No. 734,660. PATENTED JULY 28, 1903.

C. J. BELLAMY.

TYPE WRITER ATTACHMENT.

APPLICATION FILED MAR. 14, 1902.

NO MODEL. 4 SHEETS—SHEET 1.

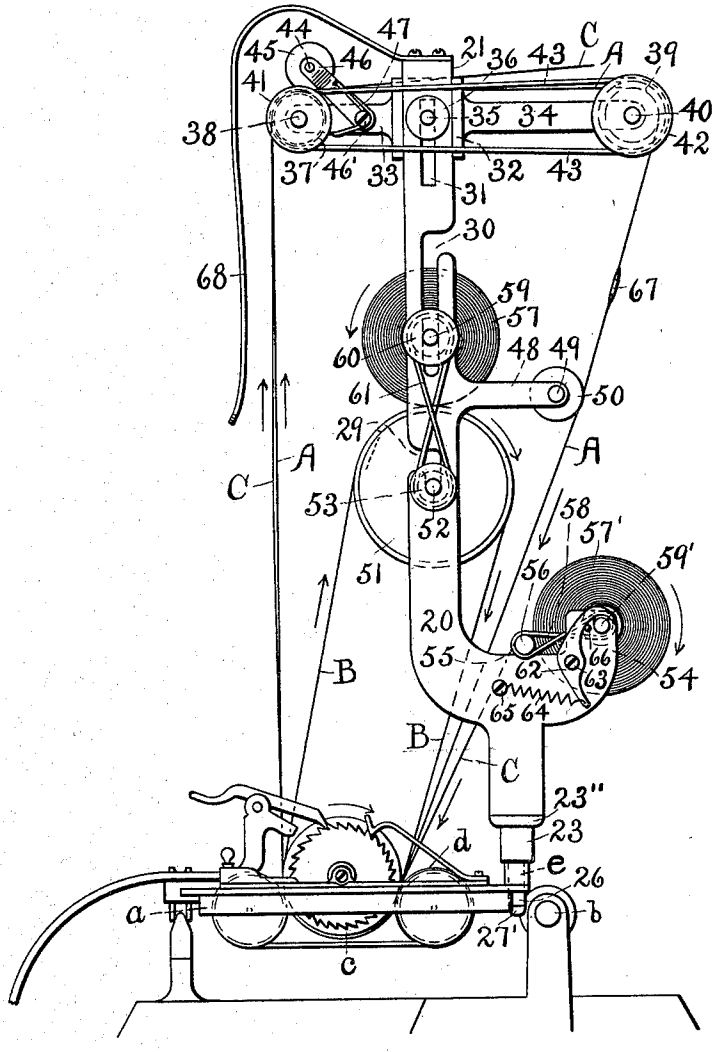


FIG. 1.

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NO MODEL. 4 SHEETS—SHEET 2.

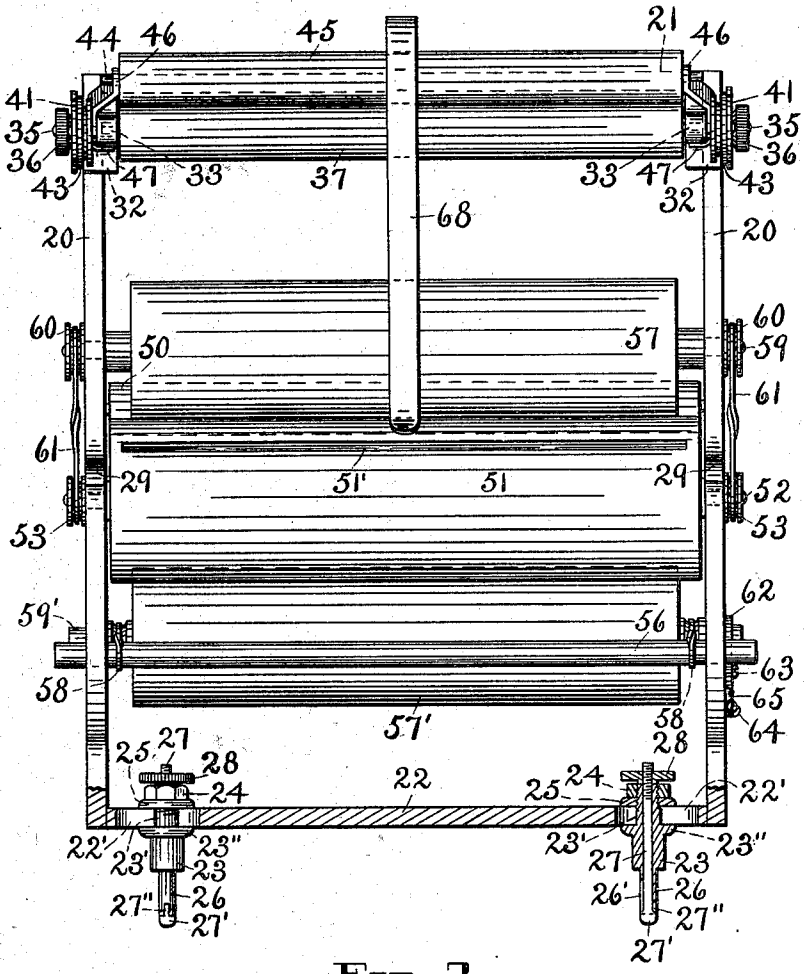


FIG. 2.

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NO MODEL. 4 SHEETS—SHEET 3.

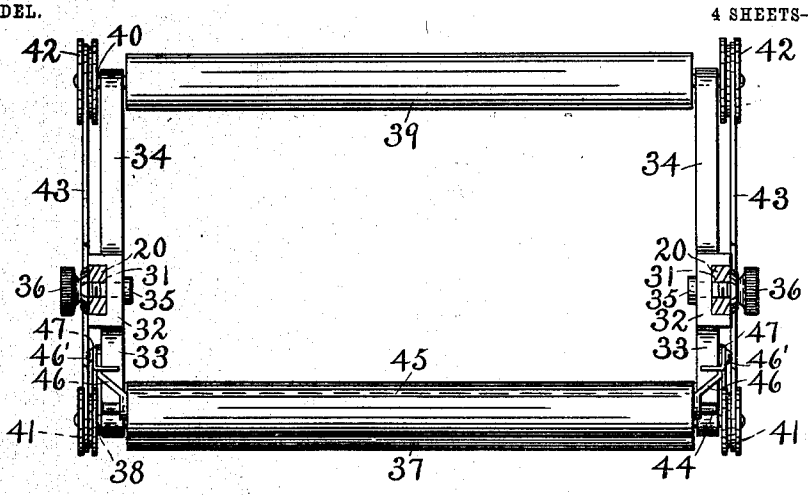


FIG. 3.

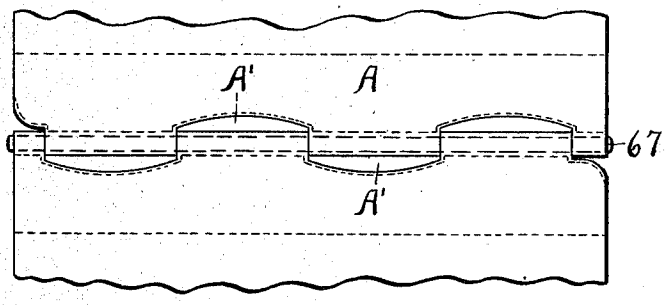


FIG. 4.

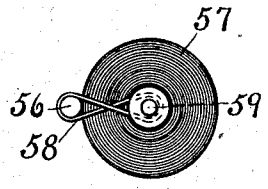


FIG. 5.

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No. 734,660. PATENTED JULY 28, 1903.

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TYPE WRITER ATTACHMENT.

APPLICATION FILED MAR. 14, 1902.

NO MODEL. 4 SHEETS—SHEET 4.

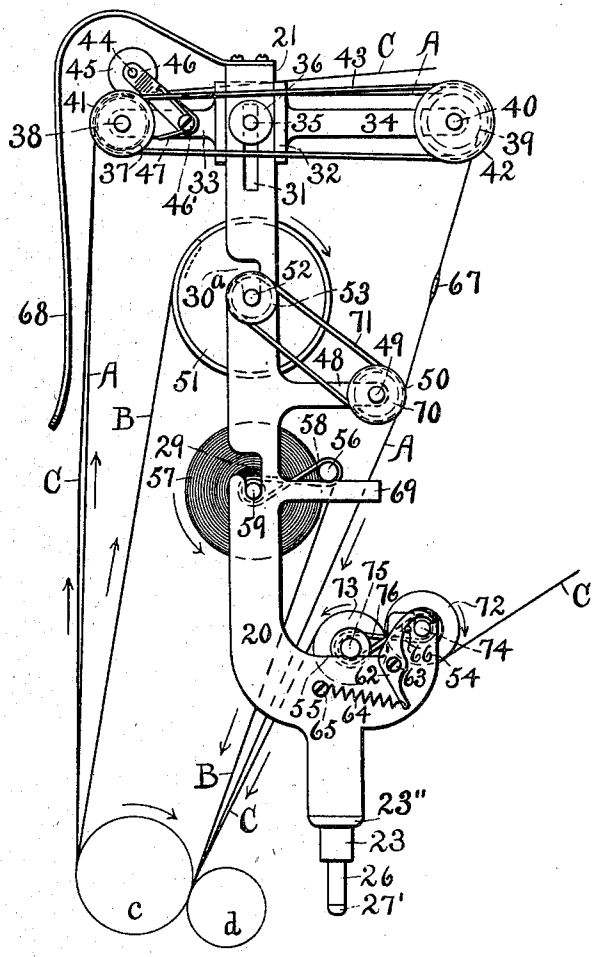


FIG. 6.

Witnesses
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No. 734,660. Patented July 28, 1903.

UNITED STATES PATENT OFFICE.

CHARLES J. BELLAMY, OF SPRINGFIELD, MASSACHUSETTS.

TYPE-WRITER ATTACHMENT.

SPECIFICATION forming part of Letters Patent No. 734,660, dated July 28, 1903.

Application filed March 14, 1902. Serial No. 98,164. (No model.)

To all whom it may concern:

Be it known that I, CHARLES J. BELLAMY, a citizen of the United States, residing at Springfield, in the county of Hampden and Commonwealth of Massachusetts, have invented a new and useful Type-Writer Attachment, of which the following is a specification.

My invention relates to improvements in atachments for type-writers with which rolls of paper may be used and in which certain peculiar devices for handling the rolls and the paper and for manifolding are employed, all as hereinafter fully described, and especially pointed out in the claims; and the objects of my improvement are, first, to provide means for attaching rolls of paper to a type-writer carriage; second, to furnish means for manifolding; third, to provide a tension appliance for paper-rolls; fourth, to construct an attachment with which to successfully manipulate paper from one or more rolls or from a single roll and in sheets or in sheets without any roll; fifth, to provide means for uniting the ends of the manifolding-apron; sixth, to effect a saving in time and labor, and, seventh, to provide mechanism embodying these advantages and carrying out these objects in a practical manner. It is a signal advantage to be able to make copies of the matter written by the machine or not, at the pleasure of the operator and with a minimum amount of trouble required to effect the change. Previous devices for the use of paper-rolls in type-writer work have shown serious defects in operation, and my invention overcomes such defects in a practical manner. It is obvious that substantial advantages must accrue from the use of rolls of continuous strips fed continuously after the paper has once been inserted between the carriage-rollers, no stop being necessary for a fresh supply until the rolls become exhausted. Much time and labor are conserved by the use of paper-rolls, whether a copy is taken or not, but naturally more in the former instance, and although my invention is useful when separate sheets are employed its greatest advantage shows forth in the manipulation of rolls.

My attachment may be made light and compact and so constructed as to be applied to almost any ordinary type-writer. I show it applied to the carriage of a Remington machine; but the same can be affixed to other makes of type-writers without material or important change. Usually the attachment will be so arranged as to permit of ready connection with and disconnection from the writing-machine; but it may be affixed permanently to the machine.

I attain the aforesaid objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a side view of a type-writer carriage having my attachment mounted thereon; Fig. 2, a front view of said attachment, the bottom bar of the frame and one of the holding devices being in section; Fig. 3, a plan view of the upper part of the attachment, the frame being in section; Fig. 4, a partial side view of the manifolding-apron, showing means for uniting the ends thereof; Fig. 5, an end view of a detached paper-roll and tension; and Fig. 6, a side view of a modified form of construction, the carriage-rolls also being represented.

Similar letters and figures designate like parts throughout the several views.

An ordinary Remington type-writer carriage *a*, slidingly mounted at the rear on a rod journaled at *b* and provided with the rubber roller or platen *c* and tension-roller *d*, is shown in Fig. 1, the platen and tension-roller also being indicated in Fig. 6. My attachment is preferably arranged to be mounted on the hollow posts that rise from the rear bar of the carriage *a*, one of said posts being shown at *e* in Fig. 1, although connections may be formed with other parts or at other points.

A supporting-frame comprising side uprights 20 20, connected by a top bar 21 and a bottom bar or base 22, is mounted on the carriage *a*, being held in place by any suitable means.

As one means of attaching the frame to the carriage I have shown two carriers 23, extending below the base 22, which will now be explained. Slots 22′ 22′ are cut in the base 22 to receive the heads 23′ 23′ of the carriers 23, which may be moved in said slots when loose. The heads 23′ extend above the top of the base 22 and are screw-threaded to re-

ceive the set-nuts 24 24, washers 25 25 being interposed between said base and nuts. Each carrier 23 has a flange 23″, located below the base 22. When the nuts 24 are screwed down tight, the base 22 is firmly gripped between the flanges 26 and the washers 25, so that lateral movement of the carriers 23 cannot take place. A bushing 26, preferably integral with the carrier, depends from the latter to enter the vertical hole in the post *e* and rear bar of the carriage *a*, while the carrier rests upon said post. Each bushing 26 is slotted at 26′, so it can be expanded by the rod 27, which extends through a central passage in the carrier, head, and bushing. The lower terminal of the rod 27 is enlarged at 27′ and has a projection 27″ to register with a second slot in the bushing 26, whereby said rod is prevented from turning. A thumb-nut 28 is threaded to the upper end of each rod 27 and bears against the head 23′. Now in order to secure the frame in place it is first necessary to loosen the thumb-nuts 28, also the nuts 24, if the bushings 26 have not already been fitted to the post-holes. Next adjust the carriers along the base 22 until the bushings 26 register with the post-holes, when the nuts 24 are tightened. Finally, turn the thumb-nuts 28 until the bushings are secured in position. This last is accomplished by the elevation of the rods 27 when the thumb-nuts are turned and the consequent expanding of the split or slotted bushings by the enlarged terminals of said rods.

When mounted on the carriage, the frame and the members supported thereby move with said carriage either when it is reciprocated or turned up and down. All parts of the frame and members must be high enough to clear the type-writer frame when the carriage assumes its vertical position, except when used with makes of type-writers in which the carriages do not turn up.

Three slots 29, 30, and 31 are cut through each frame-upright 20, the first two opening through the front and rear, respectively. A block 32, slotted to receive an upright 20, is fitted to the inside of each upright below the top bar 21, and arms 33 and 34 extend forward and backward from said block, respectively. A bolt 35 passes through a hole in each block 32 and the corresponding slot 31 to receive a thumb-nut 36 on its threaded outer end. By loosening the nuts 36 the blocks may be raised or lowered within the limits fixed by the ends of the slots 31, and then by tightening said nuts said blocks with their connected members are held securely in position. A roller 37 has its shaft 38 journaled in the front ends of the arms 33, and a roller 39 has its shaft 40 journaled in the rear ends of the arms 34. A pulley 41 is fixed on each end of the shaft 38, and a pulley 42, of larger diameter than the pulley 41, is fixed on each end of the shaft 40, the pulleys on opposite shafts being connected by cords or elastic bands 43 outside of the uprights 20. By this arrangement the roller 37 is driven a little faster than the roller 39, but in the same direction, for the purpose presently to be described. The shaft 44 of a tension-roller 45 is journaled in arms 46 46, each pivoted at 46′ to one of the arms 33. Springs 47 47, attached to the pivots 46′, are arranged to force the roller 45 into contact with the roller 37. An arm 48 extends backward from each upright 20, and the shaft 49 of the roller 50 is journaled in the rear end thereof.

A hollow winding-drum 51 is provided with trunnions or a shaft 52, which has its bearings in the bottoms of the slots 29. A pulley 53 is fast on each end of the shaft 52 outside of the upright 20. Some means for attaching the end of a strip of paper to the drum 51 must be provided, as the slot 51′, extending horizontally through the periphery thereof. By inserting the end of a strip of paper into the slot 51′ and turning the drum 51 a little the strip is connected to the latter and may be wound thereon.

A short distance above the base 22 each upright 20 extends forward and then upward for the greater part of its length, and a short rearward and upper extension or ear 54 is formed on said upright back of the forward extension, a horizontal space or bearing 55 being left between adjacent edges of the vertical parts.

Continuous strips of paper suitable for type-writing purposes are rolled up for use with my attachment, these rolls being provided with suitable holders, as trunnions or shafts, projecting from the ends thereof. Said holders supplied with paper-rolls, and the tension appliances that go with them constitute an essential feature of my invention. Such a roll and appliance are shown detached in Fig. 5, the latter consisting of a rod 56, extending across and projecting beyond the face of the roll 57 and held against the periphery of the same by some resilient means, as an elastic band 58 at each end, connecting the projecting ends of said rod and the holder or shaft 59 or a grooved enlargement thereon. Springs may be substituted for the elastic bands. This tension appliance prevents the paper from unwinding and serves other purposes presently to be explained.

The shaft 59 of the paper-roll 57 is mounted in the slots 30 of the uprights 20 above and in contact with the drum 51. On the outer ends of the shaft 59 are fixed pulleys 60 60, connected by crossed cords or elastic bands 61 61 with the pulleys 53. The pulleys 60 are slightly larger than the pulleys 53, so as to accelerate the speed of the drum 51, which is driven by the crossed bands 61 in the opposite direction to that of the roll 57. This is the copy-strip roll. Owing to the difference in size of the aforesaid pulleys, it is obvious that the bands 61 will slip more or less on the pulleys of the driving-shaft 52 during a portion of each revolution, especially as the feed-roll grows smaller with

use, thus acting as an additional brake and tending to offset the tendency to accumulate slack between the roll 57 and type-writer rollers which would naturally result from the jerking motion imparted to the paper by said rollers. The provision for accelerated speed is found useful, moreover, in offsetting the retarding effect of friction and slipping and in keeping the strip taut between the type-writer rollers and winding-drum, thus preventing bagging and uneven winding. These elastic belt connections also serve the purpose of holding the roll 57 in close frictional contact with the winding-drum, thus furnishing one element in the required tension, as well as assisting to rotate the drum.

The shaft 59′ of a second or original strip-roll 57′ has its bearings in the ears 54, one of said ears being slotted to permit of the easy removal and insertion of said shaft. A finger 62 is pivoted at 63 to the slotted ear, and the upper curved terminal of said finger is normally held over the adjacent end of the shaft 59′ by means of a spring 64, extending between the lower terminal of the finger and a screw 65 in said ear. A stop-pin 66 projects from the ear into the path of the finger 62 and holds the latter out of actual contact with the shaft. By actuating the finger 62 away from the shaft 59′ the same can be readily removed and another shaft with a fresh roll thereon substituted. A tension-rod 56 rests upon the bearing-surfaces 55 and is connected by crossed elastic bands 58 with the shaft 59′ or grooved enlargements thereon. It has been found that better results in some cases are produced—that is, the paper is handled to better advantage—by connecting a rotary paper-handling member to the roll-holder with crossed driving belts or bands to revolve said member in an opposite direction to that of said holder. This arrangement is necessary for the drum and its accompanying paper-roll, as shown in Fig. 1. Here the bases of the winding-drum journals or slots 29 constitute stops, and the drum itself serves as a rotary member, which is caused to bear against said stops by the pull of the paper as it passes partly around said drum from the roll 57. For tension purposes the crossed elastic bands are found especially desirable in connection with a paper-roll and its tension-rod, because where the angle at the point of departure of the strip from the roll is acute if the bands were not crossed the rod would be likely to act as a complete stop to the movement of the roll, especially if the angle is a sharp one, since the tendency of straight belt connections would be to rotate the rod in a direction opposite to that of the movement of the paper. Elastic bands are particularly well adapted for use in this attachment, since they always tend to take up any lost motion and counteract backlash, especially when run on pulleys of different sizes. Their utility as a tension medium in connection with the tension-rod and superiority over springs are also quite apparent.

The manifolding or copying apron A consists of a normally endless band provided with a copying medium, except at and adjacent to the jointed sections of said apron and preferably only on the inside. The apron is adapted to travel between the carriage-platen *c* and roller *d*, over the rollers 37 and 39, and in contact with the roller 50.

In order to facilitate the operation of inserting the apron A in and removing it from the carriage and attachment, it is necessary to have it in the form of a strip and provide some suitable means for uniting and disuniting the ends of said strip at will. Various means may be employed for this purpose; but I find that a simple and convenient union consists of interlocking projections A′ at the ends of the apron A, forming casings, with a thin strip 67 run through said casings. The strip 67 can be easily removed from the casings or inserted therein. The connection between the ends of the apron must be thin and narrow enough to pass, with a plurality of sheets of paper, readily between the carriage-platen and roller and over or around any other rollers that may be used to support said apron.

The joint or connection which I use comprises only two thicknesses of cloth, with that of the connecting-strip, which latter may be almost as thin as a sheet of stiff paper. A strip of this kind is quite stiff enough for the purpose and may be easily and quickly threaded into the casings, where it keeps its place without difficulty and with said casings distributes the strain evenly, so that the apron is not pulled out of shape.

It will be perceived that the casings on the two ends of the copying-apron, as well as the strip used to connect them, occupy a certain amount of space on said apron and that it will be impracticable to copy through these sections. Hence it is of vital importance to so construct the apron that the process of taking a copy shall not be interfered with. In order to avoid any difficulty of this nature, I make my apron of a length or circumference that shall be a multiple of the length of the sheet or page of paper on which copy is to be taken. Thus the same portion of the apron always comes opposite like parts of the accompanying sheets or pages if properly started. Furthermore, the non-copying sections of the apron—that is, those sections made up of the casings and connecting-strip—are identical in dimension in the longitudinal direction of the apron with the portion of the accompanying sheet or length of paper on which no copy is required, or, in other words, with their combined top and bottom margins.

Before inserting the apron A into the machine and attachment it is necessary to loosen the thumb-nuts 36 and lower the blocks 32 until the bolts 35 rest in the bottoms of the slots 31. Now pass one end of the apron A between the platen *c* and the roller *d* and be-

tween the rollers 37 and 44, the latter, with its spring-pressed arms 46, being raised for this purpose. Next carry the other end of said apron upward, back of the roller 50 and over the roller 39, and unite the two ends with the strip 67. Finally raise the blocks 32 until the proper tension is given to the apron A and tighten the thumb-nuts 36. By raising or lowering the blocks 32 any desired change in tension of the apron can be made at any time. The inked or carbon surface of the apron A is on the inside when said apron is in place. After placing the apron A insert a roll 57 above the drum 51, lead the end of the strip of paper of which said roll is composed from the bottom of the roll backward between it and said drum, around the back of the latter downward between the carriage-platen *c* and roller *d* and around said platen, thence upward to the drum, where it is attached, as hereinbefore explained. This strip is designated by the reference-letter B and may be termed the "copy-strip." Next lead the end of the strip C from the bottom of the lower paper-roll 57′, over the tension-rod 56, forward between the platen *c* and roller *d* and around the former, thence upward between the rollers 37 and 45 and out beneath the top bar 21, which serves as a straight-edge or knife against which said strip is torn off from time to time, as occasion requires. The tension-rod 56 is held against the roll 57′ by the bands 58 and against the bearing-surfaces 55 by the pull of the paper as it is drawn through the type-writer, said rod being revolved by the paper and said bands. The strip C receives the original impression from the type-writer and may be termed the "original copy-strip," and the apron A is caused to transfer a copy of this impression to the strip B. The arrows indicate the directions taken by the rotary members and traveling strips and apron when the platen *c* is turned to actuate the paper forward for a new line; but it will be understood that the paper can be actuated in the other direction by the same means, provided the strip C is rewound on its roll by turning the latter with the hand at this time. As the strip B unwinds from its roll it is wound upon the drum 51, since the latter is rotated by the pull of the paper and by the bands 61, which also serve to draw the roll into closer contact with the drum and to prevent possible accumulation of slack in the paper. In order to remove the drum, cut the paper between the platen *c* and said drum and lift the shaft of the latter out of the slots 29, when the copy may be unwound. It will be understood that the copy-strip roll rests upon the paper wound upon the drum after the first revolution of the latter.

The supplying of the attachment with fresh rolls of paper and the removal of the apron or other detachable members are mere matters of detail, and it is not deemed necessary to enlarge upon the same.

A guard 68, supported by the bar 21, overhangs the front of the attachment to prevent the end of the strip C from falling forward before it is grasped between the rollers 37 and 45. After passing between the rollers 37 and 45 the strip C is taken care of without any difficulty, owing to the fact that these rollers have an accelerated speed imparted thereto by the bands 43. This provision not only keeps the strip C taut after it leaves the type-writer, but also the front of the apron A, and increases the efficiency of the coacting mechanisms. In Figs. 1 and 6 the front reaches of the strip C and apron A are shown separated for the sake of clearness in illustration, but in practice they would be contiguous.

One or both strips B and C may have letter-heads, bill-heads, or like matter printed thereon at regular intervals and be perforated at predetermined distances before being rolled up. If there is no printing or perforation, it is desirable to have the type-written matter so spaced that the strips can be separated into pages or sheets, as before. Hence the apron A should be a multiple of the length of one of these sheets or pages, as has been stated hereinbefore, because there is no ink or carbon on the projections A′, nor would it be practical to strike the strip 67 with the face of the type. Care must be exercised in inserting the strip so that the projections A′ will arrive beneath the platen *c* coincidentally with the place of division of two of the before-mentioned sheets.

As hereinbefore explained, a paper-roll with a tension-rod and resilient means to draw it against said roll are employed in connection with the attachment described. As a complement to the roll, tension-rod, and resilient means stops are furnished for said rod, which is caused to bear against said stops by the pull of the paper. The rod may be located either above or below the stops, according to the direction which the paper is to take. If the paper passes from the bottom of the roll over the rod in a downward direction, the rod is placed above the stops, as best shown in Figs. 1 and 6, where the bearing 55 serves as such a stop in the first instance and the arm 69 in the other; but if it should be necessary to take the paper from the top of the roll and pass it under the rod in an upward direction the rod must be placed below the stops. As the paper-roll grows smaller the tension-rod approaches the shaft and always operates to hold the paper in place while being rewound or when the roll is stationary and to regulate the unwinding of the same. This is true in all cases. To recapitulate, it may be stated in a general way that the tension-rod is drawn against the paper-roll by resilient means and caused to bear against suitable stops interposed in its path by the pull of the paper, which must pass partly around said rod.

This attachment is compact and easily manipulated either in the removal of any of its detachable members or in the operation re-

quired for writing. The paper strips and apron are arranged and adapted to work in unison without slipping, twisting, or otherwise interfering with their proper passage through the carriage of the type-writer.

Several modifications are shown in Fig. 6, which will now be described. The copy-strip roll has its shaft supported at the bottom of the slots 29 in this case, and the drum is supported above and out of contact with said roll, a slot 30^a being provided in each upright 20 to receive the drum-shaft, said slot preferably opening through the front of said upright. An arm or stop 69 projects from the back of each upright to receive a tension-rod 56, which is connected by crossed elastic bands with the roll-shaft. A pulley 70 is fast on each end of the roller-shaft 49 and connected with the pulley 53 on the drum-shaft by a band 71, the pulley 70 being larger than the pulley 53. There is no connection between the paper-roll and drum, and the latter is actuated by the apron A through the medium of the roller 50, against which said apron bears. The strip B passes from the bottom of the roll 57 backward over the rod 56, downward around the platen *c*, and upward to the drum 51, to which it is attached. The tension appliance governs the paper-roll in the manner already fully described, and the apron, assisted by the bands 71, operates and controls the drum. It is obvious that the drum-pulleys could be belted to the pulleys on the shaft 40 instead of to those on the shaft 49, if desired.

An original-copy-strip roll and tension appliance may be employed with the apparatus shown in Fig. 6, or two tension-rollers 72 and 73 can be used. The trunnions or shaft 74 of the rear roller 72 is journaled in the bearings provided by the wings 54, and the trunnions or shaft 75 rests on the bearing-surfaces 55. A crossed elastic band 76 connects corresponding ends of the shafts 74 and 75. The rollers 72 and 73 are useful when the original-copy strip C is taken from a roll placed at a distance from the attachment, said strip being led under the roller 72 and over the roller 73, said rollers acting as tension-guides for the paper. These rollers are applicable to the construction shown in Fig. 1.

Aside from the differences pointed out the operation of the attachment shown in Fig. 6 is similar to that shown in Fig. 1.

When no copy of the original type-written matter is required, the apron may be removed and only the strip C run through the carriage, or the strip B may be used, the operation of either and their respective running and regulating parts being practically the same as previously described. If the strip B is used for the original copy, it can be carried upward between the rollers 37 and 45 or wound on the drum, as desired, said drum furnishing the tension when placed as shown in Fig. 1. On the other hand, either original paper or the copy-paper may be fed in detached sheets in either construction or both original and copy may be made on detached sheets, thus dispensing with one or both rolls, as the case may be. In case it is desired to take the copy on detached sheets rather than on paper from a roll a detached sheet is fed down between the actuating-rollers of the type-writer between the apron A and the platen *c* instead of feeding down the strip from the copy-roll 57, the paper-roll as well as the drum 51 being removed for the sake of convenience in manipulation should it be deemed necessary. Thus the impression given in operating the type-writer to the strip C, which is fed on the outside of the apron A, is transferred by the latter to the detached sheet, which when released from the rollers *c* and *d* after receiving the desired copy can be taken out as delivered back of said apron. In case it is desired to use detached sheets for the original impression the copy-roll 57 and drum 51 are retained and a detached sheet is fed into the machine behind the apron A, coming out in front of the same after being printed, to be removed as soon as released from the machine-rollers. When detached sheets are to be used for both original and copy, the roll 57 and drum 51 may be removed, the roll 57′ is dispensed with, and two sheets are fed between the machine-rollers, one back of the apron A and the other in front of the same, said sheets being removed as they emerge from said rollers. Then, again, the apron can be removed and sheets of carbon-paper employed with strips from both rolls or with one of said strips and detached sheets. In the event of using both rolls 57 and 57′ with carbon-paper in place of the apron A said sheets may be fed down in succession between the strips B and C in the path, as indicated in both constructions, Figs. 1 and 6, taken by the apron. The carbon-sheets come out of the machine in the path taken by said apron and can be removed for further use. When detached sheets of paper for the original and sheets of carbon-paper instead of the apron are used, retaining the roll 57 for the copy, a sheet of paper with a carbon-sheet on its back side are fed down together behind the strip B and pass between the type-writer rollers, from which they are received when released in the usual manner, while the copy-strip B goes to the winding-drum 51, as before. If it is desired to use detached sheets for the copy, retaining the roll 57′, but dispensing with the apron A, a sheet of paper designed to receive copy and a carbon-sheet on the front side thereof are fed between the type-writer rollers with the strip C and between such strip and the platen *c*. In passing out from between the type-writer rollers after the strip C has received the original impression and the detached sheet the copy through the interposed carbon-paper said strip C pursues its upward course, as hereinbefore explained; but the detached sheet and carbon-paper are

taken out as soon as freed from the machine-rollers. In this last case it is obvious that the copy-roll 57 and the drum 51 may be removed, since they are not employed if the space occupied by them is required for the more convenient manipulation of the other features.

It will be understood that numerous variations in the relative positions of the copy-strip roll and the winding-drum are possible; but they are too obvious to require further illustration or description, except to say that if frictional contact between the roll and drum is not desired the shaft of whichever is uppermost should be positively journaled, while if frictional contact is desired the shaft of whichever is uppermost should be received in slots cut low enough to permit the same to drop.

Various changes of minor importance other than those herein mentioned may be made in my invention without departing from the nature thereof, and all such variations whether in shape, size, construction, or arrangement of parts are intended to be included in and covered by this application.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a type-writer attachment, the combination with a suitable frame, of a paper-roll holder having supporting projections mounted in said frame, a tension-rod, resilient connections between said projections and rod to tension the latter toward said holder, stops against which the rod is caused to bear by the pull of the paper, and suitable actuating-rollers to handle the paper after it leaves the roll and rod.

2. In a type-writer attachment, the combination with the actuating-rollers of the machine, of a suitable frame, a paper-roll holder supported by said frame, a tension-rod, resilient means to tension said rod toward said holder and cause it to revolve with the roll or holder, and stops against which the rod is caused to bear by the pull of the paper.

3. In a type-writer attachment, the combination with the actuating-rollers of the machine, of a suitable frame, a holder for a strip of paper formed into a roll having supporting projections mounted in said frame, a tension-rod, resilient connections between said projections and rod to tension the latter toward said holder and cause it to revolve with the roll or holder, stops against which the rod is caused to bear by the pull of the paper, and a straight-edge conveniently located to assist in severing the paper.

4. In a type-writer attachment, the combination with the actuating-rollers of the machine, of a suitable frame, holders for two strips of paper formed into rolls having supporting projections mounted in said frame, rotary members extending across the rolls or holders, crossed elastic belts connecting said projections and members to retain the latter and the rolls on the holders in contact and cause them to revolve together, stops against which the members are caused to bear by the pull of the paper, and copying material adapted to be fed through the machine between said strips.

5. In a type-writer attachment, the combination with the actuating-rollers of the machine, of a suitable frame, a holder for a strip of paper formed into a roll having supporting projections mounted in said frame, a rotary member extending across the roll or holder, crossed elastic belts connecting said projections and member to retain the latter in contact with the roll on the holder and cause them to revolve together, stops against which the member is caused to bear by the pull of the paper, a holder for a second strip or sheet of paper, and copying material between the strips from said holders, adapted to pass between said actuating-rollers.

6. In combination with a type-writer attachment adapted to use an endless copying-apron and having supporting-rollers for the apron, a copying-apron adapted to be removed from the attachment and type-writer without separation of any of the parts of the mechanism other than the apron, the strip comprising said apron having connections consisting of permanent members at the ends to be united or disunited at will and adapted to pass between the actuating-rollers of the type-writer.

7. A type-writer-attachment copying-strip transformable into an endless band or apron and back into a strip again at will without destroying any part of the connections, portions of the copying side of which consist of non-copying material adapted while passing between the rollers of the type-writer with the paper on which an impression is to be taken, to have its non-copying material brought into regularly-recurring juxtapositions with particular portions of the paper on which no impression is required.

8. In combination with a type-writer attachment adapted to use an endless copying-apron and having supporting-rollers for the apron, a copying-apron adapted to be removed from the attachment and type-writer without separation of any of the parts of the mechanism other than the apron, the strip comprising said apron having connections consisting of permanent members at the ends to be united or disunited at will, and a detachable member to unite or disunite said permanent members, the said connecting members being adapted to pass between the actuating-rollers of the type-writer.

9. In a type-writer attachment, the combination with the actuating-rollers of the type-writer, of a suitable frame, an endless copying-apron adapted to travel with the paper on which a copy is to be or has been taken between said actuating-rollers and inclosing said paper longitudinally, supporting-rollers for said apron, and means for changing the position of said supporting-rollers to alter the tension of the apron.

10. In a type-writer attachment, the combination with the actuating-rollers of the machine, of a suitable frame, rollers supported by said frame, a copying-strip, means to convert said strip into an endless band or apron after one end has been fed between said actuating-rollers and over said frame-rollers, and back into a strip again at will without destroying any part of the connections, and means to change the position of the frame-rollers and lock them in place for the purpose of tensioning said apron.

11. In a type-writer attachment, the combination with the actuating-rollers of the machine, of a suitable frame, an endless copying-apron adapted to travel between said actuating-rollers, a roller journaled in said frame and driven by said apron, a second roller supporting the apron, belt connections between the frame-rollers arranged to accelerate the motion of said second roller, and a roller tensioned against the second roller, the apron passing between the two last-mentioned rollers, substantially as set forth.

12. In a type-writer attachment, the combination with the actuating-rollers of the machine, of a suitable frame, a holder for a paper-roll having supporting projections mounted in said frame, a rotary member extending across said roll or holder, crossed elastic belts between said member and projections to tension the former toward the roll or holder and cause it to revolve therewith, stops against which said member is caused to bear by the pull of the paper, and a copying-apron supported in the frame and arranged to travel with the strip of paper through said actuating-rollers, substantially as set forth.

13. In a type-writer attachment, the combination with the actuating-rollers of the machine, of a suitable frame, a holder for a paper-roll and a winding-drum supported by said frame, and means to keep the roll on said holder and said drum in frictional contact.

14. In a type-writer attachment, the combination with the actuating-rollers of the machine, of a suitable frame, a winding-drum and a holder for a roll of paper supported thereon, said drum being driven by the pull of the paper as it is drawn from said holder between said actuating-rollers, substantially as set forth.

15. In a type-writer attachment, the combination with the actuating-rollers of the machine, of a suitable frame, a holder for a paper-roll and a winding-drum supported by said frame, and belt connections between said holder and drum whereby motion is imparted from the former to the latter as the paper is drawn between said actuating-rollers, substantially as set forth.

16. In a type-writer attachment, the combination with the actuating-rollers of the machine, of a suitable frame, a holder for a roll of paper and a winding-drum both supported in said frame, said drum being actuated by the pull of the paper drawn between said actuating-rollers, and having a slot in its periphery adapted to receive the upper edge of the paper after passing between such rollers, substantially as set forth.

17. In a type-writer attachment, the combination with the actuating-rollers of the machine, of a suitable frame, a winding-drum having end projections supported in fixed bearings in said frame, and a holder for a paper-roll having end projections journaled in slots in the frame, said drum and the roll on said holder being in frictional contact and the paper therefrom passing between said actuating-rollers, substantially as set forth.

18. In a type-writer attachment, the combination with the actuating-rollers of the machine, of a suitable frame, a holder for a roll of paper having supporting projections mounted in said frame, a tension-rod, crossed elastic-belt connections between said projections and rod to tension the latter toward the roll or holder and cause it to revolve therewith, stops against which the rod is caused to bear by the pull of the paper, a winding-drum supported in said frame, and means to cause said drum to take up the paper after it has passed between said actuating-rollers, substantially as set forth.

19. In a type-writer attachment, the combination with the actuating-rollers of the machine, of a suitable frame, a holder for a copy-strip roll, a second holder for a roll of paper for the original impression, a winding-drum adapted to be actuated by the pull of the paper as drawn between said actuating-rollers from the copy-strip roll and to receive the copy-strip, and an endless copying-apron adapted to inclose longitudinally said copy-strip and to travel with and between both paper strips as they pass between the actuating-rollers, said holders and drum being supported in said frame, substantially as set forth.

20. In a type-writer attachment, the combination with the actuating-rollers of the machine, of a suitable frame, a holder for a copy-strip roll of paper and a winding-drum adapted to be actuated by the pull of the paper from said roll as it passes between said actuating-rollers, both roll-holder and drum being supported by said frame, and suitable copying material interposed between said strip and a second strip of paper adapted to receive the original impression in its passage between the actuating-rollers with the first strip and apron, substantially as set forth.

21. In a type-writer attachment, the combination with the actuating-rollers of the machine, of a suitable frame, a holder for a copy-strip roll of paper, a winding-drum adapted to receive said paper, actuated by the pull of the paper as it is drawn from said roll between said actuating-rollers, and a second paper-roll holder for the original impression-

strip, both the paper-holders and the drum being supported by said frame, substantially as set forth.

22. In a type-writer attachment, the combination with the actuating-rollers of the machine, of a suitable frame, a paper-roll holder having supporting projections mounted in said frame, a rod, and resilient means connecting said rod and supporting projections to tension the rod toward said holder or against the roll.

23. In a type-writer attachment, an endless copying-apron consisting of copying and non-copying sections, the circumference of said apron being a multiple of the linear dimension of an individual sheet or page of paper on which copy is to be taken.

24. In a type-writer attachment, an endless copying-apron consisting of copying and non-copying sections, the circumference of said apron being a multiple of the linear dimension of an individual sheet or page of paper on which copy is to be taken, and the non-copying sections having a surface corresponding in longitudinal direction of the apron, with those portions of the paper on which no copy is required.

25. In a type-writer attachment, the combination with a copying-strip transformable into an endless band or apron and back into a strip again, consisting of copying and non-copying sections, the whole length or circumference of such strip or apron being some multiple of the length of an individual sheet or page of paper on which copy is to be taken, of means for such transformation.

26. The combination, in a type-writer attachment, of a copying-strip transformable into an endless band or apron and back into a strip again, the same comprising copying and non-copying sections, the whole length or circumference of the apron being a multiple of the length of an individual sheet or page of paper on which copy is to be taken, the non-copying sections having a surface uniform in size with that of the portions of paper on which no copy is desired, and means for such transformation.

27. The combination, in a type-writer attachment, of a copying-strip having its ends provided with flat interlocking casings, and a flat removable holding-strip capable of engaging said casings, the casings and holding-strip being adapted to pass between the actuating-rollers of the type-writer.

28. The combination, in a type-writer attachment, of a holder for a roll of paper, a roller arranged to support the paper from said roll after passing between the actuating-rollers of the type-writer, means to tension the paper against this supporting-roller, a second roller, accelerating connections between the first and second rollers, and means for actuating said second roller coördinately with the action of the type-writer actuating-rollers.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

CHARLES J. BELLAMY.

Witnesses:
F. A. CUTTER,
STEPHEN S. TAFT, Jr.