May 18, 1937. H. D. ALLEN 2,080,524

PAPER FEEDING APPARATUS FOR TYPING DEVICES

Filed Sept. 10, 1932

FIG. 1

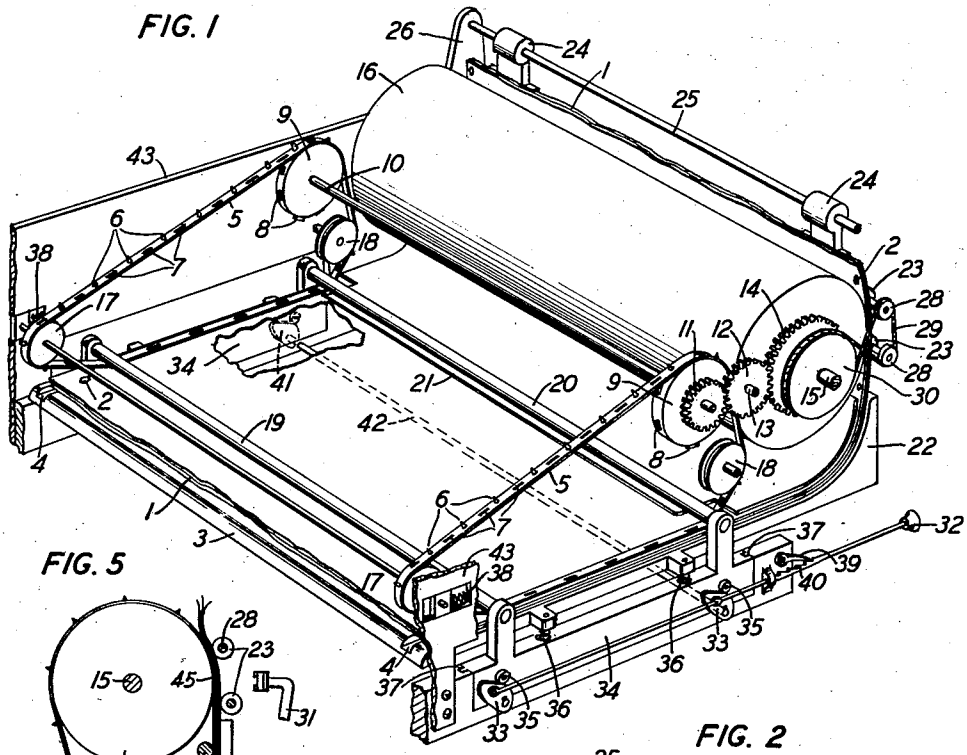


FIG. 5

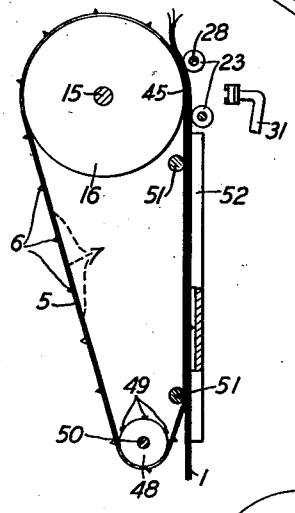


FIG. 2

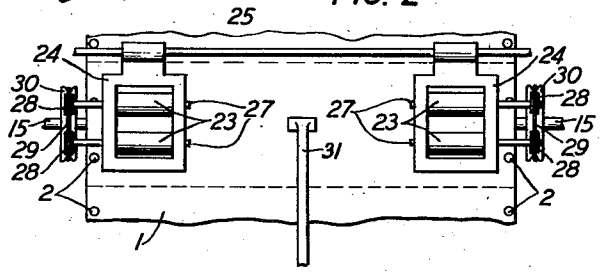


FIG. 4

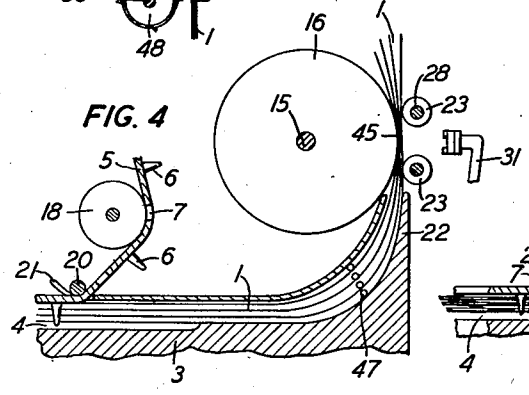
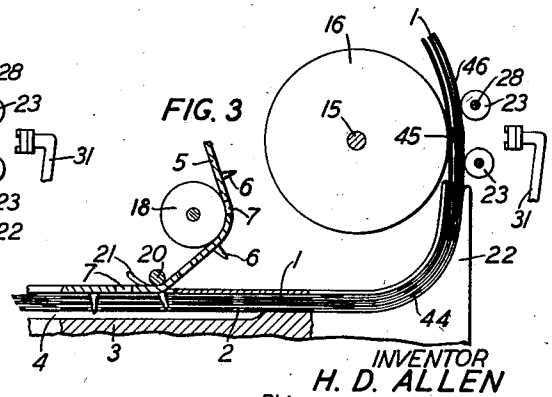


FIG. 3



INVENTOR
H. D. ALLEN
BY
A. C. Rose
ATTORNEY

Patented May 18, 1937 2,080,524

# UNITED STATES PATENT OFFICE

2,080,524

## PAPER FEEDING APPARATUS FOR TYPING DEVICES

Howard D. Allen, Passaic, N. J., assignor to American Telephone and Telegraph Company, a corporation of New York

Application September 10, 1932, Serial No. 632,593

17 Claims. (Cl. 197—133)

This invention relates to improvements in machines for typing upon stationery and more particularly to that class of typewriting machines which have a cylindrical platen and which are ordinarily used for printing upon multicopy stationery.

One feature of this invention is the provision in a typewriter of a plurality of studded endless belts for feeding sprocket feed stationery having perforations therein. Since the studs on the belts fit into the perforations in the stationery, and since the belts are geared to the platen of the typewriter, the stationery is fed through the typewriter in step with the rotation of the platen.

Another feature is the provision in a typewriter of a plurality of pressure rollers for feeding plain stationery through the typewriter. These pressure rollers press against the platen and are designed to rotate in a direction counter to that in which the platen rotates by means of spring belts connected thereto. Due to this special construction, buckling of the layers of sheets of stationery is prevented.

Another feature is the provision in a typewriter of arrangements for feeding either plain stationery or sprocket feed stationery having perforations therein. This feature includes the use of both friction and positive drive feeding arrangements and disabling means for disabling the positive drive feeding arrangement when plain stationery is to be fed through the typewriter.

Another feature is the use in a typewriter of separating rods for separating layers of sheets of stationery. By means of these rods each sheet of stationery is given a different length of travel around the platen. This allows the differential in longitudinal alinement of the individual sheets of multicopy stationery to be adjusted.

Another feature is the feeding of multicopy stationery horizontally through a typewriter in such a manner that the stationery approaches the printing point of the platen at a tangent. This reduces the amount of longitudinal misalinement which occurs when multicopy stationery is passed around a cylindrical platen.

Still another feature is the use in a typewriter, having a cylindrical platen, of sprocket feed multicopy stationery which is pre-misalined longitudinally in order to compensate for that type of misalinement which occurs when multicopy stationery is passed around a curved surface. The stationery is pre-misalined longitudinally only in respect to the printing already upon the individual sheets. The marginal perforations which are required for sprocket feed are not pre-misalined. The result is that, upon arriving at the printing point, the printing already upon the individual sheets is now in alinement and the perforations are now misalined longitudinally. Since the perforations are not used for feeding purposes after the stationery arrives at the platen, the resulting misalinement has no detrimental effects.

A modification of the invention is the use in a typewriter of a vertical feeding arrangement for completely avoiding that type of longitudinal misalinement which occurs when multicopy stationery is passed around the curved surface of a cylindrical platen.

The invention will now be illustrated by describing it as applied to a teletypewriter. It is to be understood that the scope of the invention is not limited to teletypewriters, but is, in general, applicable to all typewriters.

The following description is to be read in connection with the accompanying drawing in which only those portions of a teletypewriter are shown that are necessary for the purpose of illustrating the invention and in which:

Fig. 1 is a three-dimensional view of a preferred form of the invention;

Fig. 2 shows a preferred form of the friction feeding arrangement;

Fig. 3 is a cross-sectional view of a portion of the arrangement shown in Fig. 1;

Fig. 4 shows the optional application of separating rods to the arrangement shown in Fig. 3; and

Fig. 5 is a view of an alternative vertical feeding arrangement.

Fig. 1 shows sprocket feed multicopy stationery 1 having marginal perforations 2 therein being fed through a teletypewriter by means of a preferred form of the positive drive feeding arrangement. Stationery 1 enters the teletypewriter from the rear, passes along flat plate 3 having grooves 4, 4 cut along its sides, and meets endless belts 5, 5 having studs 6 thereon. It may be observed that studs 6 pass along grooves 4, 4 in plate 3. Belts 5, 5 have perforations 7 therein to engage with teeth 8 on pulley wheels 9, 9 rigidly fastened to a common axle 10. Also rigidly fastened to axle 10 is gear wheel 11.

Gear 11 co-acts with gear wheel 12 which is on axle 13. Axle 13 idly rotates in supports (not shown). Gear 12 co-acts also with gear 14 which is rigidly fastened to axle 15. Platen

16 is also rigidly fastened to axle 15 which is driven by some such means as the power supply (not shown) of the teletypewriter. Gears 11, 12 and 14 are of such a size and are so arranged that belts 5, 5 are caused to rotate in step with the rotation of platen 16.

If desired, another set of gears, similar to gears 11, 12 and 14 may be located upon the other side of the teletypewriter. For the sake of clarity in the drawing these have not been shown. Belts 5, 5 also pass over adjustably mounted idler pulleys 17, 17 and 18, 18 and under rods, or rollers 19 and 20. Pulleys 17, 17 and roller 19 are so located in respect to plate 3 that belts 5, 5 approach plate 3 at such an angle that studs 6 are nearly vertical when they contact with stationery 1. Due to this special construction, studs 6 readily fit into perforations 2 without any tearing of stationery 1.

Pulleys 18, 18 and roller 20 are similarly located with respect to plate 3 in order that studs 6 may readily disengage themselves from perforations 2. To facilitate this disengagement a combined stripper and guide plate 21 is used. After having been stripped from studs 6 of belts 5, 5 by plate 21, stationery 1 passes between plate 21 and guide form 22. From there, it passes between platen 16 and pressure rollers 23, 23 and then out of the teletypewriter. Thus, by means of the positive drive feeding arrangement comprising the engagement of studs 6 of belt 5, 5 with perforations 2, sprocket feed multicopy stationery 1 is fed through the teletypewriter.

Figs. 1 and 2 show a preferred form of the stationery feeding arrangement. As shown in these figures, this arrangement comprises two frames 24, 24 fastened to rod 25 which is supported in frame 26 of the teletypewriter. It is to be understood that there is a similar frame 26 on the other side of the teletypewriter, but this has not been shown in order to avoid confusion in the drawing. Each of frames 24, 24 supports a pair of pressure rollers 23, 23. Each of pressure rollers 23, 23 is rigidly fastened to an axle 27. Rigidly fastened to each axle 27 is a pulley wheel 28.

Driving means comprising a coiled spring belt 29 passing around each pair of pulleys 28 and also around pulley wheel 30 rigidly fastened to axle 15 is provided. It will be remembered that axle 15 is driven by some such means as the power supply of the teletypewriter. Pulleys 28 and 30 are of such a size and are so arranged that pulleys 28 will rotate in step with the rotation of platen 16 and in a direction counter to that of platen 16. At the same time, due to the action of spring belts 29, 29, rollers 23 are held against platen 16 under pressure. Therefore, when stationery 1 is inserted between rollers 23 and platen 16, it will be fed out of the teletypewriter by means of this friction feeding arrangement.

This friction feeding arrangement need not always be constructed as shown in the drawing. If desired, there may be only one pair of pressure rollers 23. If this were the case, they should extend about the entire width of platen 16. Also, they should be spaced apart a sufficient distance in order to provide room for type bar 31 to strike against platen 16.

In order to feed plain unperforated stationery (not shown) through the teletypewriter, it is necessary to disable the positive drive feeding arrangement because plain stationery would be apt to be torn by studs 6 which are designed to travel along grooves 4, 4 in plate 3. Some sort of disabling means must be used to raise the lower portion of belt 5, 5 sufficiently high above plate 3 so that the tips of studs 6 will be above the top surface of plate 3. Such a disabling means is shown in Fig. 1.

When it is desired to operate the disabling means in order to prepare the teletypewriter for the use of plain unperforated stationery, operating lever 32 is pulled out thereby moving cams 33, 33 into a more nearly vertical position. Bracket 34 rests on cam 33, 33 by means of supports 35, 35. When cams 33, 33 are moved into a more nearly vertical position, bracket 34 is forced upwards sliding in slots 37, 37. When bracket 34 slides up, rollers 19 and 20, which are supported by bracket 34 are likewise moved up. In so doing, rollers 19 and 20 release belts 5, 5 to a certain extent.

The slack in belts 5, 5 is then taken up by pulleys 17, 17 which are constantly being forced out to the rear of the teletypewriter by springs 38, 38. In this manner, belts 5, 5 are raised above the surface of plate 3. Bracket 34 is constantly being forced downward by means of springs 36, 36 in order to pull down rollers 19 and 20 so that they will hold belts 5, 5 against plate 3 during feeding operations. For this reason, it is desirable to employ a ratchet 39 to fit into teeth 40 in lever 32 in order to maintain bracket 34 in an elevated position.

A plurality of teeth 40 are provided in order that bracket 34 may be maintained at various heights if desired. A similar bracket 34 is located at the other side of the teletypewriter. For the sake of simplicity, the disabling means on that side is not shown in detail. Cams 41, 41 on that side are also operated by lever 32 by means of connecting rod 42 which is rigidly fastened to cams 33 and 41.

It should be understood that this form of disabling means is merely illustrative of the invention and may be modified without departing from the scope of the invention. In fact, it could be modified even to the extent of having movable side plates, instead of fixed side plates 43, 43, which could be moved whenever plain stationery is used.

When it is desired to return the teletypewriter to the condition for using sprocket feed perforated stationery 1, ratchet 39 is disengaged from teeth 40 by any convenient means, such as manual means, and lever 32 is pushed back thereby lowering brackets 34, 34. When brackets 34, 34 are lowered, they lower rollers 19 and 20. Since springs 36, 36 are more powerful than springs 38, 38, belts 5, 5 will be forced down to plate 3 as shown in Fig. 1.

Whenever multicopy stationery is passed around a curved surface, such as a cylindrical platen, the individual sheets of the multicopy stationery are misalined longitudinally. In order to compensate for this type of misalinement, a special kind of sprocket feed multicopy stationery 1 may be used. This special stationery 1 is shown in Fig. 3. Here it may be observed that when stationery 1 is first fed into the teletypewriter, perforations 2 therein are properly alined for engaging studs 6 of belts 5, 5 whereas form printing 44 is artificially misalined, or premisalined, longitudinally. When multicopy stationery 1 begins to pass around the curved surface of platen 16, the individual sheets of stationery 1 begin to become misalined longitudinally.

The result is that, upon arriving at the printing point indicated by numeral 45, form printing

44 already upon the individual sheets of stationery 1 is now properly alined for typing thereon by means of type bar 31. At the same time, perforations 2 will have become longitudinally misalined with respect to each other as is indicated by numeral 46. Since perforations 2 are not used for feeding purposes after stationery 1 arrives at platen 16, the resulting misalinement of perforations 2 has no detrimental effects.

The teletypewriter has an arrangement for reducing the amount of longitudinal misalinement which occurs when stationery 1 is passed around the curved surface of platen 16. This arrangement depends upon the fact that plate 3 is located below the bottom of platen 16 by an appreciable distance. It also depends upon the fact that plate 21 and form 22 are arranged to guide stationery 1 up to printing point 45. By means of this arrangement, stationery 1 does not touch platen 16, except at printing point 45 and it touches that approximately at a tangent. The longer curve allows the differential in longitudinal misalinement of the individual sheets of the multicopy stationery 1 to be adjusted.

This type of misalinement can be more effectively reduced if some arrangement, such as that shown in Fig. 4, is used. As shown in Fig. 4, wires or separating rods 47, located between plate 21 and form 22, are employed for separating each of the individual sheets of multicopy stationery 1. In this way, a separate path is provided for each sheet of stationery 1 and each path has a different degree of curvature. This provision of a different length of travel for each sheet compensates for longitudinal misalinement. It also allows the differential in longitudinal misalinement to be adjusted. Separating means other than rods 47, such as a block having a plurality of slits therein, could be used if desired.

A modification of the invention is shown in Fig. 5. The purpose of this modification is to provide a vertical feeding arrangement for completely avoiding that type of longitudinal misalinement which occurs when multicopy stationery 1 is passed around the curved surface of platen 16. In Fig. 5, only one side of a part of the teletypewriter is shown. It is to be understood that the other side of the teletypewriter is equipped with a similar arrangement.

It is to be noted that pulley wheel 48 is supplied with teeth 49 for engaging perforations 7 in belt 5 and is also supplied with a driven axle 50 which is driven by any convenient means, such as the power supply of the teletypewriter. It is also to be noted that belt 5 passes around platen 16 in a groove (not shown) provided for that purpose. Pressure rollers 51, 51 force belt 5 against a guiding means; namely, plate 52. Stationery 1 is fed up through the teletypewriter by means of the engagement of studs 6 with perforations 2.

Stationery 1 thus contacts with platen 16 only along a line of tangency thereto, this line of tangency on platen 16 being also only that portion of platen 16 against which type bar 31 strikes during typing operation. By using this arrangement, stationery 1 need not pass around any curved surface at all, thereby completely avoiding this type of longitudinal misalinement.

This use of the device is illustrative of its operation. The embodiments described will serve to assist in interpreting the claims. The claims are not to be restricted to the precise construction disclosed, but are intended to include all changes and modifications employing the principles and features of operation of the invention.

Wherever the term "perforations" appears in the claims, it does not refer to those perforations (usually located near the top of a form sheet) which are sometimes provided for the purpose of filing a form sheet after it has been typed upon. Nor is this term intended to have reference to those perforations which are sometimes provided across the width of a form sheet for facilitating the tearing off of a form sheet after it has been typed upon. The claims use the term "perforations" solely in reference to those perforations (usually located in the margins of a form sheet) which are provided for the purpose of co-acting with sprocket feeding instrumentalities.

What is claimed is:

1. A teletypewriter capable of printing either upon sprocket feed stationery having perforations therein or upon plain unperforated stationery of the same width as the sprocket feed stationery, said teletypewriter having a platen, a positive drive feeding arrangement comprising a plurality of endless belts for feeding perforated stationery up to said platen and a friction feeding arrangement comprising a plurality of pressure rollers for feeding plain unperforated stationery, said plain unperforated stationery being of the same width as the sprocket feed stationery.

2. A teletypewriter capable of printing either upon sprocket feed stationery having perforations therein or upon plain unperforated stationery, said teletypewriter having a positive drive feeding arrangement comprising a plurality of studded endless belts for feeding perforated stationery, a friction feeding arrangement comprising a plurality of pressure rollers for feeding plain stationery, and disabling means for rendering the positive drive feeding arrangement inoperative.

3. A teletypewriter capable of printing either upon sprocket feed stationery having perforations therein or upon plain unperforated stationery, said teletypewriter having a positive drive feeding arrangement comprising a plurality of studded endless belts for feeding perforated stationery, a friction feeding arrangement comprising a plurality of pressure rollers for feeding plain stationery, and disabling means for rendering the positive drive feeding arrangement inoperative, said disabling means comprising a plurality of cams and an operating lever.

4. In combination in a teletypewriter for printing upon multicopy stationery, a cylindrical platen, correcting means for adjusting the difference in longitudinal alinement of the individual sheets of the multicopy stationery which occurs when multicopy stationery is passed around the curved surface of the cylindrical platen, said correcting means comprising a plurality of separating rods for separating the individual sheets of stationery before they pass around the curved surface of the platen and for providing a separate path for each sheet of stationery, each path having a different length of travel, and an endless studded belt for feeding multicopy stationery through the separating rods and for forcing the individual sheets of stationery along their separate paths.

5. A teletypewriter for printing upon multicopy stationery, said teletypewriter comprising in combination a cylindrical platen, a plurality of type bars, and correcting means for reducing the amount of that type of longitudinal misalinement of the individual sheets of multicopy stationery which occurs when such stationery is passed around the curved surface of the platen, said correcting means comprising a guiding arrangement for causing the stationery to contact with the

platen only along a line of tangency thereon, said line of tangency on the platen being also only that portion of the platen against which the type bars strike during typing operations, and an endless studded belt for feeding the stationery through the teletypewriter up to the guiding arrangement and for forcing the stationery through the guiding arrangement.

6. A printing device for printing upon positively driven stationery and upon friction fed stationery, said device comprising in combination positive drive feeding instrumentalities for engaging with and for feeding the stationery, said positive drive feeding instrumentalities including an endless belt, friction feeding instrumentalities including a pressure roller for feeding stationery, and instrumentalities for removing the positive drive feeding instrumentalities from engagement with the stationery.

7. A typing device including in combination a platen, a studded belt separate from the platen for feeding stationery up to the platen, friction feeding instrumentalities for feeding stationery over the platen, said friction feeding instrumentalities including a plurality of driven pressure rollers constantly held against the platen under pressure, and driving means for causing the pressure rollers to rotate in a direction counter to that in which the platen rotates, said driving means including a spring belt and pulleys attached to the platen and the rollers.

8. A printing device having a platen, feeding means for feeding perforated and unperforated stationery, said feeding means including positive drive feeding instrumentalities for use in feeding perforated stationery up to said platen, said positive drive feeding instrumentalities comprising a studded belt, friction feeding instrumentalities for feeding unperforated stationery, said unperforated stationery being of the same width as the perforated stationery, and a single source of motive power for driving both the positive drive and the friction feeding instrumentalities.

9. A printing device including in combination an endless belt for feeding stationery therein, and an instrumentality for bodily removing the endless belt from engagement with the stationery.

10. A teletypewriter for typing upon perforated stationery, said teletypewriter having positive drive feeding instrumentalities including a plurality of studded endless belts for co-acting with the perforations in the stationery, and instrumentalities for removing the studded endless belts from engagement with the stationery, said instrumentalities including a plurality of cams.

11. A device for typing upon a strip, said device including a platen, a driven belt separate from the platen for feeding the strip up to the platen, a driven friction feed roller for feeding the stationery, and a single source of motive power for driving both the belt and the feed roller.

12. A device for recording intelligence upon a strip, said device including a platen, a driven belt separate from the platen for feeding the strip up to the platen, additional feeding means for feeding the strip over the platen, and a combination of gears for driving both the belt and said additional feeding means.

13. A device controlled by telegraph impulses for printing upon a strip, said device including a platen, a studded belt separate from the platen for feeding the strip up to the platen, friction feeding means for feeding the strip over the platen and a combination of gears for driving both the belt and the friction feeding means.

14. A device for typing upon a strip, said device including a platen, a studded belt separate from the platen for contacting with the strip to feed the strip up to the platen, and an instrumentality for bodily removing the belt from contact with the strip.

15. A device controlled by telegraph code impulses for recording intelligence upon a strip, said device including a platen, an adjustably mounted studded belt separate from the platen for contacting with the strip to feed the strip up to the platen, and a coiled spring for forcing the studded belt out of contact with the strip.

16. A typing device controlled by telegraph impulses and having feeding means for feeding stationery, said feeding means including in combination a feeding instrumentality for feeding stationery, additional feeding means for engaging with the stationery to feed the stationery, and an adjustably mounted pulley for taking said additional feeding means out of engagement with the stationery.

17. A device for typing upon multicopy stationery, said device including a cylindrical platen, correcting means for adjusting that difference in longitudinal alignment of the individual sheets of multicopy stationery which occurs when such stationery is passed around the curved surface of the cylindrical platen, said correcting means comprising a separate path for each sheet of stationery while passing around the platen, each path having a different length of travel, and a studded belt separate from the platen for feeding the multicopy stationery through the device up to the platen.

HOWARD D. ALLEN.