which is fixed to a barrel 17. Both pinion and barrel are loosely mounted upon a rod 15 17^a extending from end to end of the platen frame concentrically with the stud 9 and carrying the usual adjustable front paper guides 17^b.

A helical series of holes or perforations 18 20 extends around the barrel 17, and as many stop pins 19 as may be necessary are inserted in the proper holes to correspond with the blank line on the sheet to be written. Owing to the movement-multiplying gearing 15, 16, 25 the periphery of the barrel 17 travels about twice as fast as that of the platen, and the holes 18 are sufficiently close together so that the adjustment of the stop pins may correspond approximately with the blanks on almost any kind of a blank form. The stops 30 preferably consist of the heads of screws which are threaded into the holes 18.

When the handle 7 is pulled forward as aforesaid, the platen and stop barrel or rack 35 are advanced until the first stop 19 is engaged by the nose 20 of a pawl 21, whereby the barrel and platen are arrested, as at Figs. 2 and 4, in position for the insertion of a sheet of paper into the machine. The leading 40 edge of the sheet is introduced between the platen and the rear pressure roll without releasing the latter. The crank is swung forwardly to advance the platen until the second stop 19 is arrested by the detent, when 45 it will be found that the sheet is in position to receive the first line of writing. The screw heads may be eccentric to their shanks to effect fine adjustment, to cause the writing to fall with accuracy upon the desired line 50 upon the blank.

The crank is returned to normal position by a spring 20'; and at the final portion of its return movement a bar 26, projecting from the crank 8, engages a finger 27 formed 55 on the pawl 21, thereby turning said pawl about its pivot 28 to lift the nose 20 above the stop 19, Figs. 5 and 8. A spring 30 tends constantly to throw down the nose of the pawl. The latter has a horizontal 60 slot 32, Fig. 7, whereby it engages its pivot pin 28, the purpose of the slot being to permit the spring 30 to draw the detent bodily back, Fig. 8, to cause the nose 20 to ride over the top of the pin 19, the detent 65 being mechanically held in this released posi-

tion until the crank 8 is drawn forward to rotate the platen.

To enable the detent to move automatically from left to right to traverse the helix as the barrel 17 revolves, so that the detent may 70 engage all of the stops 19 in succession, a snail or helical cam 33 is fixed upon the outer side of the gear 13, and as the cam turns an arm 34 is caused to travel from left to right to carry the detent 27 along the 75 barrel 17. The cam 33 extends almost entirely around the stud 9 and rotates at about one quarter the angular speed of the barrel 17, the helical series of holes 18 accordingly extending four times around said barrel. 80 The left to right movement of the arm 34 is imparted to a slide 35, upon which is fixed an arm 36 carrying said detent 21. The arm 34 is fixed upon said slide, and the forward end of the arm has a bearing 37 to 85 slide upon the stud 9. The slide 35 is in the form of a tube working in the vertical wall 4^a of the platen frame end, Fig. 4, and sliding upon a fixed rod 38, which is carried by an arm 39 fixed upon the rod 17^a. The 90 barrel 17 and pinion 16 are confined between said arm 39 and the end 4 of the platen frame. The gears 15 and 16 are just within the end of the platen frame and the other gears just outside thereof, the whole 95 making a very compact structure that may be applied to existing types of machines, and, being all at the right hand end of the platen frame, need not interfere with the usual line-spacing mechanism at the left 100 hand end thereof.

The throw of the cam 33 is equal to the distance between the first and last stop holes on the barrel 17 considered lengthwise of the barrel, so that the detent 21 upon the arm 105 36 is caused to traverse the helical series of holes at a speed corresponding to the pitch of the helix, so that it is caused to engage *seriatim* all of the stops 19 wherever disposed upon said helix. The releasing bar 110 26, it will be seen, extends transversely of the helix or longitudinally of the barrel 17 for a sufficient length to be enabled to engage the detent-finger 27 at all points in the travel of the detent. 115

At the completion of the writing of the sheet, the arm 34 runs off the apex of the cam 33. A spring 42 returns the arm, slide 35 and the detent 21 to normal positions. Then the handle 7 may be pulled forward 120 until the detent engages the first stop 19, whereupon a second sheet is inserted between the platen 1 and the pressure roll, and the operation is repeated line by line.

The platen is connected to the described 125 stop mechanism by means of a clutch which is illustrated in the form of two toothed disks, one of them, designated as 43, being fixed upon the platen axle 2, and the other 44 being fixed upon the sleeve 14^a, which 130

carries the gear 15. By pressing upon a hand wheel 45 fixed upon the outer end of the platen axle 2, the latter may be pressed inwardly, Fig. 3, to separate the clutch disk 43 from the disk 44, so that the platen may be rotated independently of the stop mechanism, or so that the stop mechanism may be rotated independently of the platen as may be desired. A compression spring 46 causes the clutch members to reengage when the hand wheel 45 is released. It will be seen that the same hand wheel 45 may be employed both to release the platen and to turn it while released. The clutch teeth are shown diagrammatically, but it will be understood that they may be of any suitable form to effect a rigid connection between the platen and the gear 15.

At the left hand end of the platen the usual line-spacing lever 47 may be operated to drive back the usual slide 48 upon which is pivoted a pawl 49 to engage the usual line-space ratchet wheel 50 provided with the usual spring detent 51. If it is desired to operate the lever 47 independently of the stop barrel 17, it is only necessary to press the finger against the end of the hand wheel 45 to release the clutch 43 while the lever 47 is being operated. If however, it is desired to operate the lever 47 and write line by line by means of the usual types 52, Fig. 4, until the platen is arrested by the engagement of the detent 21 with one of the stops 19, said detent may be held down by the finger during the operation of the lever 47.

The ratchet wheel detent 51 may be released by the usual releasing lever 53 to permit the operation of the platen by the crank 8, instead of by the lever 47, so that the platen will be arrested at points determined by the stops 19. It will also be seen that after the platen has been released by said lever 53, and turned by the crank 8, the hand wheel 45 may be pressed in and fine rotative adjustment of the platen effected, and then the platen reclutched to the stop mechanism while releasing said hand wheel 45, and the clutch teeth 54 may be of very fine pitch for this purpose.

Variations may be resorted to within the scope of the invention, and portions of the improvements may be used without others.

Having thus described my invention, I claim:

1. In a typewriting machine, the combination with a revoluble platen having an axle and a platen frame having ends, of a ratchet wheel mounted at one end of the platen frame, a crank, a pawl to operate the ratchet wheel, a gear and a helical cam both secured to said ratchet wheel, a pinion upon the platen axle and meshing with said gear, a second gear upon the platen axle at said end of the platen frame and rigid with said pinion, a second pinion meshing with the

second gear, a revoluble barrel mounted at said end of the platen frame and carrying a helical series of stops, a detent to engage the stops in succession, and means for enabling the cam to move the detent along the barrel at a speed corresponding to the movement of the barrel.

2. In a typewriting machine, the combination with a revoluble platen having an axle, and a platen frame having ends, of a ratchet wheel mounted at one end of the platen frame, a crank, a pawl thereon to operate the ratchet wheel, a gear and a cam secured to said ratchet wheel and mounted at said end of the platen frame, a pinion upon the platen axle and meshing with said gear, a second gear upon the platen axle at said end of the platen frame, a second pinion meshing with the second gear, a revoluble barrel mounted at said end of the platen frame and carrying a helical series of stops, a detent to engage the stops in succession, means for enabling the cam to move the detent along the barrel, and a bar upon said crank and extending along the barrel to engage said detent to release the same at the completion of the return stroke of the crank.

3. In a typewriting machine, the combination with a platen frame having ends and a platen having an axle and revolubly mounted in said ends, of a barrel and a pinion secured together and both revolubly mounted between the platen and one end of the platen-frame, said barrel having a helical series of stops, a gear upon the platen axle and in mesh with said pinion, a second pinion fixed to said gear, a second gear mounted upon said platen frame and in mesh with the second pinion, a ratchet wheel upon said second gear, a spring-pressed crank having a pawl to engage said ratchet wheel, a helical cam upon the second gear, a traveling frame having an arm to engage said cam and provided with a returning spring, and a detent upon said traveling frame to engage said stops.

4. In a typewriting machine, the combination with a platen frame having ends and a platen having an axle and revolubly mounted in said ends, of a barrel and a pinion secured together and both revolubly mounted between the platen and one end of the platen-frame, said barrel having a helical series of stops, a gear upon the platen axle and in mesh with said pinion, a second pinion fixed to said gear, a second gear mounted upon said platen frame and in mesh with the second pinion, a ratchet wheel upon said second gear, a spring-pressed crank having a pawl to engage said ratchet wheel, a helical cam upon the second gear, a traveling frame having an arm to engage said cam and provided with a returning spring, a detent upon said traveling frame

to engage said stops, and a bar projecting from said crank to engage said detent to release the same from any of said stops.

5. In a typewriting machine, the combination with a platen frame having ends and a platen having an axle and revolubly mounted in said ends, of a barrel and pinion secured together and both revolubly mounted between the platen and one end of the platen frame, said barrel having a series of stops, a gear upon the platen axle and in mesh with said pinion, a second pinion fixed to said gear and outside of said platen frame, a second gear in mesh with the second pinion, a ratchet wheel fixed upon said second gear, a crank having a pawl to engage the ratchet wheel, and a detent to coöperate with stops upon the barrel, said detent releasable by said crank.

6. In a typewriting machine, the combination with a platen frame having ends and a platen having an axle and revolubly mounted in said ends, of a barrel and pinion secured together and both revolubly mounted between the platen and one end of the platen frame, said barrel having a series of stops, a gear upon the platen axle and in mesh with said pinion, a second pinion fixed to said gear and outside of said platen frame, a second gear in mesh with the second pinion, a ratchet wheel fixed upon said second gear, a crank having a pawl to engage the ratchet wheel, a detent to coöperate with stops upon the barrel, said detent releasable by said crank, a cam upon the second gear, and a device operated by said cam to cause said detent to move along said barrel; the stops upon the barrel being helically arranged.

7. In a typewriting machine, the combination with a platen frame having ends and a platen having an axle and revolubly mounted in said ends, of a barrel and pinion secured together and both revolubly mounted between the platen and one end of the platen frame, said barrel having a series of stops, a gear upon the platen axle and in mesh with said pinion, a second pinion fixed to said gear and outside of said platen frame, a second gear in mesh with the second pinion, a ratchet wheel fixed upon said second gear, a crank having a pawl to engage the ratchet wheel, a detent to coöperate with stops upon the barrel, said detent releasable by said crank, a cam upon the second gear, and a device operated by said cam to cause said detent to move along said barrel; the stops upon the barrel being helically arranged; and said cam-operated device being in the form of a slide mounted upon said platen frame end and having an arm to which said detent is pivoted and also having an arm engaged by said cam.

8. In a typewriting machine, the combination with a platen frame having ends and a platen having an axle and revolubly

mounted in said ends, of a rod extending along the platen and fixed to the platen frame, a barrel and pinion secured together and both revolubly mounted upon said rod at one end of the platen, said barrel having a helical series of stops, a gear upon the platen axle, and in mesh with said pinion, a second pinion fixed to said gear and outside of said platen frame, a second gear in mesh with the second pinion, a ratchet wheel fixed upon said second gear, a crank having a pawl to engage the ratchet wheel, a detent to coöperate with stops upon the barrel, said detent releasable by said crank, a cam upon the second gear, a slide mounted upon a stud which is carried by an arm projecting rearwardly from said rod, said slide having outside of the platen frame an arm engageable by said cam, and having a bearing upon a stud which carries the second gear, said detent pivoted upon said slide.

9. In a typewriting machine, the combination with a platen, of a ratchet wheel connected thereto, a crank or lever, a pawl connected to said crank to operate the ratchet wheel, a succession of stops to determine the line-spacing movements of the platen, a detent to engage said stops in succession to arrest the platen, and a projection upon said crank to engage said detent to release the same.

10. In a typewriting machine, the combination with a platen, of a ratchet wheel connected thereto, a crank or lever, a pawl connected to said crank to operate the ratchet wheel, a succession of stops to determine the line-spacing movements of the platen, a detent to engage said stops in succession to arrest the platen, a projection upon said crank to engage said detent to release the same, said stops being mounted in a helical series, and means being provided to cause the detent to traverse said helix, and said projection extending across said helix to engage said detent at all points in the travel thereof.

11. In a typewriting machine, the combination with a platen frame and a platen having an axle, of a barrel and a pinion secured together and both revolubly mounted within the platen frame at one end of the platen, said barrel having a helical series of stops, a gear upon the platen axle and in mesh with said pinion, a second pinion fixed to said gear, a second gear in mesh with said second pinion, said second gear concentric with said barrel, a ratchet wheel upon said second gear, said ratchet wheel confined between the second gear and the barrel, a crank having a pawl to engage the ratchet wheel, a detent to engage stops upon said barrel, and means to enable the crank to release the detent.

12. In a typewriting machine, the combination with a platen frame and a platen having an axle, of a barrel and a pinion secured

together and both revolubly mounted within the platen frame at one end of the platen, said barrel having a helical series of stops, a gear upon the platen axle and in mesh with
 5 said pinion, a second pinion fixed to said gear, a second gear in mesh with said second pinion, said second gear concentric with said barrel, a ratchet wheel upon said second gear, said ratchet wheel confined between
 10 the second gear and the barrel, a crank having a pawl to engage the ratchet wheel, a detent to engage stops upon said barrel, means to enable the crank to release the detent; said stops being arranged in helical
 15 series, and a helical cam being provided upon the exterior of said gear and connected to means to cause the detent to travel along the barrel.

13. In a typewriting machine, the combination with a revoluble platen and regular step-by-step line-spacing mechanism therefor, of a supplementary line-by-line spacing mechanism including means for mechanically arresting the rotation of the platen step
 20 by step at a succession of predetermined irregular intervals.

14. In a typewriting machine, the combination with a revoluble platen and regular step-by-step line-spacing mechanism therefor, including a line-space lever, of a second lever normally disconnected from the platen, but connectible therewith to move the platen, and means for mechanically arresting the rotation of the platen effected by the second
 30 lever at a succession of predetermined irregular intervals throughout a cycle consisting of a plurality of revolutions of the platen.

15. In a typewriting machine, the combination with a platen and a platen frame, of
 40 a regular step-by-step line-spacing mechanism at one end of the platen and platen-rotating mechanism at the other end of the platen, and including a finger-piece, and a succession of stops to arrest the platen line-by-line as the platen is turned in one direction.

16. In a typewriting machine, the combination with a platen and a platen frame, of a regular step-by-step line-spacing mechanism mounted at one end of the platen, a crank or finger-piece mounted at the other end of the platen and connected to the platen by movement-multiplying gearing, and a succession of stops to arrest the platen line-by-line when rotated in one direction by said
 50 crank; the latter normally disconnected from the platen.

17. In a typewriting machine, the combination with a platen, of a regular step-by-step line-spacing mechanism for the platen, and a supplementary line-by-line spacing mechanism, including a succession of stops and a releasable member to engage said stops
 60 *seriatim* to arrest the platen at successive predetermined intervals.

18. In a typewriting machine, the combination with a platen, of two sets of line-by-line spacing devices, one set effective to permit the platen to make only line-by-line movements at regular intervals, and the
 70 other set including an irregular succession of stops for arresting the platen at their regular successive intervals in its advance movements.

19. In a typewriting machine, the combination with a revoluble platen, of two ratchet
 75 wheels, a line-spacing lever and a pawl for one of said ratchet wheels to effect regular step-by-step line spacing of the platen, a lever and pawl for the other of said ratchet
 80 wheels, movement-multiplying gearing between the second ratchet wheel and the platen, and a succession of stops to arrest the platen line-by-line at successive varying intervals as it is turned in one direction.

20. In a typewriting machine, the combination with a platen revoluble for line-spacing, of a line-by-line spacing mechanism including means for mechanically arresting the rotation of the platen at a succession of
 85 predetermined irregular intervals, a releasable clutch being provided between the platen and the arresting means.

21. In a typewriting machine, the combination with a platen revoluble for line-
 90 spacing, of means for mechanically arresting the rotation at a succession of predetermined irregular intervals throughout a cycle consisting of a plurality of revolutions of the platen; the platen being normally connected
 100 by means of a clutch to said arresting means, and means being provided to release the clutch to enable the platen to be rotated independently of said arresting means.

22. In a typewriting machine, the combination with a platen, of a ratchet wheel, means including a clutch normally connecting the ratchet wheel to the platen, a finger-piece having a pawl to operate said ratchet wheel, a succession of stops to arrest the platen at
 110 successive intervals when operated by said finger-piece, and a hand wheel having means both to release the platen from said clutch and to rotate the platen when released.

23. In a typewriting machine, the combination with a platen, of a ratchet wheel, means including a clutch normally connecting the ratchet wheel to the platen, a finger-piece having a pawl to operate said ratchet wheel, a succession of stops to arrest the
 120 platen at successive intervals when operated by said finger-piece, and a hand wheel having means both to release the platen from said clutch and to rotate the platen when released; the platen having an endwise movable axle on which are fixed said hand wheel and one member of said clutch; and a spring being provided to reengage the clutch members.

24. In a typewriting machine, the combination with a platen, of a ratchet wheel, means including a clutch normally connecting the ratchet wheel to the platen, a finger-piece having a pawl to operate said ratchet wheel, a succession of stops to arrest the platen at successive intervals when operated by said finger-piece, and a hand wheel having means both to release the platen from said clutch and to rotate the platen when released; the platen having an endwise movable axle on which are fixed said hand wheel and one member of said clutch; and a spring being provided to reengage the clutch members.

nation with a revoluble platen and regular step-by-step line-spacing mechanism therefor, of supplementary line-by-line spacing mechanism including a succession of stops
5 for mechanically arresting the rotation of the platen at a succession of predetermined intervals, and means for releasing the platen from said supplementary arresting means.

25. In a typewriting machine, the combination with a revoluble platen and regular step-by-step line-spacing mechanism therefor, including a line-space lever, of a second lever normally disconnected from the platen, but connectible therewith to move the platen,
15 means for mechanically arresting the rotation of the platen effected by the second lever at a succession of predetermined irregular intervals throughout a cycle consisting of a plurality of revolutions of the platen; a normally effective clutch between
20 said arresting means and the platen, and means for releasing said clutch.

26. In a typewriting machine, the combination with a platen and a platen frame, of
25 a regular step-by-step line-spacing mechanism at one end of the platen and platen-rotating mechanism at the other end of the platen, and including a finger-piece, and a succession of stops to arrest the platen line-
30 by-line as it is rotated in one direction; a releasable clutch being provided between said platen and said succession of stops.

27. In a typewriting machine, the combination with a platen and a platen frame, of
35 a regular step-by-step line-spacing mechanism mounted at one end of the platen, a crank or finger-piece mounted at the other end of the platen and connected to the platen by movement-multiplying gearing, a revoluble
40 succession of line-by-line stops, a normally effective clutch between the stops and the platen to enable them to arrest the platen at successive intervals, and means to release said clutch.

28. In a typewriting machine, the combination with a platen, of two sets of line-by-line spacing devices, one set effective to permit the platen to make only line-by-line movements at regular intervals, and the
50 other set connected to the platen by means of a releasable clutch, and including an irregular succession of stops for arresting the platen at their regular intervals in its advance movements.

29. In a typewriting machine, the combination with a revoluble platen, of two ratchet wheels, a line-spacing lever and pawl for one of said ratchet wheels to effect regular step-by-step line spacing of the
60 platen, a lever and pawl for the other of said ratchet wheels, movement-multiplying gearing between the second ratchet wheel and the platen, and a succession of stops to arrest the platen at successive varying inter-

vals; said succession of stops releasably
connected to the platen by means of a clutch. 65

30. The combination with a platen revoluble for line-spacing, of a revoluble succession of line-by-line stops arranged in a helix or spiral, movement-multiplying gearing between the platen and the stops, and
70 means to cooperate with said stops to arrest the platen; said succession of stops being connected to the platen by means of a releasable clutch. 75

31. The combination with a platen revoluble for line-spacing, of a finger piece for rotating the platen, movement-multiplying gearing between the finger-piece and the platen, a revoluble succession of line-by-line
80 stops arranged in a helix or spiral, movement-multiplying gearing between the platen and the stops, and means to cooperate with said stops to arrest the platen; said succession of stops being connected to the
85 platen by means of a releasable clutch.

32. In a typewriting machine, the combination with a revoluble platen, of a line-spacing mechanism including a ratchet wheel, a lever and pawl to operate the same,
90 movement-multiplying gearing between the ratchet wheel and the platen, a succession of stops arranged in a helix or spiral, and means to cooperate with said stops *seriatim* to arrest the platen; said platen being connected
95 by a releasable clutch to said succession of stops.

33. In a typewriting machine, the combination with a platen, of a line-by-line spacing mechanism including a succession
100 of devices independently adjustable in line-spacing direction, means cooperative with said adjustable devices to determine the successive arresting points of the platen movement in line-spacing direction, and a
105 clutch releasably connecting the platen to said succession of adjustable devices.

34. In a typewriting machine, the combination with a platen, of a cylinder connected thereto and provided with a spiral
110 series of perforations, stops constructed to fit in any of said perforations, means to cooperate with said stops to determine mechanically the line spacing movements of the platen, and a releasable clutch connecting
115 said cylinder to said platen.

35. In a typewriting machine, the combination with a revoluble platen having an axle and a platen frame having ends, of a ratchet wheel mounted at one end of the
120 platen frame, a crank, a pawl to operate the ratchet wheel, a gear and a helical cam both secured to said ratchet wheel, a pinion loose upon the platen axle and meshing with said gear, a second gear upon the platen axle at
125 said end of the platen frame and rigid with said pinion, a second pinion meshing with the second gear; a revoluble barrel mounted

at said end of the platen frame and carrying
 a helical series of stops, a detent to engage
 the stops in succession, and means for en-
 abling the cam to move the detent along the
 5 barrel at a speed corresponding to the move-
 ment of the barrel, and a clutch, one mem-
 ber of which is rigid with the second gear,
 and the other member of which is fixed upon
 the platen axle, said axle movable endwise
 10 to release the clutch.

36. In a typewriting machine, the com-
 bination with a platen frame having ends
 and a platen having an axle and revolubly
 mounted in said ends, of a barrel and pinion
 15 secured together and both revolubly mount-
 ed between the platen and one end of the
 platen frame, said barrel having a series of
 stops, a gear upon the platen axle and in
 mesh with said pinion, a second pinion fixed
 20 to said gear and outside of said platen
 frame, a second gear in mesh with the second
 pinion, a ratchet wheel fixed upon said sec-
 ond gear, a crank having a pawl to engage
 the ratchet wheel, a detent to coöperate with
 25 stops upon the barrel, said detent releasable
 by said crank; said barrel and first pinion
 being fixed upon a sleeve which is revoluble
 about the platen axle, a clutch-member also

carried by said sleeve, and a coöperating
 clutch member fixed upon the platen axle, 30
 said axle being movable endwise to release
 the clutch.

37. In a typewriting machine, the com-
 bination with a platen frame and a platen
 having an axle, of a barrel and a pinion se- 35
 cured together and both revolubly mounted
 within the platen frame at one end of the
 platen, said barrel having a helical series of
 stops, and a gear loose upon the platen axle
 and in mesh with said pinion. 40

38. In a typewriting machine, the com-
 bination with a platen frame and a platen
 having an axle, of a barrel and a pinion se-
 cured together and both revolubly mounted
 within the platen frame at one end of the 45
 platen, said barrel having a helical series of
 stops, and a gear loose upon the platen axle
 and in mesh with said pinion; a clutch com-
 prising two members by which one is fixed
 to said gear and the other is fixed to the
 platen axle, said axle being movable endwise
 to release the clutch.

JOHN JOSEPH COOPER.

Witnesses:

HERSCHEL WILLIAMS,
 RICHARD WESTACOTT.