June 3, 1941. S. P. BRADY, JR 2,244,443

CARRIAGE RETURN MECHANISM

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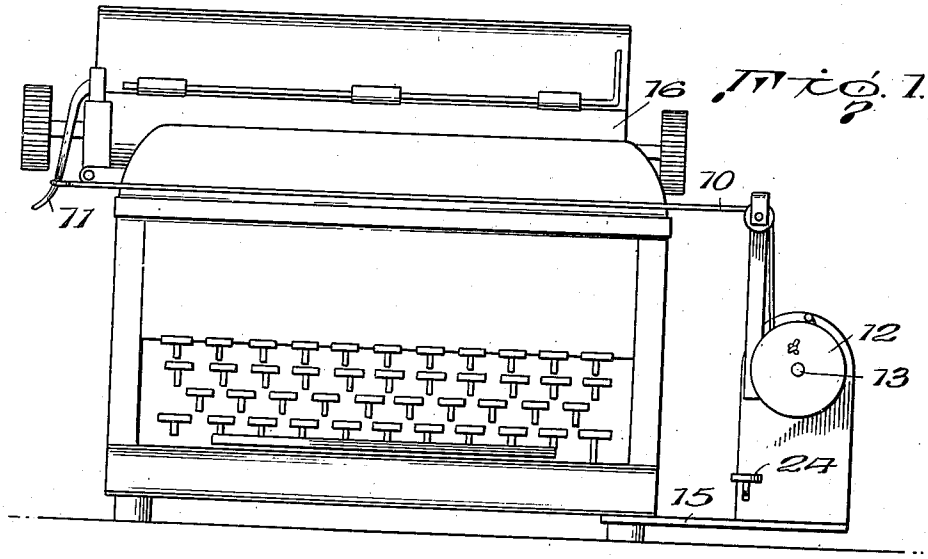
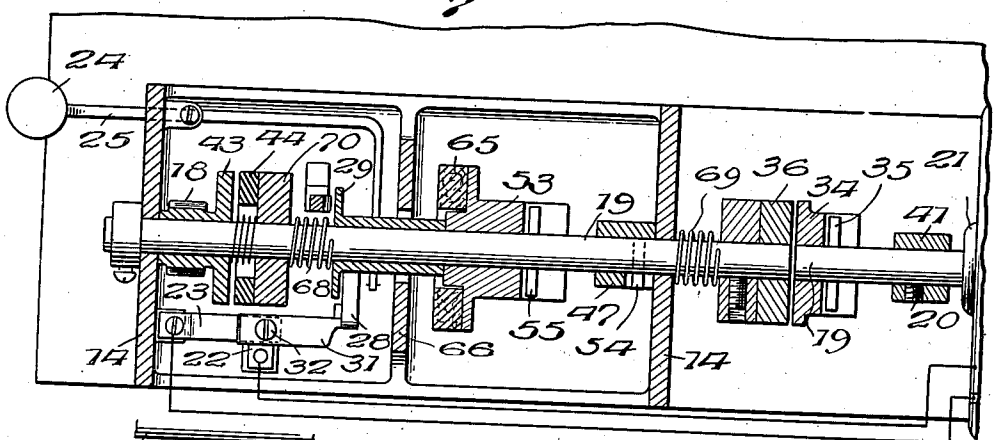


Fig. 1.

Fig. 5.



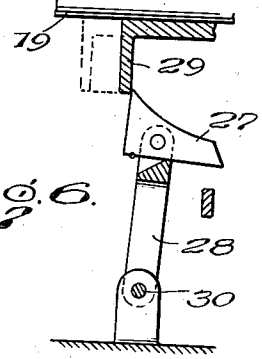


Fig. 6.

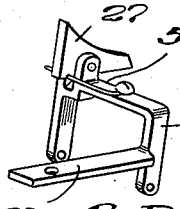


Fig. 7.

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CARRIAGE RETURN MECHANISM

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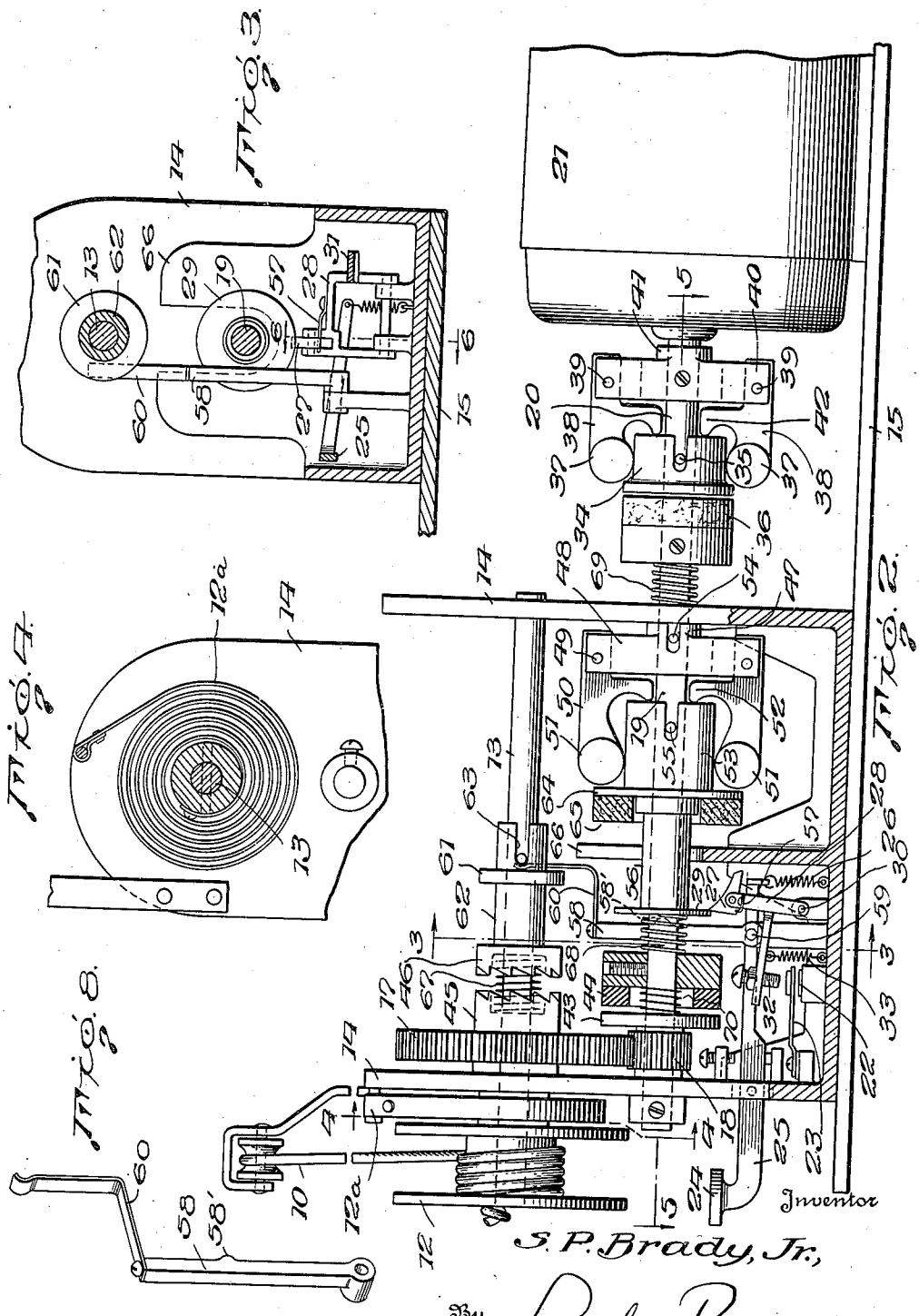


Fig. 3.

Fig. 4.

Fig. 8.

Fig. 2.

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CARRIAGE RETURN MECHANISM

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9 Claims. (Cl. 197—66)

This invention relates to improvements in mechanisms for returning the platen carriage of machines wherein the platen is moved past the printing position of type elements for imprinting characters on a printing surface such as paper, carried by the platen and its carriage.

More particularly, the invention has to do with an attachment for machines, such as typewriters, for the purpose of returning the typewriter carriage and platen after the latter have been advanced past the printing position of the type elements.

One object of the invention is to provide a carriage return mechanism which is automatically rendered inoperative after the carriage has been completely returned.

Another object of the invention is the provision of a carriage return mechanism that, without any adjustment, is capable of properly returning the carriage irrespective of the limit to which the carriage is adapted to be moved during its return movement.

Still another object is to provide a carriage return mechanism in the form of an attachment for machines, such as typewriters, and which is capable of ready installation with various styles or constructions of typewriters.

Another object is the provision of a return mechanism in which undue shocks or strains will not be imposed on any of the structural elements of the mechanism.

More specifically, the invention contemplates a motor-driven carriage return mechanism in which, after the operator has actuated the main control key for energizing the motor, the return mechanism as a whole will be rendered operative by means responsive to rotary motion of the motor shaft and a second shaft which is driven from the motor shaft. Centrifugally actuated elements preferably constitute the means responsive to the rotary motion of said shafts and, after the mechanism has once been placed in operation, it will remain operative until the carriage reaches the limit of its return movement, at which time the driven shaft is permitted to stall or stop, independently of the motor shaft, under which circumstances the centrifugally actuated elements, carried by said driven shaft, are rendered inoperative and permit the automatic actuation of additional means for rendering the entire mechanism inoperative until the main control key is again depressed.

With these and other objects in view, the invention consists in certain details of construction and combinations and arrangements of parts, all as will hereinafter be more fully described, and the novel features thereof particularly pointed out in the appended claims.

In the accompanying drawings, illustrating the preferred embodiment of the present invention,

Figure 1 is a front elevational view illustrating, more or less in outline, a typewriter with the present mechanism attached thereto;

Fig. 2 is a view taken at right angles to Fig. 1 and illustrating, partly in section and partly in side elevation, the present return mechanism;

Fig. 3 is a vertical sectional view taken transversely of the return mechanism on the line 3—3 of Fig. 2;

Fig. 4 is a similar transverse sectional view taken on the line 4—4 of Fig. 2;

Fig. 5 is a horizontal sectional view on the line 5—5 of Fig. 2;

Fig. 6 is a detail section on the line 6—6 of Fig. 3, illustrating the latch and trip mechanism controlling the motor switch;

Fig. 7 is a detail perspective view of the latch for said motor switch; and

Fig. 8 is a detail perspective view of the lever for actuating the movable clutch member controlling the operation of what is referred to hereinafter as the low-speed shaft.

In order to adapt the present carriage return mechanism to machines of various types and, particularly, to typewriters of various constructions, the only connection between the return mechanism proper and the carriage of the typewriter which is utilized for illustrating the invention, is a flexible connecting member 10, one end of which is attached to the usual carriage return lever 11 and the other end of which is secured around a winding drum 12 mounted fast on a shaft 13 hereinafter, for convenience, referred to as the low-speed shaft. This shaft is journaled in the arms 14 of a bracket mounted on a base 15 which may be clipped or otherwise secured to the typewriter. Normally, shaft 13 is free to rotate independently of the remainder of the return mechanism, and the carriage with the platen 16 moves from right to left, as viewed in Fig. 1 during normal operation of the typewriter, during which movement of the carriage and shaft, the flexible connection 10 is paid off or unwound from the winding drum 12 until the carriage reaches its extreme limit of movement in that direction. At this time, the present return mechanism is rendered operative by the operator so as to rewind the flexible connection 10 on drum 12 and return or retract the carriage and its platen to its limit of movement toward

the right, as viewed in Fig. 1. Any slack in the connecting member 10 is taken up by a spring 12a, best illustrated in Fig. 4, one end of said spring being attached to one of the arms of bracket 14 and its other end to the hub of the winding drum. To take up connecting member 10 and return the carriage, shaft 13 is adapted to be driven in an opposite direction through gears 17, 18, by means of a shaft 19, best referred to as the high-speed shaft, and shaft 20 of the motor 21, which is also carried on the base 15.

The electrical circuit for operating motor 21 is not illustrated, but it comprises a switch formed by contact elements 22, 23, which may be closed by the operator by depressing the main control key 24 located in advance of the front arm of bracket 14. This main control key 24 is carried on a lever 25 which may be pivoted in the arm of bracket 14 and the rear or inner end of said lever is normally held depressed by a spring 26 but, upon depression of key 24 and consequent elevation of the rear end of key lever 25, a latch 27, pivoted on a swinging bracket 28, is released from its catch 29 and permitted to swing or move forwardly. Latch 29 is preferably in the form of a collar forming part of a sleeve extension 56 on shaft 19 for purposes which will presently appear. Bracket 28 is pivotally supported at 30 from the base 15 and carries a forwardly extending arm 31 in which there is adjustably mounted a screw 32 which is normally positioned above contact 23. Thus, when latch 27 is freed from catch 29 so that bracket 28 may tilt forwardly, screw 32, carried in the bracket arm 31, descends against contact 23 and moves the latter into engagement with contact 22, closing the switch formed by these two contacts 22, 23, and energizing motor 21. Once the latch 27 is freed, contacts 22, 23, will be held in engagement with each other by a spring 33 attached to bracket arm 31 until the carriage has been fully returned. The catch-engaging portion or front edge of latch 27 is held in an elevated position with respect to the pivotal center of the latch by a spring 57 on swinging bracket 28.

In order to automatically render the return mechanism inoperative after the carriage has been fully returned, and also in order to eliminate undue shocks or strains that might be caused by the carriage engaging against the stop which limits its return movement, power is transmitted from the motor 21 to the high-speed shaft and thence to the low-speed shaft, preferably by means that will yieldingly, so to speak, transmit such motion so that such means may yield and absorb shocks and strains that would otherwise occur when the carriage reaches the limit of its return movement. Preferably, for this purpose, frictional clutches are utilized for connecting the motor shaft 20 to the high-speed shaft 19 and for driving the high-speed gear 18 from said high-speed shaft. Furthermore, these clutches, as well as the clutch for driving low-speed shaft 13 from gear 17, are preferably actuated by means responsive to rotation of shafts 19 and 20 and the combined use of these friction clutches and the means responsive to the rotation of the shafts permit the return mechanism to be rendered inoperative automatically upon the carriage reaching its limit of return movement.

Referring, particularly, to Fig. 2, motor shaft 20 carries a collar 34 slidable thereon, but adapted to be driven from the shaft by a pin 35. This collar constitutes a clutch member adapted to cooperate with a second clutching member 36 preferably of leather, for reasons which will later appear, fast on high-speed shaft 19. Normally, clutch members 34 and 36 are disengaged, but upon motor 21 being energized member 34 is moved axially of shaft 20 into engagement with the leather disc constituting clutch member 36 by means responsive to the rotation of shaft 20. These shaft-responsive means comprise weights 37 located diametrically opposite each other with respect to shaft 20 and carried on arms 38 pivoted at 39 in radial extensions 40 of a collar 41 fast on shaft 19. The arms 38 have radially inwardly protruding extensions 42 bearing against clutch member 34 so that, as shaft 20 is rotated, the weights 37 and arms 38 move outwardly with the result that clutch member 34 is forced against clutch member 36 by the extensions 42.

High-speed shaft 19 is slidably supported in its journals in the arms of bracket 14 and high-speed gear 18 is normally inoperative, preferably being loose on said shaft. However, this high-speed gear has a collar 43 formed on its hub portion which serves as one element of a clutch for driving the gear from shaft 19. Mounted on shaft 19 opposite clutch element 43 is a second clutch element 44 and when clutch members 34, 36, are brought into contact by rotation of shaft 20 through the action of centrifugally operated weights 37, shaft 19 is moved axially to force clutch element 44 against the face of clutch element 43. Thus, rotary motion is imparted to gear 18 and, in turn, to gear 17. However, as previously mentioned, gear 17 is loose on low-speed shaft 13, so that motion is not imparted to that shaft until clutch elements 45, on the hub of gear 17, and 46, slidable on shaft 13, are brought into clutching engagement with one another. To accomplish this, means responsive to rotary motion of shaft 19 are provided for sliding clutch member 46 axially of low-speed shaft 13 into engagement with clutch member 45. Preferably, centrifugally actuated means, similar to those provided for clutch member 34, are utilized. For instance, collar 47, rotatable with shaft 19, has radial extensions 48 in which there are pivoted, at 49, arms 50 provided with weights 51 and extensions 52, the latter engaging against a sleeve 53 slidable on shaft 19.

As will be apparent, when shaft 19 is rotated, the tendency of the weights 51 to move outwardly will cause the extensions 52 of the arms 50 to move sleeve 53 axially of the shaft. Collar 47 is secured on shaft 19 by a pin and slot connection 54, and the sleeve 53 is secured on said shaft by a pin and slot connection 55. Thus, both the collar 47 and sleeve 53 will rotate with the shaft but relative axial movement is permitted between the shaft and these elements. Sleeve 53 is formed with tubular extension 56 which, in turn, has the annular flange or collar 29 thereon which functions as the catch for latch 27 controlling the closing of the electrical contacts 22, 23. Positioned in proximity to said collar 29 is a lever 58 having its lower end pivoted at 59 and provided at its upper end with an extension 60. This extension is preferably in the form of a strip of spring steel bent at right angles with one end or leg attached to the lever 58 and with its other end engaging against a collar 61 on the sleeve-like hub 62 of clutch member 46. This clutch member 46 is secured on low-speed shaft 13 by a pin and slot connection 63 so that, when sleeve 56 is advanced axially of shaft 19 and lug 58' on lever 58 is rocked to the left by collar 29, the extension 60 will advance clutch member 46

into engagement with clutch member 45 of low-speed gear 17, thus clutching that gear to the low-speed shaft and imparting a rotary motion to the winding drum 12 to take up the flexible connection 10 and return the platen carriage.

In order to provide a braking action, sleeve 53 is provided with a collar 64 on which is mounted an annulus of suitable frictional braking material 65, such as leather and, as the speed of the shaft 19 increases, this braking element will be advanced into contact with the sides of the bifurcated stanchion 66. By properly positioning the brake 65 and standard 66, so as to bring them into contact when shaft 19 attains a predetermined speed, the necessary braking action will be obtained for limiting the rotation of the shaft to the desired speed.

As thus far described, it will be seen that, when the latch 27 is tripped by depression of the finger piece 24, the switch composed of contacts 22, 23, will be closed and motor 21 energized, with the result that clutch elements 34, 36, will become engaged and shaft 19 rotated and advanced axially to clutch gear 18 thereto. The rotation of shaft 19 will also cause sleeve 53, with the collar 29 on its extension 56, to be advanced by the centrifugally actuated members 51 so as to rock lever 58 and interlock clutch members 45, 46, to clutch gear 17 to the low-speed shaft 13 on which the winding or take-up drum 12 is mounted. Thus, the carriage is retracted.

The take-up mechanism is automatically rendered inoperative and these several elements are restored to their original positions without undue shocks or strains being imposed on any of the operating connections instantly at the time the carriage is fully returned. To accomplish this, the operative face of one of the clutch elements 34, 36, is made of a material having a lower coefficient of friction than the material of which the operative face of one of the clutch elements 43, 44, is made. For instance, clutch element 36 may be made with a face of leather, while the operative face of clutch element 44 may be made of rubber, with the result that, when the carriage reaches its limit of return movement, so that shaft 13 cannot continue to rotate, that shaft, as well as shaft 19, can stall or come to rest while motor shaft 20 continues to rotate due to slippage between the contacting surfaces of clutch elements 34, 36. Consequently, by reason of the fact that shafts 13 and 19 cease rotating, the weights 51 will move inwardly toward the shaft with the result that sleeve 53 and its extension 56 are returned to their original positions, under which conditions the pressure of member 60 on the low-speed gear clutch member 46 is relieved. During this return movement of these parts, the collar on extension 56, constituting catch 29 for latch 27 engages the upper extremity of the latch and returns it, together with bracket 28, to original position. In this manner, the bracket arm 31 with screw 32 is raised to free contact 23 from contact 22. Contact 23 is carried on a strip of resilient material so that it immediately separates from contact 22 when the pressure of screw 32 thereon is relieved and, upon the contacts being separated, motor 21 is de-energized. At the time sleeve 53, with its extension 56 and collar 29, is retracted, by the collapse of the weights 51, pressure of member 60 on clutch element 46 for the low-speed gear is relieved and that clutch element will be separated from clutch element 45. Preferably, a spring 67 coiled around shaft 13 between these clutch elements augments the action of the upper extremity of the resilient member 60 in the retraction or disengagement of clutch member 46 from member 45. The retraction of sleeve 53, upon the collapse of weights 51, is primarily effected by a spring 68 coiled around shaft 19 between the collar 29 and the rear face of clutch member 44, which is pinned to shaft 19.

As just stated, upon the separation of contacts 22, 23, motor 21 is de-energized and, consequently, weights 37 move inwardly as shaft 20 comes to rest, leaving clutch member 34 free to return to its original position. Under these circumstances, shaft 19 is then restored to its original position by the action of a spring 69 interposed between the rear face of clutch member 36 and the adjacent arm of bracket 14 and a second spring 70, interposed between the two clutch members 43, 44. The action of spring 70 in separating clutch members 43, 44, also relieves driving pressure on clutch member 45 which further facilitates the separation of clutch member 46. It will be appreciated that, due to the lower coefficient of friction of clutch 36, shafts 13 and 19 can stall or stop at any time the carriage reaches the limit of its return movement. Consequently, it is immaterial what adjustments are made in the typewriter for limiting the return movement of the carriage. In other words, the usual stops employed for determining the extent of return movement of the carriage can be adjusted to any position desired without requiring adjustment of any element of the carriage return mechanism proper. This fact, together with the further fact that the only connection between the return mechanism and the machine, of which the carriage is a part, is in the form of a flexible connection 10 which is attached to the carriage, permits the present return mechanism to be readily adapted to or installed on various types of machines. It will also be appreciated that no severe shocks or stresses are imposed on any portion of the return mechanism proper, due to the fact that the construction is such that the mechanism is rendered inoperative upon full return of the carriage merely by the ability of the high and low speed shafts 19 and 13 to stall or remain stationary while the motor and its shaft continue to function at least momentarily after the carriage has reached the limit of its return movement. The stalling effect described will not cause a jolting or jarring since the heavy motor armature does not stall at the time the comparatively light shafts 19 and 13 are stalled. These shafts 19 and 13 being comparatively light build up very little inertia so that stalling thereof has no detrimental effect so far as jolting or jarring is concerned and, as just described, the motor, with its heavy armature, comes to rest under what might be termed normal conditions by the opening of contacts 22, 23.

What I claim is:

1. In a carriage return mechanism, a carriage, a low-speed winding shaft, a connection between said carriage and said low-speed shaft, an axially movable high-speed shaft, a motor driven power shaft, means responsive to the rotation of the power shaft to rotate and move the high-speed shaft axially when the power shaft reaches a predetermined speed, normally inoperative gearing connecting the said low-speed and high-speed shafts, said gearing including a gear freely mounted on the high-speed shaft, and means rendered operative by axial movement of said

high-speed shaft to drivingly connect said gear to said high-speed shaft.

2. In a carriage return, a carriage, a low-speed winding shaft, a winding cable leading from said shaft to the carriage, an axially movable high-speed shaft, a motor driven shaft, an axially movable, speed responsive clutch means responsive to the rotation of said motor driven shaft to rotate and axially move said high-speed shaft when said motor driven shaft reaches a predetermined speed, normally inoperative gearing connecting said low-speed and high-speed shafts, and a clutch on said high-speed shaft adapted to render said gearing operative upon axial movement of said high-speed shaft.

3. In a carriage return, a carriage, a low-speed shaft, a winding drum thereon, a flexible coupling secured to said drum and said carriage, an axially movable high-speed shaft, a motor driven shaft, means responsive to the rotation of said motor driven shaft to rotate and axially move said high-speed shaft when said motor driven shaft reaches a predetermined speed, normally inoperative gearing connecting said low-speed and high-speed shafts, and a clutch on said high-speed shaft for rendering said gearing operative to rotate said low-speed shaft when said high-speed shaft is moved axially.

4. In a carriage return mechanism, a carriage, a low-speed shaft, a flexible connector thereon secured to said carriage, a high-speed shaft, gearing connecting said shafts, a motor driven shaft for driving said high-speed shaft, friction clutches respectively interposed between the said gearing and the said high-speed shaft and between the high-speed shaft and the motor driven shaft, the said clutch interposed between the said gearing and the said high-speed shaft having a higher coefficient of friction than the clutch interposed between the high-speed shaft and the motor driven shaft whereby the said low-speed and high-speed shafts may stall independently of the motor driven shaft when said carriage reaches the limit of its return movement.

5. A carriage return mechanism comprising high-speed and low-speed rotary shafts, a winding drum on the low-speed shaft and a separable motor drive for the high-speed shaft, means interconnecting said shafts, a brake on said high-speed shaft, a stationary member engageable by said brake and means to engage said brake with said stationary member when said high-speed shaft reaches a predetermined maximum speed.

6. A carriage return mechanism including a carriage, a flexible connector secured to the carriage, a reel for the connector, a driven low-speed shaft for rotating said reel, a high-speed shaft, normally inoperative gearing connecting said shafts, a motor driven shaft for driving the high-speed shaft, a first friction clutch for connecting the said motor driven shaft to the high-speed shaft, a second friction clutch for connecting the high-speed shaft to the said gearing, and means including said high-speed shaft responsive to rotary motion of the motor driven shaft for rendering said friction clutches operative.

7. A carriage return mechanism including a carriage, a flexible connector secured to the carriage, a reel for the connector, a driven low-speed shaft for rotating said reel, an axially movable high-speed shaft, normally inoperative gearing connecting said shafts, a motor having a driven shaft for driving the high-speed shaft, a friction clutch for connecting the said motor driven shaft to the high-speed shaft, a second friction clutch carried on and rendered operative by axial movement of said high-speed shaft for connecting the high-speed shaft to the said gearing, and means responsive to rotary motion of the motor driven shaft for rendering the first mentioned friction clutch operative and for axially moving said high-speed shaft for rendering the second friction clutch operative.

8. A carriage return mechanism including a carriage and comprising high-speed and low-speed shafts, a winding drum on the low-speed shaft and connected to the carriage by a flexible cord, a speed responsive friction clutch drive for said high-speed shaft comprising a friction disc of low frictional characteristics on the high-speed shaft and an axially movable plate engageable therewith, an abutment positioned adjacent the high-speed shaft, an axially movable friction brake disc carried on said high-speed shaft and engageable with said abutment, a flanged sleeve on said high-speed shaft adjacent the said friction brake disc and movable therewith, an arm in contact with said flanged sleeve, a drive gear free on the end of said high-speed shaft, a friction clutch disc of high frictional characteristics on said high-speed shaft cooperating with said free drive gear, a second gear free on said low-speed shaft meshing with the said drive gear, and a clutch on the low-speed shaft operated by said arm for connecting the second free gear to the low-speed shaft.

9. A carriage return mechanism including a high-speed shaft and a low-speed shaft, a winding drum secured to the low-speed shaft, a speed responsive device secured to said high-speed shaft, means including a normally de-energized motor for driving said high-speed shaft, means interconnecting said shafts, a switch for energizing said motor, key controlled means for closing said switch and means operable upon de-energization of the said speed responsive device to open said switch and de-energize said motor.

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