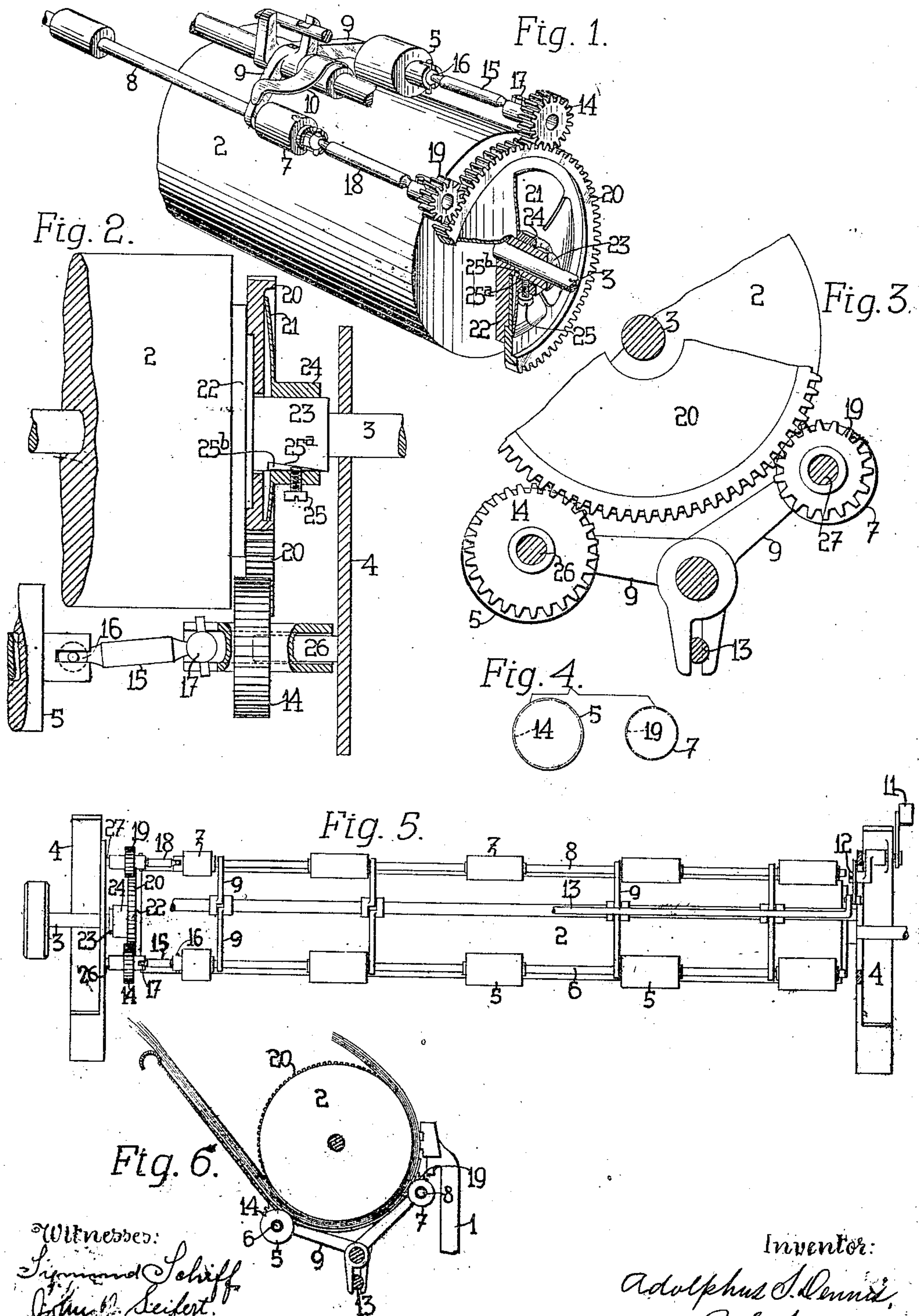


A. S. DENNIS.
TYPE WRITING MACHINE.
APPLICATION FILED DEC. 8, 1909.

991,706.

Patented May 9, 1911.



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UNITED STATES PATENT OFFICE.

ADOLPHUS S. DENNIS, OF LAKEWOOD, OHIO, ASSIGNOR TO UNDERWOOD TYPEWRITER COMPANY, OF NEW YORK, N. Y., A CORPORATION OF NEW JERSEY.

TYPE-WRITING MACHINE.

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To all whom it may concern:

Be it known that I, ADOLPHUS S. DENNIS, a citizen of the United States, residing in Lakewood, in the county of Cuyahoga and State of Ohio, have invented certain new and useful Improvements in Type-Writing Machines, of which the following is a specification.

This invention relates to the pressure rolls, which run upon the cylindrical platens of typewriting machines, for feeding the paper around the platen.

In many machines now in use it is found difficult to introduce a thick card or envelop or a quantity of sheets of substantial thickness, and this difficulty is due to the fact that the leading edge of the card or the pack of sheets separates the pressure roll from the platen. The pressure roll being thus separated from the platen lies dead, and has little or no tendency to advance the card or the like. The same is true with relation to the forward pressure roll. Moreover the latter is often found not to have sufficient tendency to advance the card or pack of sheets after its bottom edge has passed the first pressure roll.

The principal object of this invention is to overcome these difficulties, and to provide a simple and inexpensive device that may be readily applied to existing machines, for effecting a substantial improvement in the carrying capacity of the pressure rolls. To this end I first connect the pressure rolls to each other in such a manner that when the forward roll rotates the rear roll must rotate also; and vice versa. Thus when a pack of sheets is being introduced between the platen and the first pressure roll, the latter, although separated from the platen, does not lie lifeless, but is caused to rotate when the platen rotates, by reason of the gear or other driving connection between such pressure roll and the forward pressure roll, which at this time is running in direct contact with the platen, and hence is rotated thereby. Moreover after the card or pack of sheets has passed the first pressure roll and is fed only by the forward pressure roll, the latter is positively rotated by means of its gear connection to the first (or rear) pressure roll, which at this time is running in direct contact with the platen, and is hence driven thereby. In short the gearing

enables one pressure roll to drive the other, and this construction is of great advantage when one roll is running upon the platen, and the other roll is bearing the entire burden of feeding the sheets.

The gear connection between the forward and rear pressure rolls comprises pinions for the pressure rolls, and an idle gear with which both pinions mesh, said idle gear being preferably mounted upon the axle of the platen itself, and of a diameter approximating that of the platen. Said idle gear is preferably not fixed to the platen, but connected thereto in a manner to enable independent rotation of the idle gear and the platen relatively to each other. To further improve the construction a friction device is employed between the platen and said idle gear, for the purpose of enabling the platen, acting as a driver, to aid (through the train of gearing) in rotating both front and rear pressure rolls; although this friction device will also be useful in machines in which either more or less than two rolls are employed. The frictional connection between the platen and the gear is sufficient to aid substantially in driving the pressure rolls, so that it is not necessary to depend, as is usually the case, upon the surface friction between the platen and the paper, and also upon the surface friction between the paper and the pressure rolls, for rotating the latter. This friction, while sufficient to aid in the operation of the pressure rolls, is not sufficient to enable the platen to positively insure the rotation of said rolls. Hence the frictional connection can be made of such strength as to be of a decided advantage without any resulting disadvantage.

Provision is made for accommodating either a single thin sheet or a thick pack of sheets. In the latter case, the rolls must occupy positions at some distance from the surface of the platen, while their pinions remain in mesh with said idle gear. To accommodate such movement each roll shaft is made in two parts, one carrying the rolls and the other jointed by a universal joint to the main portion of the roll shaft and by another universal joint to the pinion, so that the latter is positively connected to the roll, irrespective to the position of the roll. This universal joint also accommodates the releasing movement of the rolls from the platen.

One effect of wrapping a thick pack of sheets around the platen is to increase the diameter of the rotating mass, without increasing the diameter of the pressure rolls which are geared together and frictionally connected to said platen. To avoid any consequent tendency of the rolls to retard the outer sheet of the pack, said pressure rolls are made slightly over size. Or in other words, the construction is such that the rolls tend to rotate at a higher surface speed than the platen when the rolls are directly in contact therewith. The same result may of course be attained by suitably proportioning the idle gear to the pinions, instead of changing the diameter of the rolls. From this it follows that when the diameter of the rotating mass is enlarged by wrapping a thick pack of sheets around the platen, the surface speed of the pressure rolls will be equal or approximately equal to the surface speed of the rotating mass, and hence there will be no tendency to retard the outer sheet thereof. At the same time, the fact that the rolls tend to rotate faster than the platen when only a single sheet of paper is being fed, is somewhat of an advantage, because it tends to insure that the sheet shall move positively with the platen; the frictional connection between the platen and the gearing not being strong enough to cause the sheet to be advanced faster than the platen.

In the accompanying drawings, Figure 1 is a perspective view of the platen and pressure rolls inverted, showing particularly the flexible connection between the pressure roll shafts and their pinions, and also showing the connection of the idle gear to the platen. Fig. 2 is a rear sectional elevation showing one end of the platen and parts adjacent thereto. Fig. 3 is an end elevation showing the relation of the idle gear, the pinions and the pressure rolls. Fig. 4 is a diagram to illustrate the differences between the pitch diameters of the pinions and the diameters of the rolls connected thereto. Fig. 5 is a plan of the pressure roll system, inverted. Fig. 6 is a diagram to illustrate the manner in which a pack of sheets is carried around the platen.

In the Underwood typewriting machine, which is illustrated in the drawings, types 1 strike rearwardly against the front side of a cylindrical platen 2, which by means of an axle 3 is journaled in the ends 4 of a platen frame. Running upon the platen is a rear or introductory pressure roll 5 usually formed in several sections which are fixed upon or connected to a common shaft 6 to rotate therewith. A front pressure roll 7 is similarly constructed and mounted upon the shaft 8. The shafts are pressed toward the platen by arms 9, actuated by springs 10. Releasing mechanism of usual con-

struction includes a release key 11 mounted upon the platen frame and a link 12 connecting said key to a rock shaft 13, the latter having flats or cams, as usual, to act upon the roll-carrying arms, to force them away from the platen. To the rear pressure roll shaft 6 is connected a rear pinion 14, the connection including a short flexible shaft 15 connected by a universal joint 16 to the main shaft and by a universal joint 17 to the pinion. The forward pressure roll shaft 8 is similarly connected by a flexible shaft 18 to a pinion 19. Both pinions are in mesh with an idle gear 20, which is loose upon the platen axle 3, so that when one roll turns the other must turn with it. Where the pitch diameter of the idle gear is equal to that of the platen, the diameter of each of the rear and forward rolls should be a trifle greater than the pitch diameter of its pinion, as illustrated diagrammatically at Fig. 4, for the purpose above specified. A friction washer 21 is provided between the platen and said idle gear 20, to enable the platen to tend to turn the gear, as above explained. Said washer has a hub 24, which is fixed by a screw 25 upon the hub 23 of the platen head 22. Said screw is threaded through the hub 24, and bears upon a floor 25^a of a recess 25^b formed in the hub 23; said floor being inclined inwardly from the outer end to the inner end of the hub 23, to enable the tightening of the screw 25 to cam the hub 24 toward the head 22 of the platen, thereby completing the pressure or tension of the spring washer 21. By loosening the screw the tension will be relieved. Thus the power of the platen to rotate the pressure rolls 5, 7 may be regulated.

It will be found that a thick card or a thick pack of sheets may be introduced readily between the platen and the rear pressure roll 5, usually without the necessity of first depressing the release key 11, and that the rear pressure roll, being in active rotation by reason of its connection to the platen driven front roll 7, will cooperate with the platen to bite the leading edge of the card or pack and draw it through; this operation being aided by the frictional connection between the platen and the train of gearing. Upon continued rotation of the platen, the rear roll effectively cooperates with the platen, to advance the sheet to the front roll 7, and the latter through the aid derived from its connection to the rear roll, and from the frictional driving connection between the platen and the gearing, cooperates with the platen to grasp the leading edge of the card or pack, so that the latter is accurately advanced, without liability of skewing or dragging.

After the card or pack passes the rear roll, the latter does not go out of commission, but being still rotated by the platen, acts

through the gearing to help drive the front roll, and hence to enable the latter to co-operate effectively with the platen to advance the paper to the printing line.

5 The pinions 14 and 19 may be mounted on studs 26 and 27 projecting from the platen frame.

The pinion heads may slide endwise upon the studs, to accommodate the vibrations of
10 the shafts 15 and 18.

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
15 claim:

1. In a typewriting machine, the combination with a revoluble platen, of forward and rear pressure rolls to run thereon, and means independent of the platen to connect
20 said pressure rolls to enable one to rotate the other.

2. In a typewriting machine, the combination with a revoluble platen, of forward and rear pressure rolls to run thereon, and
25 means independent of the platen to connect said pressure rolls to enable either to rotate the other.

3. In a typewriting machine, the combination with a revoluble platen, of forward
30 and rear pressure rolls to run thereon, and a train of gearing connecting said pressure rolls independently of the platen.

4. In a typewriting machine, the combination with a revoluble platen, of forward
35 and rear pressure rolls to run thereon, and a train of gearing connecting said pressure rolls; said train including an idle gear which is mounted to turn around the axis of rotation of the platen.

40 5. In a typewriting machine, the combination with a revoluble platen, of forward and rear pressure roll to run thereon, and a train of gearing connecting said pressure rolls; said train including an idle gear which
45 is mounted to turn around the axis of rotation of the platen, said idle gear and said platen being relatively revoluble.

6. The combination with a platen having an axle upon which it rotates, of forward
50 and rear pressure rolls having pinions, and an idle gear loose on said platen axle and meshing with said pinions.

7. The combination with a platen having an axle upon which it rotates, of forward
55 and rear pressure rolls having pinions, and an idle gear loose on said platen axle and meshing with said pinions, a frictional connection being provided between the platen and said idle gear.

60 8. In a typewriting machine, the combination with a revoluble platen, of forward and rear pressure rolls to run thereon, and a train of connecting devices frictionally connected to the platen and extending to the
65 pressure rolls and tending to rotate them.

9. In a typewriting machine, the combination with a revoluble platen, of a wheel mounted for rotation about the axis of the platen but revoluble independently of the platen, a frictional connection between the
70 platen and said wheel, forward and rear pressure rolls to run upon the platen, and means for enabling said wheel to rotate said pressure rolls.

10. In a typewriting machine, the combination with a revoluble platen, of a wheel
75 mounted for rotation about the axis of the platen but revoluble independently of the platen, a frictional connection between the platen and said wheel, forward and rear
80 pressure rolls to run upon the platen, and means for enabling said wheel to rotate said pressure rolls; the connections being so proportioned between the platen and the pressure rolls that the latter, when in contact
85 with the platen, tend to advance at a greater surface speed than the platen.

11. In a typewriting machine, the combination with a revoluble platen, of a gear
frictionally connected to the platen, pinions meshing with said gear, and pressure
90 rolls connected to said pinions and running upon the platen; said platen, gear and pressure rolls being so proportioned that the rolls tend to turn at higher surface speed
95 than the platen, when in contact therewith.

12. In a typewriting machine, the combination with a revoluble platen and forward
and rear pressure rolls to run thereon, of a frictionally actuated train of devices extending
100 from the platen to the pressure rolls to aid in rotating the latter.

13. In a typewriting machine, the combination with a revoluble platen and forward
and rear pressure rolls to run thereon, of
105 a frictionally actuated train of devices extending from the platen to the pressure rolls to aid in rotating the latter, said devices including an idle gear turning around the
110 platen axis, and frictionally connected to the platen, pinions in connection with said idle gear, and connections between the pinions and said rolls.

14. In a typewriting machine, the combination with a revoluble platen and forward
115 and rear pressure rolls to run thereon, of a frictionally actuated train of devices extending from the platen to the pressure rolls to aid in rotating the latter, but incapable of enabling the platen to control the rotation
120 of said pressure rolls, said devices including an idle gear turning around the platen axis, and frictionally connected to the platen, pinions in connection with said idle gear, and connections between the pinions and said
125 rolls; the parts being so proportioned that the rolls, when in contact with the platen, tend to rotate at higher surface speed than the platen.

15. In a typewriting machine, the combination with a revoluble platen, of a wheel
130 mounted for rotation about the axis of the platen but revoluble independently of the platen, a frictional connection between the platen and said wheel, forward and rear pressure rolls to run upon the platen, and means for enabling said wheel to rotate said pressure rolls.

nation with a revoluble platen, of a pressure roll to run thereon, and frictional devices to enable the platen to turn the pressure roll.

16. In a typewriting machine, the combination with a platen and a pressure roll, of a gear frictionally connected to the platen, and a pinion meshing with said gear and connected to said roll.

17. In a typewriting machine, the combination with a platen and a pressure roll, of a gear frictionally connected to the platen, and a pinion meshing with said gear and connected to said roll; the parts being proportioned to tend to cause the pressure roll to turn at higher surface speed than the platen when in contact with the latter.

18. In a typewriting machine, the combination with a platen having an axle and a gear loose on said axle, of two pinions meshing with said gear, and pressure rolls connected to said pinions.

19. In a typewriting machine, the combination with a platen and a gear rotatable independently thereof, of two pinions meshing with said gear, and pressure rolls connected to said pinions, said rolls having flexible connections to the pinions.

20. In a typewriting machine, the combination with a platen and a gear, of two pinions meshing with said gear, and pressure rolls connected to said pinions, said rolls having flexible connections to the pinions, said gear and platen being relatively revoluble, and a friction device between the gear and platen.

21. The combination with a platen and a wheel, of a pressure roll to run upon the platen, and a connection between the pressure roll and the wheel; a frictional device being provided between the platen and the roll, to enable the platen to aid through said wheel in turning said roll.

22. In a typewriting machine, the combination with a revoluble platen and a pressure roll to run thereon, of a frictional connecting device running from the platen to the roll and tending to rotate the latter.

23. In a typewriting machine, the combination with a revoluble platen, of a pressure roll to run thereon, and frictionally actuated devices to enable the platen to turn the pressure roll; said frictionally actuated devices

constructed to tend to turn the pressure roll at greater surface speed than the platen.

24. In a typewriting machine, the combination with a revoluble platen and a pressure roll to run thereon, of a frictional connecting device running from the platen to the roll and tending to rotate the latter at a higher surface speed than the platen.

25. In a typewriting machine, the combination with a revoluble platen and a pressure roll to run thereon, of a frictional connecting device running from the platen to the roll and tending to rotate the latter, and means for regulating the transmitting power of said frictional device to rotate the roll.

26. The combination with a platen and a wheel, of a pressure roll to run upon the platen, and a connection between the pressure roll and the wheel; a frictional device being provided between the platen and the roll, to enable the platen to aid through said wheel in turning said roll; and adjustable means for regulating the frictional device to increase or diminish the transmitting power thereof to turn the rolls.

27. In a typewriting machine, the combination with a platen and a gear, of two pinions meshing with said gear, pressure rolls having flexible connections to the pinions, said gear and platen being relatively revoluble, a friction device between the gear and platen, and adjustable means for regulating the frictional device to increase or diminish the transmitting power thereof to turn the rolls.

28. In a typewriting machine, the combination with a revoluble platen and forward and rear pressure rolls to run thereon, of a frictionally actuated train of devices extending from the platen to the pressure rolls to aid in rotating the latter; said devices including an idle gear frictionally connected to the platen; pinions connected to said idle gear; connections between the pinions and said rolls; said frictionally actuated train including a friction washer; and a screw to regulate the pressure or tension of said washer.

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