PATENT SPECIFICATION

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COMPLETE SPECIFICATION

Improvements in and relating to Feeding Means for Webs of Continuous Stationery

We, LAMSON PARAGON LIMITED, a British Company of Paragon Works, Canning Town, London, E.16, do hereby declare the invention, for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:—

This invention relates to apparatus for feeding continuous webs of stationery round the platen of a tabulator, typewriter or like machine.

It has been the practice heretofore to provide continuous stationery in pack form comprising two or more superposed record webs between which are secured carbon sheets for transferring details of data typed or imprinted on the top web to the underlying record web or webs, the transfer sheet and record webs being adapted to travel round the platen as a unit, after which they are separated. This form of pack is very wasteful as the transfer sheet is only used once and although there may be large areas in its carbonised surface which have not been used, it is thrown away as it is not practicable to salvage it and re-assemble it with other superposed record webs.

It has previously been proposed to obviate this wastage by feeding the carbon transfer sheets at a slower rate than the record webs in order that small areas of the transfer sheets could be used with succeeding portions of the record webs. This, however, necessitates feeding the record webs relatively to the transfer sheets but this has presented many difficulties as considerable frictional resistance is set up between the surfaces of the superposed webs and sheets, with the result that they tend to bind together, particularly as they are fed round the platen, and relative feeding of the record webs was either prevented, or resulted in tearing of the transfer sheets. Heretofore no practical means has been found for effecting this relative feed movement.

[*Price* 3/-]

It is an object of the present invention to provide means for feeding the record webs independently of, and relatively to the transfer sheets so that the tendency of the webs and sheets to bind together is overcome or greatly reduced.

According to the present invention apparatus for feeding superposed record webs relatively to interleaved carbon transfer webs round the platen of a tabulator, typewriter or like machine includes two web feeding means each provided with feed pins engageable with marginal pin feed apertures in the record webs for feeding the latter, one feeding means being mounted at the rearward or infeed side of the platen in a position to push the record webs in a substantially straight line path to the platen, and the other feeding means being mounted above the platen at the outfeed side thereof in a position to exert a pull on the record webs to draw them away from the platen in a substantially straight line path, after they have fed round the platen, both said pin feeding means being simultaneously operated at the same speed, and being adapted to be positioned in engagement with the record webs in such a manner that the portion of the record webs extending between said feeding means is maintained in a relatively slack condition such that as they are fed round the platen they will be sufficiently loosely disposed relative to the platen and the interleaved carbon transfer webs to permit their free feeding movement round the platen relatively to said carbon transfer webs.

The invention also includes apparatus for feeding superposed record webs relatively to interleaved carbon transfer webs round the platen of a tabulator, typewriter or like machine wherein two web feeding means are provided having feed pins engageable with marginal pin feed apertures in the record webs for feeding the latter, one feeding means being mounted at the rearward or infeed sides of the platen in a position to push the

record webs to the platen in a path free of feed impeding bends or restrictions and extending substantially tangential to the circumference of the platen, the other feeding means being mounted above the platen at the outfeed side thereof in a position to pull the record webs away from the platen in a vertically extending path free of feed impeding bends or restrictions and extending substantially tangential to the circumference of the platen, both said pin feeding means being simultaneously operated at the same speed and being positioned in engagement with the record webs in such a manner that the portion of the record webs extending between said feeding means is maintained in a relatively slack condition such that as they are fed round the platen they will be sufficiently loosely disposed relative to the platen and the interleaved carbon transfer webs to permit their free feeding movement round the platen relatively to said carbon transfer webs.

The feeding means according to the present invention ensures that the superposed record webs and the interleaved carbon transfer sheets will be relatively loosely disposed in relation to one another as they are fed round the platen so that the record webs can be readily drawn past the carbon transfer sheets with little or no drag due to frictional resistance between the adjacent surfaces of the webs and transfer sheets as they pass around the platen.

To enable the invention to be fully understood it will now be described with reference to the accompanying drawing, in which:—

Fig. 1 illustrates in more or less diagrammatic form a unit embodying one form of the present invention; and

Fig. 2 is a fragmentary view on an enlarged scale showing the gearing for driving one of the tractors.

As shown in the accompanying drawings a unit generally indicated by the reference A is provided which is adapted to be detachably mounted on the tabulator, typewriter or like writing or recording machine to feed continuous record webs of stationery *a* interleaved with carbon transfer webs *b* past the cylindrical platen roller 1 which is rotatably mounted on the frame of the tabulator or like machine, the webs being imprinted as they reach the typing or imprinting position on the platen roller indicated by *t*.

The record webs *a* are delivered from a suitable pack or supply and are separated and fed over rods a^1 and webs of transfer material from supply rolls b^1 are fed over rods b^2 into interleaved relation with the record webs *a*. The supply rolls b^1 and the rods a^1, b^2 are mounted on a sub-unit B adapted to be attached to the unit A. The record webs will be fed line by line as they are imprinted but fed relatively large increments when a succeeding area or form length has to be fed into imprinting position, but in order that the whole of the area of the transfer webs may be used the record webs must be fed relatively to the transfer webs and according to the present invention this is effected by providing web feeding means which will simultaneously exert a push on the webs *a* on the infeed side of the platen and a pulling action on the outfeed side.

As shown in the embodiment of the invention illustrated in Fig. 1 the unit A includes a pair of side plates each having a vertical portion 2 and a rearwardly extending substantially horizontal portion 3, the plates being held in spaced parallel relation by one or more transverse rods extending between the plates. Only one side plate is shown in the accompanying drawing but it will be understood that a similar plate will be provided on each side of the unit.

A transverse rod 4 extending between opposed vertical portions 2 of the plates supports a pair of endless tractor units 5 (one only being indicated in the drawing), the tractors being aligned and spaced transversely of the unit according to the width of the continuous record webs to be fed. A second pair of endless tractors 6 are mounted on transverse rods extending between the opposed horizontal portions 3 of the side plates, these tractors being also aligned and spaced transversely to correspond with the spacing of the first mentioned pair of tractors so that the tractors on each side of the unit will be positioned for feeding engagement with marginal perforations in the respective side edges of the webs *a*.

Each of the tractors 5, 6 includes a body portion on which are rotatably mounted sprocket wheels 7 adapted to drive endless chains 8 which support laterally projecting carriers on which are mounted feed pins 9. It will be noted that the tractors 5 are located above and on the outfeed side of the platen and that the tractors 6 are located at the rearward or infeed side of the platen. One example of a tractor unit suitable for use in the present invention is described in prior British Specifications Nos. 468,327 and 468,284.

The feed pins 9 of the respective tractors are adapted to engage with rows of marginal apertures at the side edges of the superposed record webs *a*, such apertured webs being well known in the art. The transfer webs will be slightly narrower than the record webs to permit the free engagement of the feed pins in the feed aperture of the webs *a*. The tractors 5, 6 are adapted to be simultaneously driven at the same speed and the arrangement is such that the tractors 6 on the infeed side of the platen exert a pushing effect on the webs *a* and the tractor 5 on the outfeed side exerts a pulling effect. It will be understood that before the unit is set in operation

the portion of the web a^2 extending between the tractors 5 and 6 will be formed with sufficient amount of slack so that as they pass round the platen they are loosely disposed relatively to one another and form a relatively loose loop at the platen 1, so that the webs will be drawn smoothly round the platen relatively to the webs *b*.

Accordingly the webs will not be drawn tightly against the platen as they are fed but will be only lightly in contact therewith, so that there will be little or no tendency for the webs to be in such tight frictional contact with each other or the platen as would prevent the webs *a* being fed round the platen relatively to the transfer webs *b*.

It will be noted that the feed path for the webs between the platen and pin feed tractors 5 comprises a substantially straight line path which is free of bends or restrictions likely to impede or restrict the smooth feeding of the webs *a* and accordingly the webs will be pushed by the infeed tractor units 6 towards the platen in a substantially straight line path substantially tangential to the circumference of the platen 1 and will be drawn off after passing round the platen, by the outfeed tractor units 5, in an upwardly extending substantially straight line path substantially tangential to the circumference of the platen. As shown the last mentioned path is disposed in the same plane as the portion *t* of the platen against which the webs *a* are imprinted.

As shown the endless tractors 5, 6 are adapted to be driven by gearing on the frame, indicated by M of the tabulator or like machine on which the unit is mounted, and for this purpose a gear 10 is secured coaxially with the platen 1 so as to be rotated when the platen rotates when the tabulator or the like ~~machine~~ is in operation. The gear 10 meshes with the main drive gear 11 of the unit, and the latter is connected through a train of pinions 12, 13 to a pinion 15 on a shaft 14, which extends transversely of the unit and carries one of the driving sprockets of the outfeed tractors 5. The shaft 14 also has pinion 15*a* fast thereon (Fig. 2) which meshes with a pinion 16 on a shaft 17 which also carries a chain wheel 18. The chain wheel 18 drives an endless chain 19 which passes round and drives the chain wheel 20 fast on the shaft 21. The driving sprocket of the infeed tractor 6 is fast on the shaft 21 and accordingly when the tabulator or the like is in operation a gear 10 will be rotated to effect the simultaneous rotation of both the infeed and the outfeed tractors. the interposed gearing referred to above being so arranged that both tractors 5 and 6 will be driven at the same speed.

The tractors 6 are mounted on the transverse rod 6*a* which extends between the horizontal portions 3 of the side plates. The tractors 6 are omitted from Fig. 2 of the drawings for the sake of clarity.

In order to permit the adjustment of the slack in the webs, means is provided to permit adjustment of one or other of the tractors. As shown this means includes an adjustable coupling disc or sleeve keyed to the shaft 14 and connected to the pinion 15*a* by screws extending through slots 23. This permits the pinion 15*a* to be rotated into adjusted position relative to the shaft 14 and locked in adjusted position.

It will be understood that the tabulating or like machine will normally be operated to rotate the platen 1 and drive the tractors to feed the webs *a* line by line as the webs are imprinted and intermittently operated after imprinting to effect a feed movement of the webs *a* the equivalent of a form length, the feed being then halted while the webs are again imprinted. If desired, the webs *a* may be given a series of feed movements during a period in which the webs *b* remain immobile.

The plane in which the webs are fed towards the platen should be at such an angle to the plane at which they are fed away from it, as to ensure that it is possible to maintain the webs in a slack or loosely looped condition as they pass round it.

As an alternative to the feed means forming part of a unit adapted to be detachably mounted on a tabulator, typewriter or like machine, said feed means may form an integral part of such a machine.

It will be understood that the slackness of the webs as they pass round the platen will be such as to permit their being fed relatively to the transfer webs but will not be such as to prevent an efficient imprint being obtained by the type bars of the tabulator or the like.

What we claim is:—

1. Apparatus for feeding superposed record webs relatively to interleaved carbon transfer webs round the platen of a tabulator, typewriter or like machine wherein two web feeding means are provided having feed pins engageable with marginal pin feed apertures in the record webs for feeding the latter, one feeding means being mounted at the rearward or infeed side of the platen in a position to push the record webs in a substantially straight line path to the platen, and the other feeding means being mounted above the platen at the outfeed side thereof in a position to exert a pull on the record webs to draw them away from the platen in a substantially straight line path after they have been fed round the platen, both said pin feeding means being simultaneously operated at the same speed, and being adapted to be positioned in engagement with the record webs in such a manner that the portion of the record webs extending between said feed-

the portion of the web *a*² extending between the tractors 5 and 6 will be formed with sufficient amount of slack so that as they pass round the platen they are loosely disposed relatively to one another and form a relatively loose loop at the platen 1, so that the webs will be drawn smoothly round the platen relatively to the webs *b*.

Accordingly the webs will not be drawn tightly against the platen as they are fed but will be only lightly in contact therewith, so that there will be little or no tendency for the webs to be in such tight frictional contact with each other or the platen as would prevent the webs *a* being fed round the platen relatively to the transfer webs *b*.

It will be noted that the feed path for the webs between the platen and pin feed tractors 5 comprises a substantially straight line path which is free of bends or restrictions likely to impede or restrict the smooth feeding of the webs *a* and accordingly the webs will be pushed by the infeed tractor units 6 towards the platen in a substantially straight line path substantially tangential to the circumference of the platen 1 and will be drawn off after passing round the platen, by the outfeed tractor units 5, in an upwardly extending substantially straight line path substantially tangential to the circumference of the platen. As shown the last mentioned path is disposed in the same plane as the portion *t* of the platen against which the webs *a* are imprinted.

As shown the endless tractors 5, 6 are adapted to be driven by gearing on the frame, indicated by M of the tabulator or like machine on which the unit is mounted, and for this purpose a gear 10 is secured coaxially with the platen 1 so as to be rotated when the platen rotates when the tabulator or the like ~~machine~~ is in operation. The gear 10 meshes with the main drive gear 11 of the unit, and the latter is connected through a train of pinions 12, 13 to a pinion 15 on a shaft 14, which extends transversely of the unit and carries one of the driving sprockets of the outfeed tractors 5. The shaft 14 also has pinion 15*a* fast thereon (Fig. 2) which meshes with a pinion 16 on a shaft 17 which also carries a chain wheel 18. The chain wheel 18 drives an endless chain 19 which passes round and drives the chain wheel 20 fast on the shaft 21. The driving sprocket of the infeed tractor 6 is fast on the shaft 21 and accordingly when the tabulator or the like is in operation a gear 10 will be rotated to effect the simultaneous rotation of both the infeed and the outfeed tractors, the interposed gearing referred to above being so arranged that both tractors 5 and 6 will be driven at the same speed.

The tractors 6 are mounted on the transverse rod 6*a* which extends between the horizontal portions 3 of the side plates. The tractors 6 are omitted from Fig. 2 of the drawings for the sake of clarity.

In order to permit the adjustment of the slack in the webs, means is provided to permit adjustment of one or other of the tractors. As shown this means includes an adjustable coupling disc or sleeve keyed to the shaft 14 and connected to the pinion 15*a* by screws extending through slots 23. This permits the pinion 15*a* to be rotated into adjusted position relative to the shaft 14 and locked in adjusted position.

It will be understood that the tabulating or like machine will normally be operated to rotate the platen 1 and drive the tractors to feed the webs *a* line by line as the webs are imprinted and intermittently operated after imprinting to effect a feed movement of the webs *a* the equivalent of a form length, the feed being then halted while the webs are again imprinted. If desired, the webs *a* may be given a series of feed movements during a period in which the webs *b* remain immobile.

The plane in which the webs are fed towards the platen should be at such an angle to the plane at which they are fed away from it, as to ensure that it is possible to maintain the webs in a slack or loosely looped condition as they pass round it.

As an alternative to the feed means forming part of a unit adapted to be detachably mounted on a tabulator, typewriter or like machine, said feed means may form an integral part of such a machine.

It will be understood that the slackness of the webs as they pass round the platen will be such as to permit their being fed relatively to the transfer webs but will not be such as to prevent an efficient imprint being obtained by the type bars of the tabulator or the like.

What we claim is:—

1. Apparatus for feeding superposed record webs relatively to interleaved carbon transfer webs round the platen of a tabulator, typewriter or like machine wherein two web feeding means are provided having feed pins engageable with marginal pin feed apertures in the record webs for feeding the latter, one feeding means being mounted at the rearward or infeed side of the platen in a position to push the record webs in a substantially straight line path to the platen, and the other feeding means being mounted above the platen at the outfeed side thereof in a position to exert a pull on the record webs to draw them away from the platen in a substantially straight line path after they have been fed round the platen, both said pin feeding means being simultaneously operated at the same speed, and being adapted to be positioned in engagement with the record webs in such a manner that the portion of the record webs extending between said feed-

* C L M S *

ing means is maintained in a relatively slack condition such that as they are fed round the platen they will be sufficiently loosely disposed relative to the platen and the interleaved carbon transfer webs to permit their free feeding movement round the platen relatively to said carbon transfer webs.

2. Apparatus according to Claim 1 wherein the platen is of circular cross section and the said infeed feeding means is positioned to feed the record webs to the platen in a path extending substantially tangentially to the circumference of the platen.

3. Apparatus according to Claim 2 wherein the said outfeed feeding means is positioned to draw off the record webs in an upwardly extending path which substantially tangential to the platen.

4. Apparatus according to any one of the preceding claims wherein a pair of aligned pin feed devices is provided for feeding the record webs to the platen, the said devices being transversely spaced and positioned for engaging feed apertures in the oppositely disposed marginal edges of the record webs.

5. Apparatus according to any one of the preceding claims wherein a pair of aligned pin feed devices is provided for feeding the webs away from the platen, said devices being transversely spaced and positioned for engaging feed apertures in the oppositely disposed marginal edges of the record webs.

6. Apparatus according to any one of tthe preceding claims wherein means is provided for adjusting one, or one pair of aligned feeding devices, relatively to the other feed device or pair of aligned devices, to permit the degree of slackness in the record webs between said feeding devices to be varied.

7. Apparatus according to Claim 6 wherein the pin feed devices comprise endless bands carrying feed pins, the endless bands being supported on driving sprockets coupled to driving means, means being provided for adjusting the coupling connection of said driving means to one of the feeding devices for example the infeed device, to enable the pin feed means of said feeding device to be adjusted relative to the platen to vary the degree of slackness in the record webs.

8. Apparatus according to any one of the preceding claims wherein the feeding means or devices are mounted on a frame to form a unit adapted to be detachably mounted on a tabulator, typewriter or like machine, the unit including a drive gear adapted to mesh with a gear on an adjacent part of the tabulator, typewriter or the like when the unit is assembled thereon.

9. Apparatus for feeding superposed record webs relatively to interleaved carbon transfer webs round the platen of a tabulator typewriter or like machine wherein two web feeding means are provided having feed pins engageable with marginal pin feed apertures in the record webs for feeding the latter, one feeding means being mounted at the rearward or infeed side of the platen in a position to push the record webs to the platen in a path free of feed impeding bends or restrictions and extending substantially tangential to the circumference of the platen, the other feeding means being mounted above the platen at the outfeed side thereof in a position to pull the record webs away from the platen in a vertically extending path free of feed impeding bends or restrictions and extending substantially tangential to the circumference of the platen, both said pin feeding means being simultaneously operated at the same speed and being positioned in engagement with the record webs in such a manner that the portion of the record webs extending between said feeding means is maintained in a relatively slack condition such that as they are fed round the platen they will be sufficiently loosely disposed relative to the platen and the interleaved carbon transfer webs to permit their free feeding movement round the platen relatively to said carbon transfer webs.

10. Apparatus according to any one of the preceding claims wherein the record webs are adapted to be given a series of feed movements during a period in which the carbon transfer webs remain stationary.

11. A method of feeding superposed record webs to and round the platen of a tabulator, typewriter or like machine and relatively to interleaved carbon transfer webs, which includes imparting a feed movement to the record webs from the infeed side of the platen to push them towards the platen relatively to the transfer webs in a substantially straight line path, simultaneously imparting a feed movement to the said record webs from the outfeed side of the platen to pull them round and away from the platen relatively to the transfer webs in a substantially straight line path, and maintaining the said record webs in a relatively slack condition as they are fed round the platen, such that they will be sufficiently loosely disposed relative to the platen and interleaved carbon transfer webs to permit their free feeding movement round the platen relatively to said carbon transfer webs.

12. Apparatus for feeding a series of superposed webs round the writing platen of a tabulator, typewriter or like machine substantially as described with reference to the accompanying drawing.

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PROVISIONAL SPECIFICATION

Improvements in and relating to Feeding Means for Webs of Continuous Stationery

We, LAMSON PARAGON LIMITED, a British Company of Paragon Works, Canning Town, London, E.16, do hereby declare this invention to be described in the following statement:—

This invention relates to typewriting, tabulating, and like recording machines wherein continuous webs of stationery are fed round a platen roller or the like.

It has been the practice heretofore to provide continuous stationery in pack form comprising two or more superposed record sheets between which are secured carbon sheets for transferring details of data typed or imprinted on the top sheet to the underlying record sheets, the transfer and record sheets being secured together, travel round the platen as a unit, and are subsequently separated. This form of pack is very wasteful as the transfer sheet is only used once and although there may be large areas in its carbonised surface which have not been used, it is thrown away as it is not practicable to salvage it and re-assemble it with other superposed record sheets.

If however loose transfer sheets are provided interleaved between the record sheets and anchored so as to be usable with succeeding portions of the record sheets, difficulty is experienced in feeding the record sheets relative to the transfer sheets round the platen roller, as with the normal feeding means the record and transfer sheets are pulled tightly against the roller and the friction set up between the record sheets and the carbonized surface of the transfer sheets causes the sheets to bind and prevent the feed of the former.

It is an object of the present invention to provide improved feed means which will overcome this drawback.

According to the present invention a typewriting, tabulating or like recording machine of the kind referred to is provided with web feeding means which includes means for exerting feeding movement simultaneously to the portions of the web on the infeed and outfeed sides of the platen roller or the like, the arrangement being such that the web forms a loose loop as it passes round the platen, the loop being only lightly in contact with the surface of the platen.

This feeding arrangement ensures that the superposed layers forming the stationery pack are not pulled tightly together and against the platen but the transfer sheets are loosely disposed between adjacent record sheets so that the latter can be freely drawn past.

In practice the transfer sheets will not be completely immobile but will be fed forwardly a small amount each time the record sheets are fed. The feed of the transfer sheets will however be very small compared with that of the record sheets and is designed to ensure that substantially the whole area of the transfer material is progressively presented to the typing or imprinting position and used several times during its passage across the type face.

The means for feeding the webs may comprise pin feeding devices adapted to engage marginal apertures in the webs one pin feed device being disposed on the infeed side of the platen and another on the outfeed side. The effect is that the infeed feeding device exerts a pushing effect on the webs and the outfeed device exerts a pulling effect. The two devices run at the same speed but the web is so positioned that it is slack enough to form a loop as it passes round the platen.

The initial degree of slackness of this loop is fixed and maintained by means of a simple adjustment in driving means between the infeed and outfeed pin devices, such that the infeed pin wheels or tractors may be readily retarded or advanced relative to the outfeed ones.

The feed devices may comprise tractor units having an endless belt carrying feed pins, such as described in prior British Patents 468,327, 468,284. The driving shafts of the tractors are coupled as by an endless chain or by gearing and one of these shafts is driven through suitable gearing by the drive means of the recording machine or by a separate motor if desired. The infeed tractor is disposed rearwardly and tangential to the platen and the outfeed tractor is disposed above the platen in line therewith.

Means are also provided preferably in the main drive means from the tabulating machine to advance or retard the infeed and outfeed tractors equally so providing longitudinal adjustment between lines on the printed forms and the type faces. Further the tractors or pin wheels are preferably laterally adjustable on transverse shafts to compensate for webs of different width.

In operation the web feeding means are intermittently operated after each imprinting operation to feed the record sheets a form length, and present the succeeding form in typing position, the transfer sheets being also simultaneously fed forwardly a small amount to present fresh areas of transfer material.

By the present invention a considerable economy is made as the length of transfer material used per record sheet fed forward is very little indeed and is a great improve-

ment compared with the old arrangement wherein each transfer sheet had to be the same length as the record sheet.

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