

July 11, 1944.

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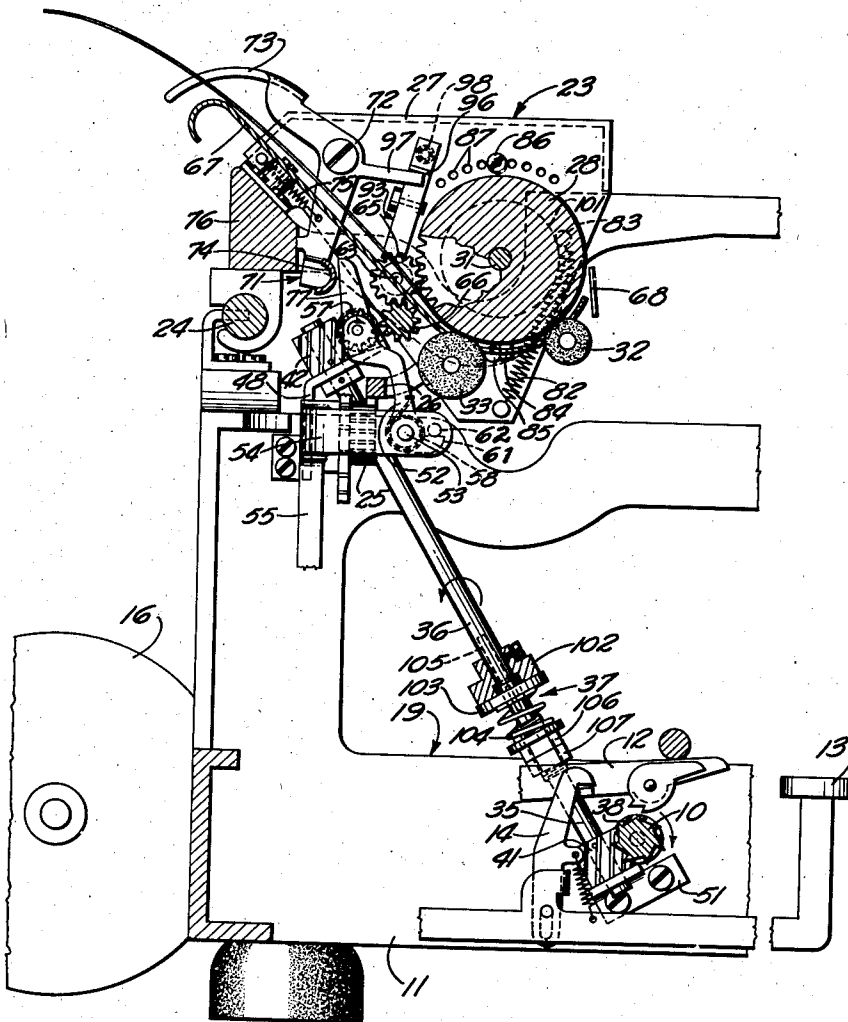
2,353,407

TYPEWRITING MACHINE

Filed June 26, 1941

3 Sheets-Sheet 1

Fig. 1



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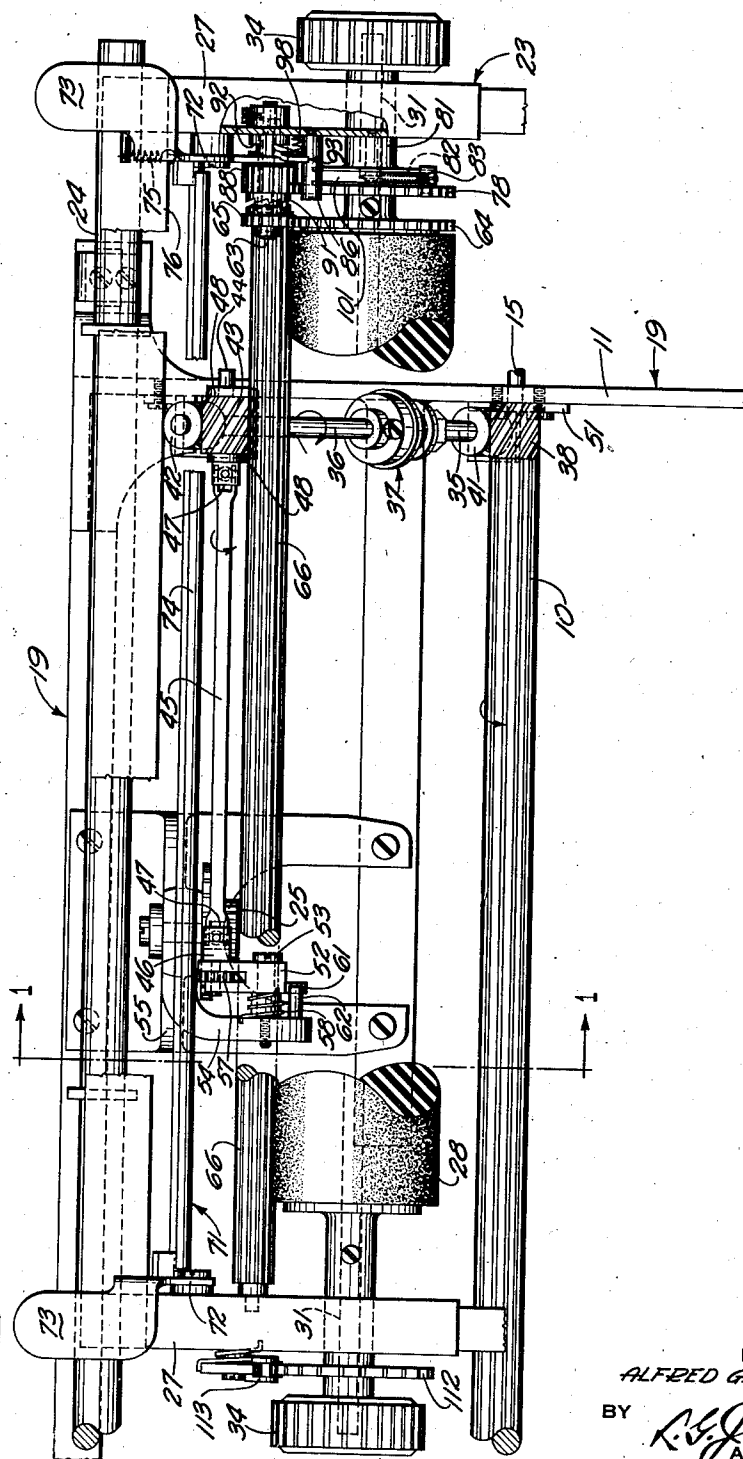
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3 Sheets-Sheet 2

FIG. 2



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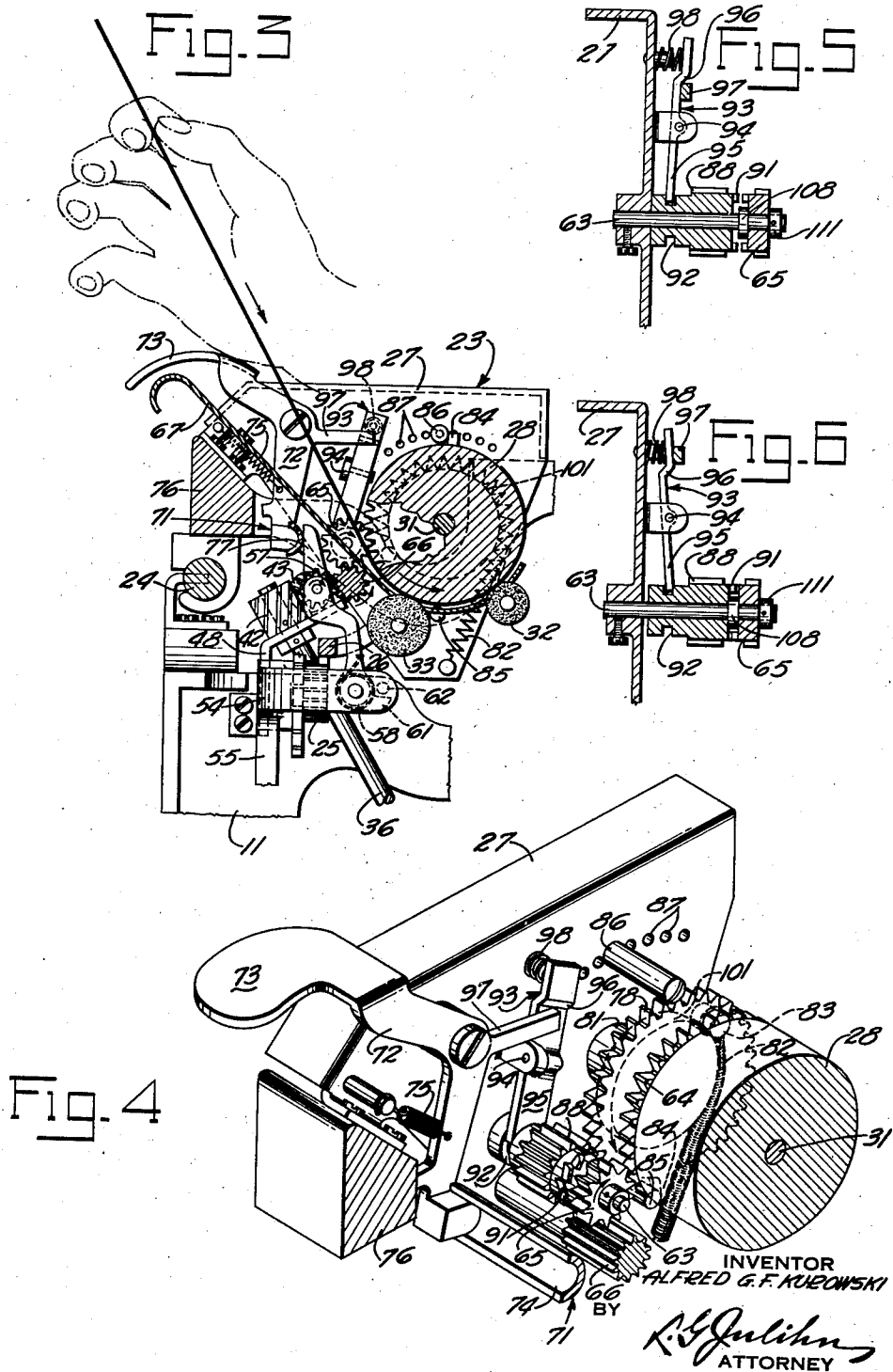
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TYPEWRITING MACHINE

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3 Sheets-Sheet 3



UNITED STATES PATENT OFFICE

2,353,407

TYPEWRITING MACHINE

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22 Claims. (Cl. 197—127)

This invention relates to typewriting and analogous machines, such as adding and bookkeeping machines, and more particularly to devices for the power feeding of paper in such machines.

In conventional machines of this kind, the work sheets or work webs to be typed upon are fed around the bottom side of a rotatable platen to bring the desired line into printing position. Usually the structure is such that rotation of the platen will advance the work sheets, the sheets being gripped between pressure rolls and the platen. The work sheets are usually introduced into the machine by the operator's hands, and, in order to effect straight feeding, they must be presented squarely to the bite of the pressure rolls and the platen, that is, they must be presented so that in each instance the leading end of the sheet is gripped and advanced in continuous alignment by rotating the platen.

Obviously, for the above reasons, the work sheets, especially when dealing with a pack thereof, are most efficiently and accurately inserted into the machine if the operator's attention can remain focused on the sheets during the entire inserting procedure.

It is, therefore, a major object of the invention to provide efficient power-operable paper-feeding means that are adapted to be rendered effective by control means located in close association with the typewriter carriage.

Another object of the invention is to provide a device of the above character which is conveniently controllable by the operator's hands during the act of presenting the sheet material to the typewriter.

It is also an object of the invention to provide a reliably operating economically manufactured power-paper-feeding device.

A further object of the invention is to provide simple, efficiently operating power means for feeding paper on a typewriter carriage from a power source on the typewriter frame.

Also an object of the invention is to devise a reliably operating, conveniently controllable device for power-feeding paper to predetermined exact extents.

Still a further object of the invention is to provide a reliably operating, low-cost power-operable paper-feeding device which is definitely controllable to feed paper either to definite predetermined extents or to extents different therefrom by directly controlling the time of feeding operation.

Other objects and features of the invention will

be obvious from the following description of a preferred embodiment of the invention.

Referring now more particularly to the drawings:

Figure 1 is a sectional side elevation taken along line 1—1 of Figure 2 and illustrates a portion of a typewriter inclusive of the power-feed mechanism of the invention, the latter being shown ineffectively conditioned.

Figure 2 shows in plan, portions of a typewriter frame and carriage, together with said power-paper-feeding mechanism.

In Figure 3, the power-feed mechanism of Figure 1 is shown operatively conditioned and as having advanced a work sheet to a predetermined extent.

Figure 4 is a perspective view looking against the inner side of the right-hand carriage end from the rear of the machine.

Figures 5 and 6 show in detail a clutch mechanism in open and closed positions, respectively.

The invention is shown embodied in a power-driven typewriter that corresponds to an extent to the one shown in U. S. patent to Kurowski No. 2,139,552, issued December 6, 1938. A continuously rotating fluted shaft 10, extending intermediate left and right side walls 11 of a frame 19, is adapted to operate typing instrumentalities which include type-action-operating power links 12. The links are normally disassociated from the fluted shaft 10, but are selectively connectible thereto by the operation of type keys 13, through the medium of links 14. The fluted shaft 10 has opposite reduced ends 15 which run in bearings provided upon the opposite frame walls 11. A continuously running electric motor 16, carried upon the rear of the typewriter frame, drives the fluted shaft 10 in the direction of the arrow (Figure 1), through the medium of transmission elements, not shown. The main frame 19 supports a rear rail 24 and also a front rail, not shown, and these rails guide a paper carriage 23 for movements in letter-feed and return directions. As in most conventional typewriters, the movements of the carriage may be normally controlled by a letter-feed escapement, not shown, through an escapement-controlled pinion 25 meshing with a rack 26 on the carriage 23. The carriage has opposite ends 27 upon which a platen roll 28 is rotatively carried by means of a platen shaft 31. The platen 28 constitutes a feed roll that is part of a paper-feeding mechanism which includes conventional front and rear feed rolls 32 and 33, respectively, it being understood that these latter rolls may be releasable as usual.

The platen is revolvable by knobs 34 mounted upon opposite ends of the platen shaft 31.

The most frequent procedure followed to locate a work sheet in the desired typing position upon the machine is to present it first to the bite of the rear feed rolls 33 and to feed it thereafter to the desired extent by manually rotating the platen 28. An important aim of the present invention is to facilitate the above procedure by providing an efficient and conveniently controllable power device for feeding work sheets, the preferred embodiment of which device will presently be described.

A rearwardly inclined shaft, see Figures 1 and 2, comprising a lower portion 35 and an upper portion 36 joined to said lower portion by a friction coupling 37, is normally continuously driven by the fluted shaft 10 in the direction indicated by the arrows, through spiral gears 38, 41, respectively carried by the fluted shaft 10 and the lower shaft portion 35. Another spiral gear 42 carried by the upper end of the shaft portion 36 is in driving engagement with a spiral gear 43 secured upon the right-hand end of a horizontal composite shaft comprising successively adjoining portions 44, 45 and 46 connected by universal joints 47. (See Figure 2.) A bracket 48 attached to the inner side of the right-hand frame wall 11 provides pivot bearings for both, the horizontal shaft portion 44 and the inclined shaft portion 36. The lower portion 35 of the inclined shaft is pivoted in a bracket 51 that is also secured to the inner side of the right-hand frame wall 11. The leftmost horizontal shaft portion 46 is rotatably carried upon an arm 52 swingable on a stud 53 projecting laterally from a branch 54 of an escapement support 55 on the machine frame 19, a spring 58 being provided upon a hub of the arm to resiliently retain it in a normal position in which a finger 61 thereof normally engages a stop pin 62 on the bracket branch 54, see Figure 1. The arm 52 carries between a forked upper portion thereof a gear 57 which is secured to the short shaft portion 46 for rotation therewith.

Secured to the platen shaft adjacent the right platen end is a gear 64 which is in mesh with a small gear 65 rotatively carried near the inner side of the right-hand carriage end 27 by means of a stud 63 carried and projecting therefrom. A pinion rod 66, extending intermediate the carriage ends has reduced ends by which it is rotatively carried by the opposite carriage ends 27. This pinion rod 66 extends along the rear of a rearwardly inclined paper shelf 67 and the small gear 65 provides an operative connection between the gear 64 and the pinion rod 66, it being desired to have the gear 64 no larger in diameter than the platen 28 so as never to interfere with the usual wing scales at the front of the platen, indicated at 68 in Figure 1. The gear 57 occupies normally a position closely adjacent to the pinion shaft 66, and, as hereinbefore stated, is continuously power driven by the motor 16. The composite shaft 44, 45, 46 being provided with universal joints 47, and the gear 57 being swingable with the arm 52, it follows that the gear 57 is movable into and out of engagement with the pinion rod 66. Engagement may be effected in any position of the carriage because the pinion rod 66 is coextensive with the carriage and the gear 57 is disposed substantially midway between the left and right side walls 11 of the machine framework. A bail 71 on the carriage 23 is rockably mounted thereon to swing the arm

52 forwardly to thereby engage the gear 57 with the pinion rod 66. The bail comprises two arms 72 pivotally carried upon the opposite carriage ends 27, and a rod or bar 74 extending parallelly to the carriage and connecting the arms, each arm being provided with a control key 73. A spring 75, shown attached to the right-hand arm 72, resiliently retains the bar in a normal rearward position against a carriage-frame part 76 so that the bar 74 of the bail is normally clear of an upward extension 77 on the arm 52 and does not impede the carriage in its movements, see Figure 1. The control keys 73, by being disposed as shown, may be conveniently operated subsequently to presenting the work sheets to the bite of the rear feed rolls 33 and the platen 28, that is, the operator is enabled to use both hands to properly square the work sheets in the throat presented by the rear feed rolls and the platen and may then proceed, without losing control of the sheets, to operate the control keys.

Preferably the control keys 73 are so located that they may be operated by the palms of the operator's hands while the fingers of the same hands may be engaged in holding the work sheets in inserting positions. This allows the operator to give full attention to the work sheets before they are drawn downwardly by the paper-feeding mechanism. However, the mere fact that these controls 73 are close to the paper being handled permits more expeditious operation of the machine. The position of the control keys 73 is also advantageous for feeding the work sheets out of the machine, the operator being enabled to operate the keys 73 with the hand in grasping reach of the paper.

According to the paper-feeding mechanism described to this point, the platen will rotate as long as the operator maintains the key or the keys 73 operated, that is, as long as the gear 57 remains in mesh with the small gear 65. The gears in the drive train from the paper-feeding mechanism should be portioned so as to cause paper-feeding operation at a fairly moderate speed, thus enabling the operator to control with a fair degree of accuracy, the extent of paper feed by differently timing the duration of operation of the control keys 73.

A paper-feed measuring or determining device may be incorporated in the machine to enable the operator to obtain accurately predetermined extents of paper feed. This device, according to the embodiment of the invention shown, includes a gear sector 78 and a grooved collar 81, both rotatably mounted adjacent the gear 64, on the platen shaft 31. A tension spring 82, having one end attached to a pin 83 on the gear sector 78 and having another end attached to the lower portion of the adjacent carriage end, influences the gear sector 78 to occupy normally the position shown in Figures 1 and 4, in which position a stop ear 84 integral with the sector 78 engages a stop pin 85 projecting leftwardly from the lower portion of the adjacent carriage end 27. Another stop pin 86 limiting the extent of paper feed, as will be evident from further description, is securable in different positions on the inner face of the right-hand carriage end 27, as by screwing it into any one of a plurality of threaded holes 87. Coaxially arranged on the stud 63, together with the small gear 65, and in constant mesh with the gear sector 78, is another small gear 88 and these small gears have normally disassociated clutch teeth 91 facing toward each other. See Figures 2, 4,

and 5. The gear 88 is movable axially on the stud 63 toward the gear 55 by operating the bail 71; and when so moved, will bring about the engagement of the clutch teeth 91. With the clutch teeth engaged, the gears 65 and 88 are connected for rotation in unison by the pinion rod 66, in the direction of the arrow indicated in Figures 3 and 4; and, since the gear 64 and the gear sector 78 are in mesh with the said gears 65 and 68, it follows that also they will rotate in unison when the said clutch teeth are engaged. The small gear 88 has a circumferentially grooved hub 92, and a lever 93 pivoted at 94 to an ear on the right-hand carriage end, has an arm 95 extending downwardly into the said groove. An upwardly extending arm of the said lever 93 has a cam face 96 adapted for engagement by a camming finger 97 that is integral with the right-hand bail arm 72. A compression spring 98, arranged between the lever 93 and the adjacent carriage end, maintains the lever 93 normally in the position seen in Figure 5 so that the gear 88 is normally disassociated from the gear 65. As may be appreciated readily from Figure 4, the camming finger 97, upon operation of the bail 71 by acting upon the cam 96, causes the shifting of the small gear 88 into clutched engagement with the small gear 65, see Figure 6; and, since operation of the bail causes the pinion rod 66 to be rotated by the normally revolving gear 57, it follows that both, the platen gear 64 and the adjacent sector 78 will be driven in response to operating the bail, the direction of rotation being to feed the paper as indicated by the arrow in Figure 3. If the operator maintains the key or keys 73 operated, the extent of rotation will be limited positively by the sector ear 84 engaging the stop pin 86. If, however, the operator allows the key or keys 73 to restore before the stop ear 84 reaches the stop pin 86, the extent of platen feed will be less, that is, will be dependent directly on timing the release of the keys. The friction coupling 37, included in the drive from the fluted shaft 10, is ordinarily capable of transmitting platen-driving motion but allows the platen-driving mechanism to stall readily when the said stop ear 84 on the sector 78 engages the stop pin 86. The platen-driving mechanism is, therefore, not unduly stressed at the conclusion of the feeding operation as determined by the engagement of the stop ear 84 with the pin 86; furthermore, since the platen will stall readily, there is no danger of injury to the operator. During the rotation of the gear sector 78, the spring 82 is extended, and progressive portions thereof become seated into the groove 101 of the collar 81. Upon release of the key 73, the gear sector 78 assumes readily its normal position under the influence of the spring 82, and the operator, if desired, may again operate the bail 71 to effect a further feeding operation.

Referring to Figure 1, the friction coupling may comprise a collar 102, fixedly mounted on the shaft 36, and a disc 103 keyed to, but axially movable along, the shaft 35, a spring 104 being provided to urge the disc 103 into facewise frictional engagement with the collar 102. A reduced end of the shaft portion 35 may fit, as at 105, for an appreciable distance rotatably within a bore in the shaft portion 36, thus eliminating the necessity for special pivotal supporting means. The pressure of the spring 104, and therefore the torque transmitted from the shaft 35 to the shaft 36 is variable by adjustment of a flanged nut

106 on the shaft 35, there being a lock nut 107 provided to set the adjustment.

As seen in Figures 5 and 6, the stud 63 has an enlarged portion 108 between which and a collar 111 the gear 65 is accurately confined. The clutch teeth 91 on the gears 65 and 88 are circumferentially spaced in agreement with the line spaces obtainable by a conventional line-spacing mechanism which may include a toothed line-space wheel 112 and a spring-pressed detent 113 acting upon it. It is, therefore, evident that the clutch teeth 91 on the gears 65 and 88 are always in proper relation at the outset of each power-paper-feeding operation.

It should, furthermore, be noted that the platen 28 is normally operatively disassociated from the power-paper-feeding and feed-measuring mechanism and can be turned independently thereof by, for example, the platen knobs 34. Also, it should be noted that the engagement of the sector ear 84 against the stop pin 86 prevents positively over-rotation of the platen because at the moment of arrest, the platen is positively connected to the sector 78.

While the description has been made with reference to the details of construction shown in the drawings, it is to be understood that the invention is not restricted to the particular construction shown, but is intended to cover such modifications or departures as are within the purposes of the improvements.

I claim:

1. In a machine of the class described having a carriage movable on a frame; a carriage carried paper-feeding device including an operatable member extending parallel to the carriage, power operating means on the frame operatively associable with said member in any position of the carriage to actuate said device, and means including a manual control on the carriage and a bar movable transversely of the carriage by said control to operatively associate said power operating means with said member irrespective of the position of the carriage.

2. In a machine of the class described having a carriage movable on a frame, a paper-feeding mechanism on the carriage, normally ineffective means on the frame for power operating said paper-feeding mechanism, and means operatable from a location on the carriage to render said power-operating means effective in any position of the carriage, said last means including, an element on the carriage and an element on the frame, the latter operable by the former, both being mounted for movement transversely of the carriage and at least one comprising a bar extending parallel to the carriage.

3. In a machine of the class described having a paper-feed roll; power means adapted to rotate said roll, means operatively connectible with said roll for operation thereby, said roll being normally rotatable independently of said connectible means, means to connect said last means operatively with said roll and simultaneously render said power means effective to rotate said roll, and means influenced by the operation of said connectible means to a certain extent to render said power means automatically ineffective.

4. In a machine of the class described having a paper-feed roll on a carriage; power means adapted to rotate said roll, means operatively connectible with said roll for operation thereby, said roll being normally rotatable independently of said connectible means, means operatable on the carriage to connect said last means opera-

tively with said roll and simultaneously render said power means effective to rotate said roll, and means influenced by the operation of said connectible means to a certain extent to render said power means automatically ineffective.

5. In a machine of the class described having a carriage, work-sheet feeding means on the carriage to which work sheets are presentable by the operator's hands for subsequent advance to typing position, normally ineffective means to power operate said work-sheet feeding means to effect work-sheet advancement to typing position, and means to render said operating means effective, comprising a control on the carriage so arranged as to be conveniently operable by an operator's hand occupied in work-sheet presentation to said sheet-feeding means.

6. In a machine of the class described, having a carriage, work-sheet feeding means on the carriage to which work sheets are presentable by the operator's hand for subsequent advance to typing position, normally ineffective means to power operate said work-sheet feeding means to effect work-sheet advancement to typing position, and control means to render said operating means effective, comprising a bail supported on and extending parallel to the carriage, the bail having an operating piece at each end of the carriage, each so arranged as to be operable by the palm of an operator's hand occupied in work-sheet presentation to said sheet-feeding means.

7. In a machine of the class described having a carriage movable on a frame, a paper-feeding mechanism on the carriage, frame-supported power-operating means for said paper-feeding mechanism, operatively associable with the latter in any position of the carriage, and control means operable to associate said power-operating means with said paper-feeding mechanism, said control means including an element on the frame and a manipulative element on the carriage, the elements being adapted to each other so that the former is operable through manipulation of the latter in any position of the carriage, thereby to cause association of said power-operating means with said paper-feeding mechanism.

8. In a machine of the class described having a carriage movable on a frame; a toothed rod rotatable on the carriage, means operable by said rod to feed paper on the carriage, normally ineffective power means on the frame for rotating said rod in any position of the carriage, and means operable from a location on the carriage to render said power means effective in any position of the carriage, said last means including an element on the frame and an element on the carriage, the elements being adapted to each other so that the former is operable by the latter in any position of the carriage.

9. In a machine of the class described having a carriage movable on a frame, a carriage-supported paper-feeding means including a rotary motion-transmitting member, frame-supported power-driving means for said paper-feeding means, including a rotary drive member associable with said carriage-supported member in any position of the carriage, means operable from a location on the carriage and when operated being effective to associate the rotary drive member with the carriage-supported member, regardless of the position of the carriage, said last means including an element on the frame and an element on the carriage, the elements being adapted to each other so that the former is operable by the latter in any position of the carriage.

10. In a machine of the class described, normally ineffective power paper-feeding means, means to render said paper-feeding means effective for a predetermined extent of paper-feeding operation, comprising, control means operable to effectuate the paper-feeding means, a spring-restored feed-determining device normally disconnected from said power paper-feeding means and adapted by being operated to a predetermined extent to ineffectuate the power paper-feeding means, and means responsive to the operation of said control means to connect said feed-determining device for operation by said power paper-feeding means.

11. In a machine of the class described, normally ineffective power paper-feeding means, and means to cause said means to effect a limited extent of paper-feeding operation, comprising, control means operable to effectuate said power paper-feeding means, spring-restored, limitedly operable means, and means responding to the operation of said control means, to connect said limitedly operable means for operation by said power paper-feeding means.

12. In a machine of the class described, normally ineffective power paper-feeding means, and means to cause said means to effect a limited extent of paper-feeding operation, comprising, control means operable to effectuate said power paper-feeding means, limitedly operable means, and means responding to the operation of said control means, to connect said limitedly operable means for operation by said power paper-feeding means, said operable means including adjustable means to vary the extent to which it is operable.

13. In a machine of the class described, a paper-feed roll, a power device adapted to be rendered effective for non-positively rotating said roll, limitedly operable means operatively associable with said roll for positively limiting the extent of rotation of said roll by said power device, and means to positively connect said limitedly operable means for synchronous operation with said roll and simultaneously render the power device effective to rotate said roll, whereby said roll will be rotated to the extent controlled by said limitedly operable means and will be prevented by the limitedly operable means from overrotating by momentum.

14. In a machine of the class described, normally ineffective power paper-feeding means, control means adapted by varying periods of operation to cause said power paper-feeding means to be effective for corresponding extents of paper-feeding operation, a device supplementing said control means, being connectible for operation by said power paper-feeding means to render the latter automatically ineffective in response to a definite extent of paper-feeding operation, and means responding to the operation of said control means to connect said device for operation by said power paper-feeding means.

15. In a machine of the class described, paper-feeding means, normally ineffective power means for operating said paper-feeding means, manipulative means adapted by varyingly timed manipulations thereof to render said power means effective for varying periods, to thereby obtain varying extents of operations of said paper-feeding means, means operable to a predetermined extent to render said power means ineffective, and means controllable by said manipulative means to cause the operation of said operable means to the said predetermined extent synchronously with the operation of said paper-feeding means, to

thereby obtain a predetermined extent of operation of said paper-feeding means.

16. In a machine of the class described, paper-feeding means, normally ineffective power means for operating said paper-feeding means, manipulative means adapted by varyingly timed manipulations thereof to render said power means effective for varying periods, to thereby obtain varying extents of operations of said paper-feeding means, limitedly operable means, and means controllable by said manipulative means to cause the operation of said limitedly operable means synchronously with the operation of said paper-feeding means, to thereby obtain a predetermined extent of operation of said paper-feeding means.

17. In a machine of the class described, paper-feeding means, normally ineffective power means for operating said paper-feeding means, manipulative means adapted by varyingly timed manipulations thereof to render said power means effective for varying periods, to thereby obtain varying extents of operations of said paper-feeding means, spring-restored means operable to a predetermined extent to render said power means ineffective, and means controllable by said manipulative means to cause the operation of said spring-restored means to the said predetermined extent synchronously with the operation of said paper-feeding means, to thereby obtain a predetermined extent of operation of said paper-feeding means.

18. In a machine of the class described, normally ineffective power paper-feeding means, and means to render said paper-feeding means effective for differing periods to cause paper-feeding of differing extents, said rendering means comprising, a control adapted by differing periods of operation to render said paper-feeding means effective over corresponding periods, thereby to cause differing extents of paper-feeding operation, and additional means including a part connectable to said power paper-feeding means by operation of said control, for synchronous operation with said paper-feeding means, and operative upon sustained operation of said control, to render said paper-feeding means automatically ineffective after a definite extent of paper-feeding operation has taken place.

19. In a machine of the class described, a carriage having end walls, feed roll means arranged between the said carriage ends so that work-sheets are presentable downwardly to said feed roll means for rolling into the machine, nor-

mally ineffective means for power operating said feed roll means, and means to render said power means effective, comprising a control piece projecting upwardly from one of said carriage end walls in such a location as to be conveniently operable by an operator's hand occupied to present a work-sheet to said feed roll means.

20. In a machine of the class described, normally ineffective power paper-feeding means, a spring-restored feed-determining device normally disconnected from said power paper-feeding means and adapted by operation thereof to render said paper-feeding means ineffective after a definite extent of paper-feeding operation has taken place, and control means operable to render said paper-feeding means effective, and said feed-determining means connected for operation by said power paper-feeding means, said control means, when being restored, being effective to disconnect said feed-determining device to allow its restoration in preparation for another feed-determining operation.

21. In a machine of the class described, paper-feeding means, normally ineffective means for power operating said paper-feeding means, control means adapted by varying periods of operation to cause said power-operating means to effect operations of said paper-feeding means to corresponding extents, a device being operable synchronously with said paper-feeding means to limit positively the operation thereof and concomitantly to render said power-operating means ineffective, and means responding to the operation of said control means to cause operation of said device, and responding to the restoration of said control means to cause restoration of said device in preparation for another operation.

22. In a machine of the class described, having a carriage movable on a frame, means on the carriage operable to feed paper thereon, frame-supported motor-drive means for said paper-feeding means, including a constantly running motor, adapted to operate said paper-feeding means in any position of the carriage, and means, including a control element on the carriage, operable and restorable respectively to render concomitantly said motor-drive means effective and ineffective to drive said paper-feeding means, the entire carriage-supported paper-feeding means being quiescent whenever said motor-drive means is ineffective.

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