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(54) MACHINE FOR WINDING MAGNETIC TAPES ONTO CASSETTES

(71) We, AEG - TELEFUNKEN Societa Italiana per Azioni a company organized under law of the Italian republic of Via Pirelli 12, 20124 Milan, Italy 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 a machine for winding magnetic tapes onto cassettes.

Magnetic tape cassettes, when empty, are notably provided with a neutral connecting tape (commonly known as the "leader tape"), which connects together the two internal cassette spools and is partially wound thereon.

It is also known that the magnetic tape is wound onto a cassette of this type by extracting a middle portion of the connecting tape through an aperture provided for this purpose in the cassette casing, cutting said middle portion to divide the connecting tape into two pieces, which are connected to respective areas of the two inner cassette spools, joining the free end of a reel of magnetic tape to the cut end of one of said pieces so as to connect said magnetic tape to one of the cassette spools, driving this latter spool so as to wind thereon nearly the entire required length of magnetic tape, cutting said length of magnetic tape from the rest of the magnetic tape reel, joining the cut end of said length of magnetic tape to the cut end of the other portion of connecting tape, and again driving said cassette spool to complete the winding of said length of magnetic tape.

Certain known machines are commercially available for carrying out this winding operation, and basically comprise support and unwinding means for a reel of magnetic tape, a support seat for the empty cassette comprising drive means for one of the spools thereof, a cutting and jointing area disposed in the path of the magnetic tape between the reel from which it unwinds and said cassette, and comprising cutting and jointing means, and extractor means for extracting a middle portion of connecting tape from said cassette and disposing it superimposed on one end of the magnetic tape in said cutting and jointing area.

It is apparent that in machines of this type the extraction of the connecting tape represents just one of the many operational stages which follow each other and for which the operational times are added together.

The object of the present invention is to provide a winding machine in which the extraction of the connecting tape takes place simultaneously with other operations, so as to reduce the total winding time.

According to the invention there is provided a machine for loading magnetic tape into empty cassettes each provided with a connecting tape joined at each end to a respective one of two spools situated within the cassette, the machine comprising a preparation assembly and a filling assembly, the preparation assembly comprising a first support seat arranged for supporting an empty cassette in a predetermined position relative to the preparation assembly and extractor means operable to extract portion of the respective connecting tape from an empty cassette supported by said first support seat and to extend said extracted portion into a predetermined configuration and tape position relative to said preparation assembly, said filling assembly comprising a second support seat for supporting a cassette in a predetermined position, relative to said filling assembly, during a tape winding operation, supporting means for supporting a reel of magnetic tape and means for winding magnetic tape into a cassette supported by said second support seat from said reel via a predetermined path, and tape cutting and joining means in a cutting and joining area in said path, the preparation assembly being

mounted for movement, relative to the filling assembly, between an advanced position and a withdrawn position, the arrangement being such that with the preparation assembly disposed in its withdrawn position, and with an empty cassette supported by said first support seat, the portion of the connecting tape of the latter cassette can be extracted and extended into said predetermined configuration and tape position by said extractor means, the machine including first transfer means, operable, in the advance position of the preparation assembly to transfer the cassette from said support seat of the preparation assembly to said support seat of the filling assembly, and a second transfer means operaable, in the advance position of the preparation assembly to simultaneously transfer to said cutting and joining area of the filling assembly the connecting tape, extracted and extended into said predetermined configuration and tape position of the casette transferred by said first transfer means, said tape cutting and joining means being operable to cut the extracted connecting tape, transferred to the cutting and joining area, of a cassette transferred to said second support seat, so as to provide two connecting tape parts each connected to a respective spool of the cassette, and to join ths free ends of said connecting tape parts to respective ends of a desired length of magnetic tape drawn from a reel of magnetic tape supported by said supporting means.

It is apparent that by dividing the machine according to the invention into two assemblies capable of simultaneously carrying out certain operations, one cassette can be prepared by partially extracting its connecting tape while the acutal filling of a previous by prepared cassette takes place, with the obvious result of appreciably reducing the total winding time and thus correspondingly increasing the machine productivity.

This and further characteristics of the present invention will be more evident by reference to the accompanying drawings, given by way of non-limiting example, in which:

Figure 1 is a diagrammatic elevation of the general layout of a machine according to the invention;

Figure 2 is a frontal view of a cassette to be filled with magnetic tape;

Figure 3 is a section through said cassette on the line III-III of Figure 2;

Figure 4 is an enlarged frontal detailed view of the cutting and jointing area of the machine of Figure 1;

Figures 5, 6 and 7 are partially sectional enlarged frontal, side and plan views of a device used in the machine of Figure 1 for transferring the already extracted portion of connecting tape from the preparation assembly to the filling assembly;

Figure 8 is a frontal view of the preparation assembly of the machine of Figure 1, when at rest;

Figure 9 is a partially sectional plan view of an extractor device for connecting tape, forming part of the preparation assembly shown in Figure 8;

Figure 10 is a side view, at the beginning of the extraction stage, of the extractor means for connecting tape which make up the preparation assembly shown in Figure 8;

Figure 11 shows the same extractor means in a subsequent operating state, with parts sectioned;

Figure 12 is a partially sectional frontal view of said extractor means under the same operating conditions as in Figure 11;

Figure 13 is a frontal view of said preparation unit during the movement of the extracted portion of connecting tape in front of the cutting and jointing area of the facing filling assembly;

Figure 14 is a partially sectional plan view of the preparation and filling units after said movement of the extracted portion of connecting tape and before the transfer of the prepared cassette and the extracted tape into the filling unit;

Figure 15 is a partially sectional plan view of a possible arrangement of the extractor device of Figure 9 in the case of lack of, or inadequate extraction of the connecting tape;

Figure 16 is a partially sectional plan view of the same assemblies at the moment of transfer of the prepared cassette from the preparation assembly to the filling assembly;

Figure 17 is a frontal view of the filling unit immediately after receiving the prepared cassette and the extracted tape;

Figure 18 is a frontal view of the filling assembly in the immediately subsequent stage, when the transfer device transfers the connecting tape into the cutting and jointing area suitably superimposed on the end of the magnetic tape to be wound.

The winding machine shown in the drawings is provided for winding a desired length of magnetic tape into a magnetic tape cassette of the general type indicated by the reference numeral 1 in Figures 2 and 3. As can be seen from said figures, the standard cassette 1 comprises a box casing of approximately parallelepiped shape 2, in which two spools 3 and 4 provided with drive sockets (holes 5 and 6) assessible from the outside of the casing are rotatably disposed. When the cassette is empty, a neutral connecting tape 7 also known as the "leader tape" extends from one to the other of said spools, and is accessible from the outside and thus extractable through one of three apertures 8, 9 and 10 contained in a thickened lateral edge thereof.

As can be seen in particular in Figures 1 and 14, the machine shown in the drawings is

formed from two parallel operational assemblies, i.e. a preparation assembly 11 and a filling assembly 12, each adapted to hold a cassette in a respective predetermined position relative to the respective assembly, such that a cassette held in the respective predetermined position in one assembly has the axes of its spools coincident with the axes of the spools of a cassette held in the respective predetermined position in the other assembly, so that corresponding faces of cassettes in the two predetermined positions are parallel. For convenience, the assemblies themselves are herein referred to as being parallel and face-to-face. The assembly 11 is movable with pure rectilinear motion, parallel with the axes of spools of cassettes supported in said predetermined positions, between a withdrawn position spaced from assembly 12 and an advanced position directly adjoining assembly 12.

As will become evident, each assembly 11, 12 when supporting a cassette in the respective predetermined position, supports the cassette with the axes of its spools extending horizontally and thus with the major faces of the cassette casing extending vertically.

The purpose of the preparation assembly is to prepare a cassette by presenting the same with it connecting tape already extracted for subsequent filling by the filling assembly. This latter (Figures 1 and 4) comprises rotatable support means 13 for supporting a reel 14 of magnetic tape 15, deflecting means 16 by means of which the magnetic tape is deflected through an angle, a cutting and jointing area 17 (traversed by the magnetic tape 15) and finally a support seat 18 for supporting the cassette when being filled. In the cutting and jointing area 17 (Figure 4) there operate a connecting tape transfer device 19 provided with a shaped prong 20, pressure means 21 cooperating with a plate 22 provided with a groove 23 (Figures 14 and 16), a cutter 24 and a jointing device 25. The transfer device 19 is shown in detail in Figures 5, 6 and 7, and comprises a fixed support 26 provided with two vertical guide rods 27 along which a pneumatic cylinder 28 reacting against the fixed structure 26 is able, when driven, to move a substantially C-shaped structure 29. This latter slidably carries a horizontally mobile member 30, which is operated by a pneumatic cylinder 31 and is integral with a block 32 which rotatably supports a spindle 33. One end of this spindle 33 carries a cylindrical gear 34 with which there engages a toothed sector 35 rotated about a pivot 36 by a pneumatic cylinder 37 carried by the vertically mobile structure 29. The other end of the rotatable spindle 33 carries the shaped prong 20, which, as shown in Figures 4, 14, 16, 17 and 18, comprises on one side a bevel 38 and on the other side an undercut 39. The purpose and method of operation of the shaped prong 20 will be evident hereinafter. The support seat 18 finally comprises (Fig. 14) a fixed plate 40, relative to which a cylinder 41 can move parallel with the direction of movement of assembly 11 between its withdrawn and advanced positions a plate 42 supporting an idle spindle 43 arranged for insertion into one of the two drive sockets 5 and 6 of the cassette 1, a motorised spindle or hub 44 arranged for introduction into the other drive socket of the cassette, a drive motor 45 for the hub 44, two fixed L brackets 46 designed to support the casset from below, and two levers 47 pivoted at 48, said levers 47 being kept by springs 49 in such a position as to avoid lateral movement of the cassette.

The preparation assembly 11 comprises basically (Figures 8-16) a first support seat 50 for the empty cassette, a suction device 51 and an extractor device 52, the devices 51 and 52 constituting together extractor means for the extraction and suitable prior positioning of the connecting tape of the empty cassette during the preparation stage. The support seat 50, the suction device 51 and extractor device 52 are supported by a support structure 53 which is normally spaced from the filling assembly 12, but can be moved to approach it for the transfer of the prepared cassette (Figures 14 and 16) by operating a pneumatic cylinder 65 (Figure 14) acting against a fixed structure 55 (Figures 1 and 8). The suction device 51, disposed below the temporary support seat 50, is also movable vertically from a rest position spaced from the seat 50 (Fig. 8) to a closer position (Fig. 10) and vice versa (Figures 11 and 12) by operating a pneumatic cylinder 56. Finally, the extractor device 52 is movable along longitudinal guides 57 carried by the support structure 53, from a rest position in which it lies substantially between the temporary support seat 50 and the suction device 51 (Figures 8, 10, 11 and 12) to a working position in front of the transfer device 19 (Figures 14 and 16) by operating a pneumatic cylinder 58 acting on a chain system 59 (Figure 8).

The temporary support seat 50 is shown in detail in Figures 14 and 16 (and partially in Figures 8, 12 and 13) and comprises a plate 60 which constitutes the support base for the entire structure receiving and releasing the empty cassette. A L-shaped bracket 61 is fixed on the plate 60 to support the cassette 1, from the bottom and the sides thereof remote from the assembly 12 and two grips 63 for supporting the narrow sides of the cassette and the face thereof nearest assembly 12 are pivoted at 62, these grips 63 being under the action of a return spring 72 and openable by a pneumatic cylinder 64. The plate 60 also slidably supports two pillers 66

biassed by springs 67 and 68 in the direction of assembly 12 and retractable against said bias by pneumatic cylinders 69. The plate 60 is movable horizontally relative to the support structure 53 towards and away from assembly 12 by a pneumatic cylinder 54. The support seat 50 is surmounted by an empty cassette feed device 70 (Fig. 1) which is able to feed the cassettes one at a time with the apertures, 8, 9 and 10 always pointing downwards (Figures 8 and 10 to 13) whatever their position in the vertical loader 71. Said feed device is preferably of the type described in our co-pending U.K. Patent application No. 07482/77 (Serial No. 1566960) filed on 28.2.77.

The suction device 51 comprises a concave suction port 73 (Figures 11 and 12) connected to a suction pump (not shown on the drawings) by a conduit system 74 (Figures 8 and 12).

Finally, the extractor device 52 comprises (Figures 8 to 16) a base carriage 75 slidable along the guides 57 under the control of the cylinder 58 and chains 59. A swivel arm 77 slidably supporting two parallel bars 78 and 79 is pivoted at 76 to said carriage, a pneumatic cylinder 80 also being fixed thereto. A spring 81 tends to resist the angular movement of the swivel arm 77 towards the position of Figure 13. The pneumatic cylinder 80 causes a first (82) of two relatively mobile blocks 82 and 83 to move forwards and backwards (towards and away from the filling assembly 12), the first (82) of these blocks being rigid with the slidable bar 78 (provided with an end retention ring 84) and slidably carrying the other bar 79, while the second (83) is rigid with the slidable bar 79 (provided with an end retention ring 85). Two extractor bars 86 are rigid with the block 82 and slidably pass through the front block 83, thus projecting forwards when the two blocks 82 and 83 are relatively close to each other as in Figures 11 and 14 to 16, and being completely contained within the space occupied by the two blocks 82 and 83 when these latter are relatively withdrawn as in Figures 9 and 10. A spring 87 thrusts the two blocks 82 and 83 into this latter position. Both the blocks 82 and 83 are provided with a central front cavity (88 and 89 respectively) and the block 83 is provided with a rear axial projection 90 insertable into the cavity 88 of the block 82.

With the extractor device 52 there is also associated a feeler 91 formed from a flat lever 92 pivoted at 93 to the slidable carriage 75. To the end of the lever 92, the weight of which tends to urge it into the position of Figure 15, there is fixed a plate 94 arranged to cooperate with a photosensor 95 supported by a support 96 rigid with the carriage 75, in such a manner as to indicate during the extraction of the connecting tape from the cassette if the feeler 91 is in the correct working position as shown in Figures 13 and 14, i.e. with its front feeler prong 97 resting on the connecting tape 7 extracted by the extracting bars 86 (as will be further explained hereinafter).

The method of operation of the machine shown in the drawings for winding magnetic tape onto empty cassettes such as that shown in Figures 2 and 3 is as follows. After the feed device 70 has inserted an empty cassette (with the apertures 8, 9 and 10 facing downwards) into the temporary support seat 50, where it is retained by the L-shaped bracket 61 and the side grips 63, the suction device 51, which is positioned exactly below one of said apertures (Figures 8, 12 and 13) is made by the cylinder 56 to rise towards the cassette to allow the port 73 to suck and extract a small loop of connecting tape 7 from the cassette (Fig. 10). During this stage the extractor device 52 is close to the support seat 50, but with the blocks 82 and 83 in a retracted close position and with the feeler 91 kept in the open position of Figure 9 by a suitable stop (not shown on the drawings) rigid with the support seat 50. The suction device 51 is then made to move downwards again, the result of which is that a larger loop of connecting tape 7 is extracted, into which the extracting bars 86 of the extractor device 52 become inserted (Figures 11 and 12) by the action of the cylinder 80 (the cylinder 80 causes the block 82 and therefore the bars 86 to move forward, while the block 83, because of the weakness of the spring 87, tneds to approach the block 82, thus allowing the extracting bars 86 to emerged). The carriage 75 and hence the extractor device 52 are then moved by the cylinder 58 towards ths position shown in Fig. 14, in which the two extracting bars 86 engage in the extracted loop of connecting tape 7 so that they entrain the tape and cause further extraction (Fig. 13).. While the extractor device 52 moves towards the position of Fig. 14, carrying with it an increasingly greater portion of connecting tape 7, the feeler 91, no longer retained, rests by its feeler prong 97 on the tape 7 (Figs. 13 and 14), so that if the tape has been correctly extracted the feeler 91 is kept in the position which ensures that the plate 94 remains below the photosensor 95 to give the signal for the subsequent operating stages. If however, for example, the tape 7 has left its engagement with the extracting bars 86, the feeler 91 moves into the position of Figure 15 and the photosensor 95 would then cause the extracting cycle to be repeated.

The translatory motion of the extractor device 52 stops when the device is in the position shown in Figure 4, i.e. exactly in front of the transfer device 19 and with the extracted portion of connecting tape 7 in front of the cutting and jointing area of the

facing filling assembly 12. At that moment this latter has its shaped prong 20 raised by the cylinder 28 as in Figures 4 and 17, advanced by the cylinder 31 and angularly positioned by the cylinder 37 as in Figure 14, its pressure means 21 raised, its cutter 24 withdrawn, its jointing device 25 at rest, one half of the groove 23 of its plate 22 occupied by the previously cut end of the magnetic tape 15, and its support seat 18 still occupied by the previous cassette which has been filled and is close to being expelled.

As soon as the cassette still inserted in the seat 18 has been allowed to fall from this latter by withdrawing the plate 42 and the associated spindles 43 and 44, brackets 46 and levers 47 by means of the cylinder 41, the cylinder 65 causes the entire unit comprising the temporary support seat 50 with its relative prepared cassette 1, the suction device 51 and the extractor device 52 with the relative extracted tape 7 to move towards the filling assembly 12 to transfer to it both the cassette and the extracted tape (Fig. 16). The cassette is transferred by causing the cylinders 54 and 64 to further advance the plate 60 and L-shaped bracket 61 and simultaneously rotate the grips 63 into the open position, by which the cassette 1 is released from its engagement with the temporary support seat 50 and instead engaged with the support and filling seat 18, in which the cassette, with the spindles 43 and 44 in the drive socket holes 5 and 6, is retained by the L brackets 46 and levers 47. During this stage, the pillars 66, controlled by the cylinders 69, push against the ends of the spindles 43 and 44 so as to keep them at rest by friction and thus prevent undesirable movement of the spools 3 and 4. Immediately afterwards the pillars 66 and plate 60 again withdraw to leave the cassette free in the seat 18. The transfer of the connecting tape 7 extracted and retained by the bars 86 of the extractor device 52 is carried out by rotating the shaped prong 20 though 180° and then withdrawing the bars 86 by the cylinder 80, so that the connecting tape 7, freed from these bars, is taken into the undercut 39 in the shaped prong 20 (Figure 17). The entire unit consisting of the temporary support seat 50, the suction device 51 and extractor device 52 is then again withdrawn from the filling assembly 12 and returned to the rest position of Figure 8, from which the preparation of a new cassette fed by the feed device 70 immediatley begins.

In the meantime the previously prepared cassette has been transferred to the filling unit 12, in which the tape 7 is supported by the shaped prong 20 in the raised position (relative to the grooved plate 22 and prearranged magnetic tape 15) of Figure 17. At this point the cylinder 28 of the transfer device 19 causes the vertically movable structure 29 and therefore the shaped prong 20 to be lowered relative to the fined structure carrying plate 22, with consequent lowering of the lower portion of the connecting tape 7 onto the magnetic tape 15 and into the groove 23 of the plate 22, while the upper portion of the connecting tape remains raised by its engagement between two bent lugs 98 and 99 disposed in front of the jointing device 25 (Fig. 18). The shaped prong 20 is then again rotated through 180° and withdrawn by the cylinders 37 and 31, so as to free the connecting tape 7, the lower portion of which thus remains superimposed on the magnetic tape 15 in the groove 23 of the plate 22, being retained thereby the pressure means 21, lowered for this purpose.

At this point the final filling operation begins, Thus with the pressure 21 lowered, the cutter 24 moves transversely tm the superimposed portions of the tapes 7 and 15 and cuts the connecting tape 7 simultaneously with the cut end of the magnetic tape 15, the presser 21 is then raised taking with it the left hand portion (relative to Figure 18) of the connecting tape, while the magnetic tape and the other portion of connecting tape remain in an exactly abutting condition in the groove 23 of the plate 22 (the presser 21 and plate 22 are provided with suitable suction means to aid the aforesaid operation). The jointing device 25 then descends and joins the magnetic tape and the right hand portion of the connecting tape, while the left hand portion of this latter remains in the raised position. The hub 44 is then rotated by the motor 45 to wind the right hand portion of connecting tape and the required length of magnetic tape onto the spool 4 of the cassette. The motor 45 is then halted and the presser 21 is lowered to return the cut end of the left hand portion of connecting tape into the groove 23 and thus onto the magnetic tape 15, after which the cutter 24, jointing device 25 and motor 45 are again operated to successively cut the magnetic tape 15 at the cut end of the left hand portion of connecting tape 7, join this latter to the length of magnetic tape already partially wound on the cassette and finally complete the winding of the magnetic tape and remaining portion of connecting tape onto the spool 4 of the cassette.

At this point the preparation assembly 11 has already been returned to the position of Figure 14, and while the filled cassette is expelled from the seat 18 a new cassette already prepared with the connecting tape partially extracted is transferred from the preparation assembly 11 to the filling assembly 12.

WHAT WE CLAIM IS:-

1. A machine for loading magnetic tape into empty cassettes each provided with a connecting tape joined at each end to a respective one of two spools situated within

the cassette, the machine comprising a preparation assembly and a filling assembly, the preparation assembly comprising a first support seat arranged for supporting an empty cassette in a predetermined position relative to the preparation assembly and extractor means operable to extract a portion of the respecitve connecting tape from an empty cassette supported by said first support seat and to extend said extracted portion into a predetermined configuration and tape position relative to said preparation assembly, said filling assembly comprising a second support seat for supporting a cassette in a predetermined position, relative to said filling assembly, during a tape winding operation, supporting means for supporting a reel of magnatic tape and means for winding magnetic tape into a cassette supported by said second support seat from said reel via a predetermined path, and tape cutting and joining means in a cutting and joining area in said path, the preparation assembly being mounted for movement, relative to the filling assembly, between an advanced position and a withdrawn position, the arrangement being such that with the preparation assembly disposed in its withdrawn position, and with an empty cassette supported by said first support seat, a portion of the connecting tape of the latter cassette can be extracted and extended into said predetermined configuration and tape position by said extractor means, the machine including first transfer means, operable, in the advanced position of the preparation assembly to transfer the cassette from said support seat of the preparation assembly to said support seat of the filling assembly and second transfer means operable, in the advanced position of the preparation assembly to simultaneously transfer to said cutting and joining area of the filling assembly the connecting tape, extracted and extended into said predetermined configuration and tape position of the cassette transferred by said first transfer means, said tape cutting and joining means being operable to cut the extracted connecting tape, transferred to the cutting and joining area, of a cassette transferred to said second support seat, so as to provide two connecting tape parts each connected to a respective spool of the cassette, and to join the free ends of said connecting tape parts to respecitve ends of a desired length of magnetic tape drawn from a reel of magnetic tape supported by said supporting means.

2. A machine according to claim 1, wherein the axes of the spools of a cassette when supported in said predetermined position relative to the filling assembly, by said second support seat, are coincident with the axes of the spools of a cassette when supported in said predetermined position, relative to the preparation assembly, by said first support seat, the preparation assembly being arranged to execute pure rectilinear translatory movement, parallel with said axes, in movement between its advanced and withdrawn positions.

3. A machine as claimed in claim 2 wherein said cutting and joining area and said second support seat are spaced apart in a direction substantially perpendicular to the direction of the axes of the spools of a cassette when supported by said second support seat and wherein said extractor means comprises a suction device, and an extractor device, the suction device being so disposed as to face that edge face, of a cassette supported by said first support seat in said predetermined position relative to the preparation assembly, in which are provided the openings via which a tape, extending between the two spools of the cassette, is accessible, and said extractor device being movable, in a direction parallel with that in which the second support seat and said cutting and joining area are spaced aprat, between an initial position, in which the extractor device is substantially interposed between said first support seat and said suction device and a position spaced from said first support seat.

4. A machine as claimed in claim 2, wherein said extractor device comprises a carriage slidable in a direction parallel with that in which said cutting and jointing area and said second support seat are spaced apart, and two extracting bars supported by said carriage and movable transversely to the direction of movement of the carriage between a retracted rest position and a projected position in which, when the carriage is in said initial position of the extractor device, they may be inserted between said temporary support seat and said suction device to engage with a loop of connecting tape previously extracted by the suction device, in order to then move the tape laterally and further extract is in the direction of movement of the carriage.

5. A machine as claimed in claim 4, wherein said carriage has associated with it a feeler provided with a feeler prong which can abut against a portion of connecting tape engaged by said extracting bars to check that said tape has been correctly extracted.

6. A machine as claimed in claim 4, wherein said second transfer means comprise a shaped prong movable in a first direction which is perpendicular to the direction in which extend the axes of the spools of any cassette supported, by said second support seat in the respective position, and which first direction is transverse to said direction in which said cutting and joining area and said second support seat are spaced apart, the prong also being movable in a second direction parallel with the axes of the spools of a cassette supported by said second support

seat in the respective predetermined position and being furthermore pivotable angularly about an axis extending in said second direction between a first position in which the prong presents to the end loop of the extracted connecting tape, extended into said predetermined configuration and tape position from a cassette supported by said first support seat, as the preparation assembly is moved into said advanced position, a bevel to facilitate insertion of the prong into said loop, and a second position in which it presents to said end loop an undercut for holding the connecting tape when released from said extracting bars.

7. A machine as claimed in claim 1, substantially as hereinbefore described with reference to, and as shown in, the accompanying drawings.

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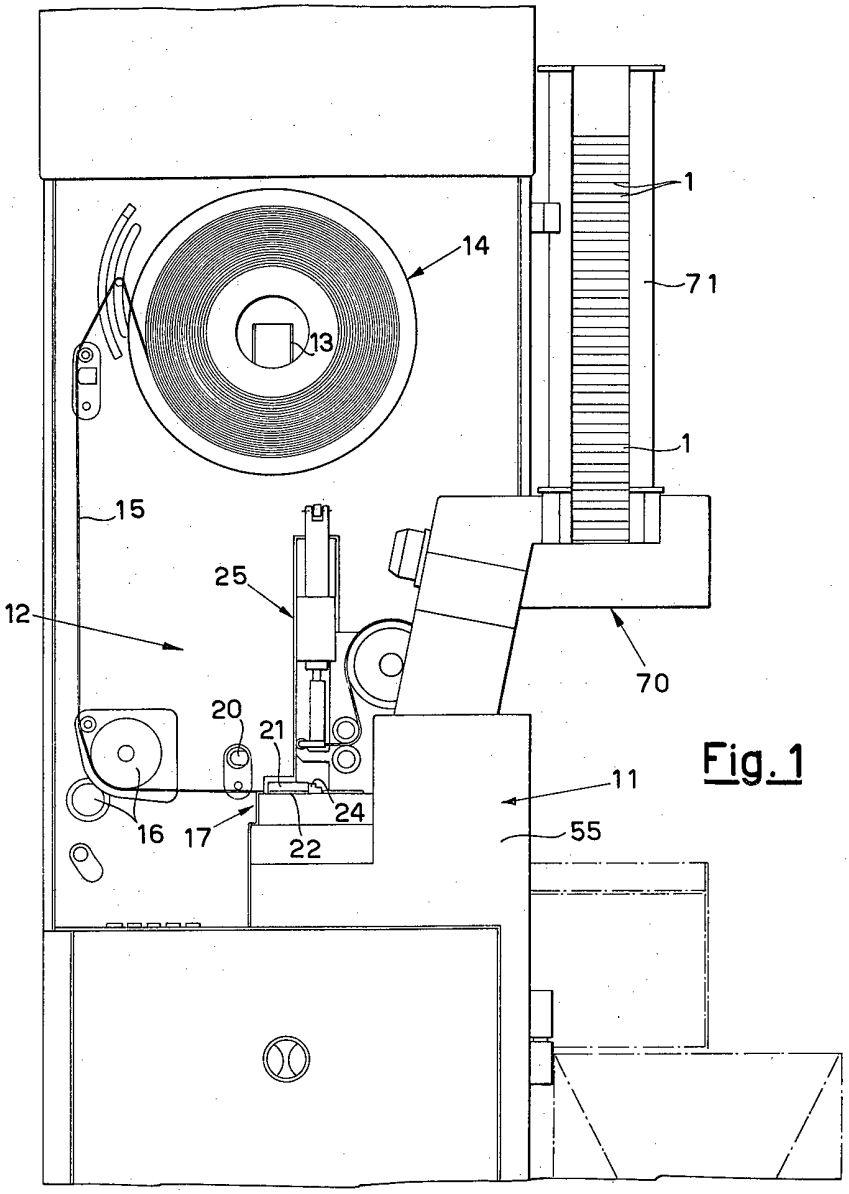

Fig.1

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Fig.3

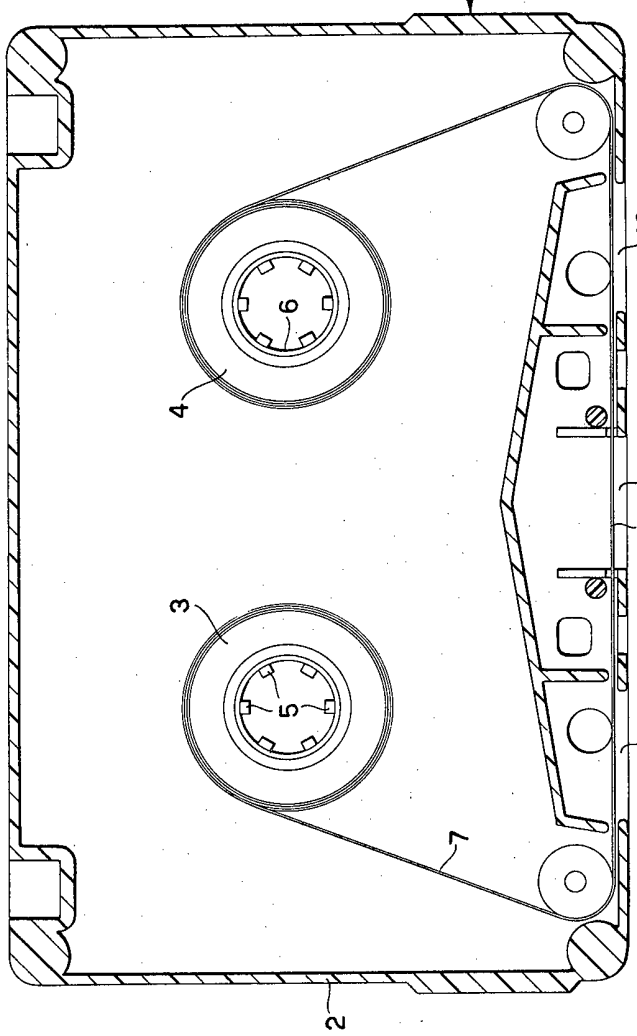

Fig.2

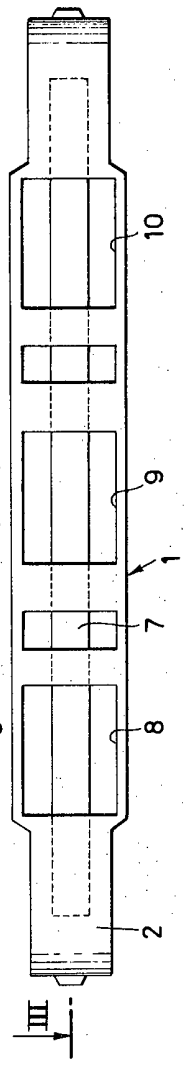

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Fig.4

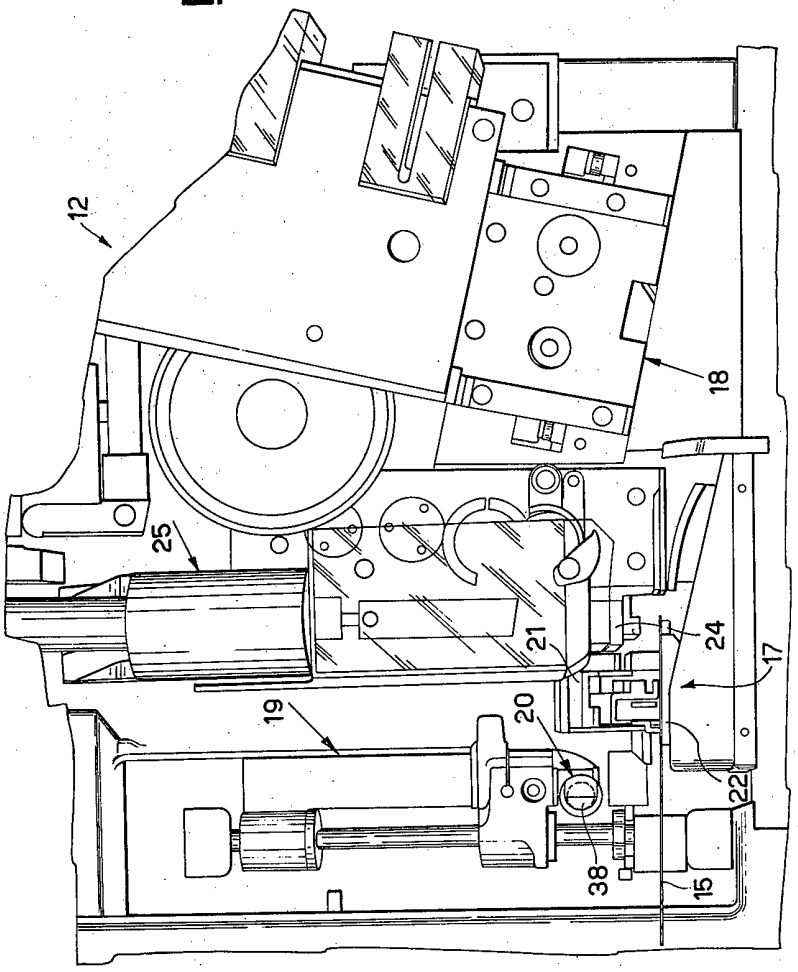
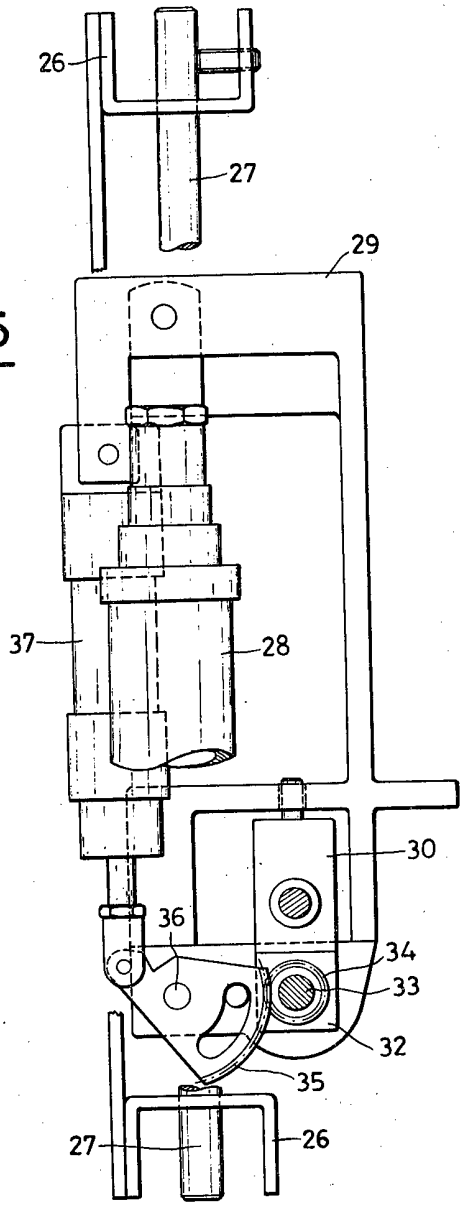


Fig.5



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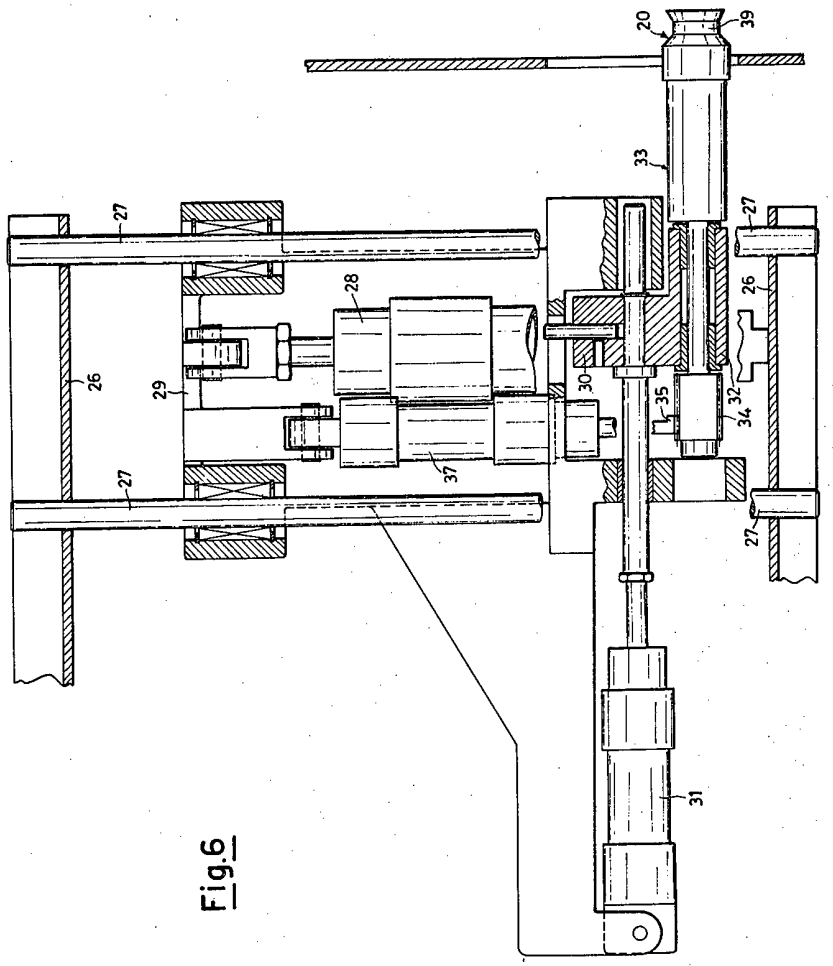

Fig.6

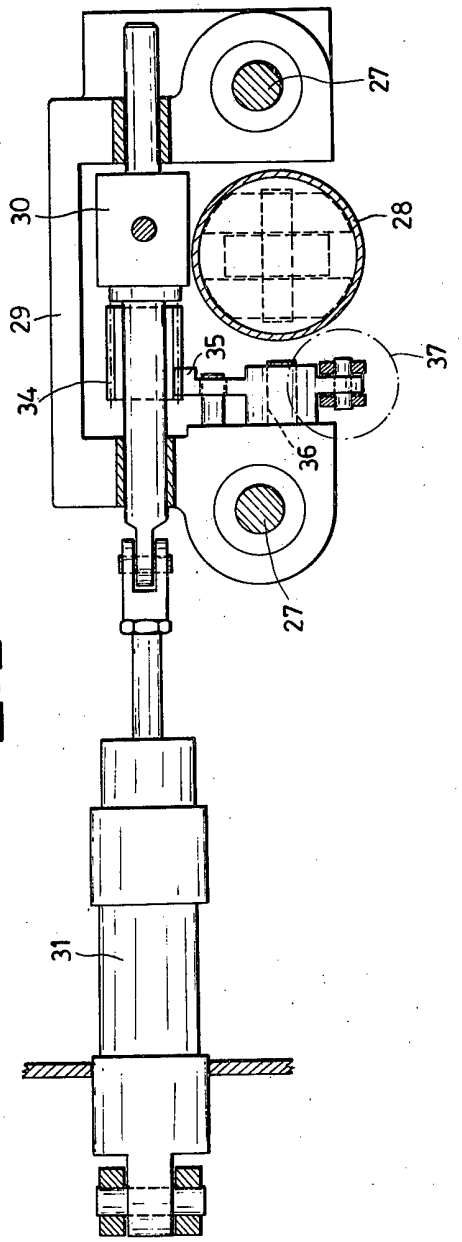

Fig.7

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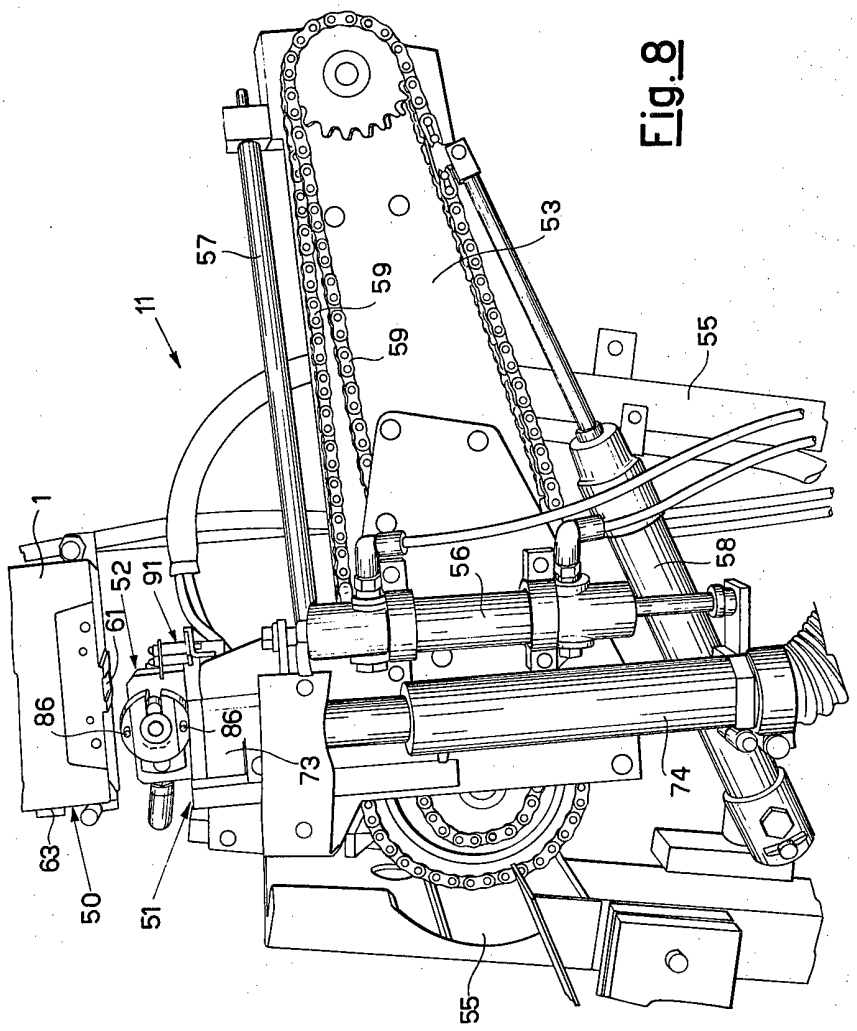

Fig.8

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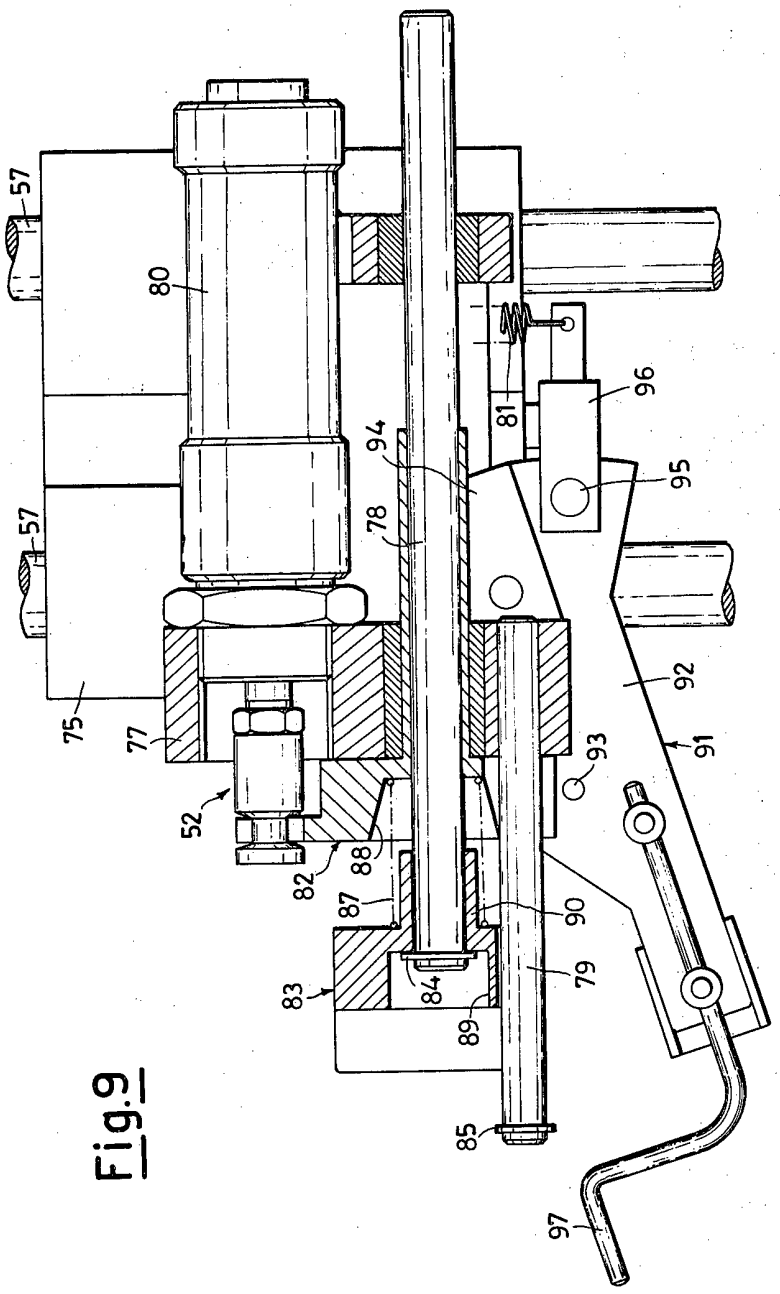

Fig.9

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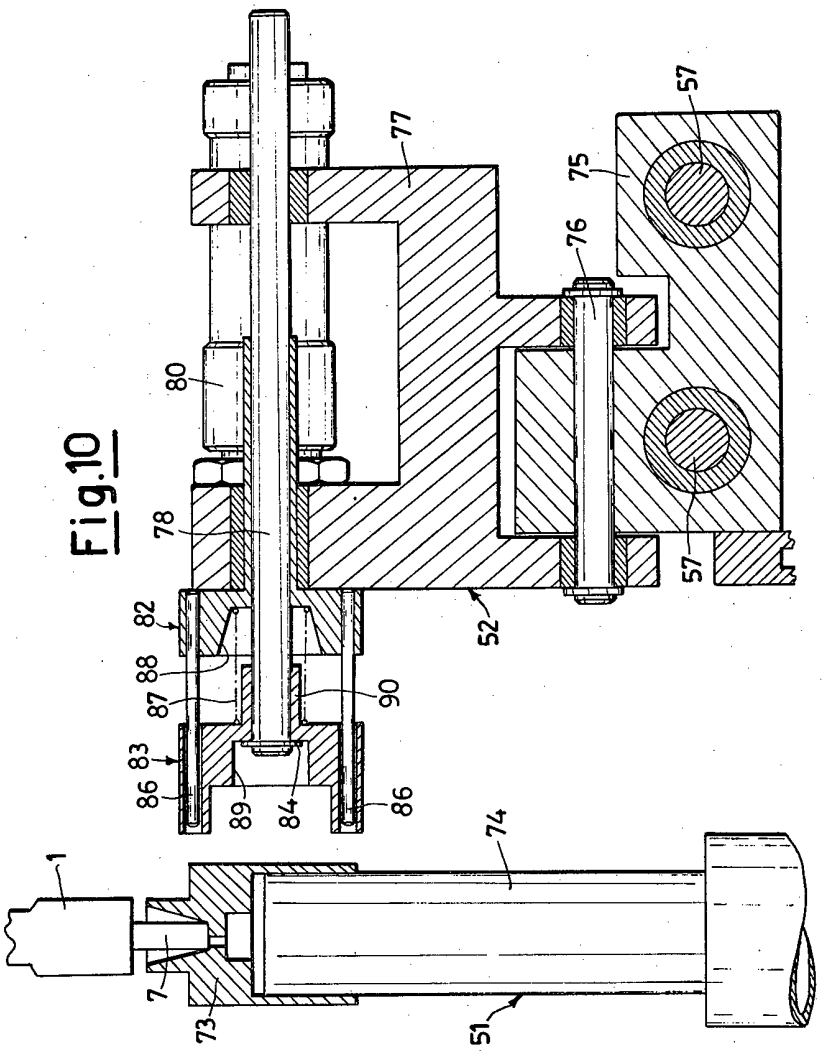
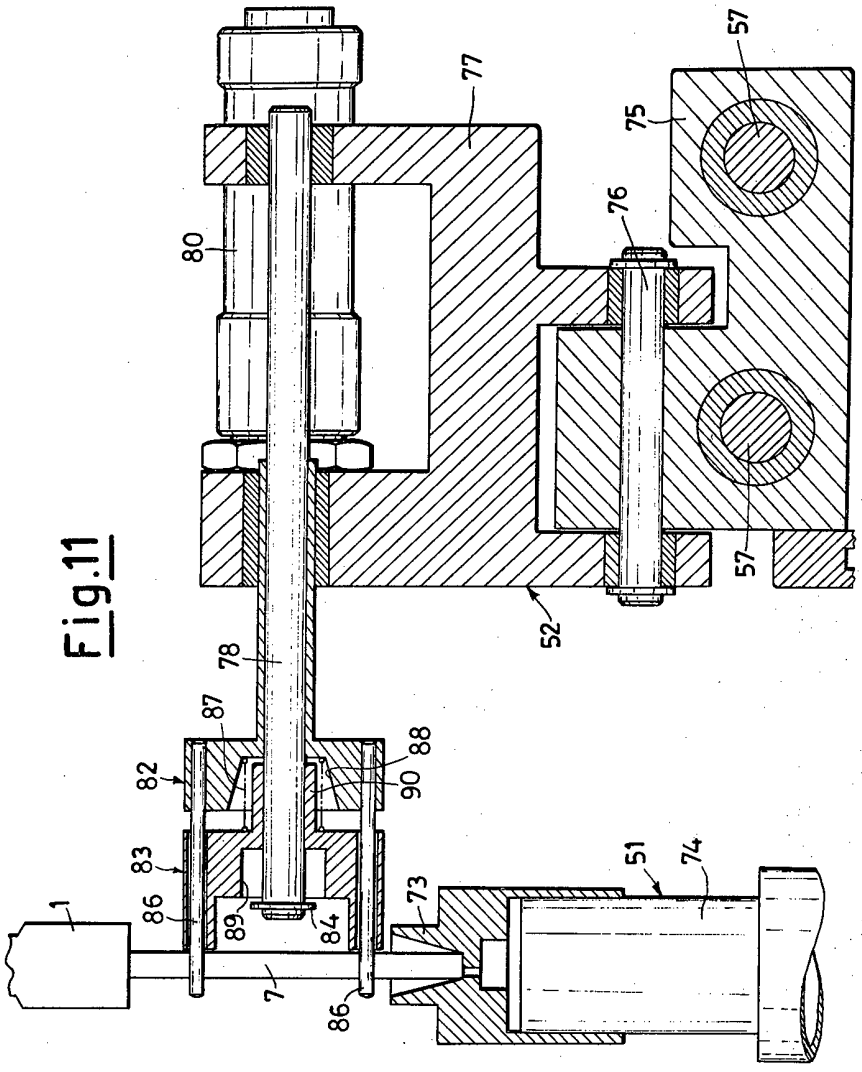
Fig.10



1577037 COMPLETE SPECIFICATION
17 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 10

Fig.11



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Sheet 11

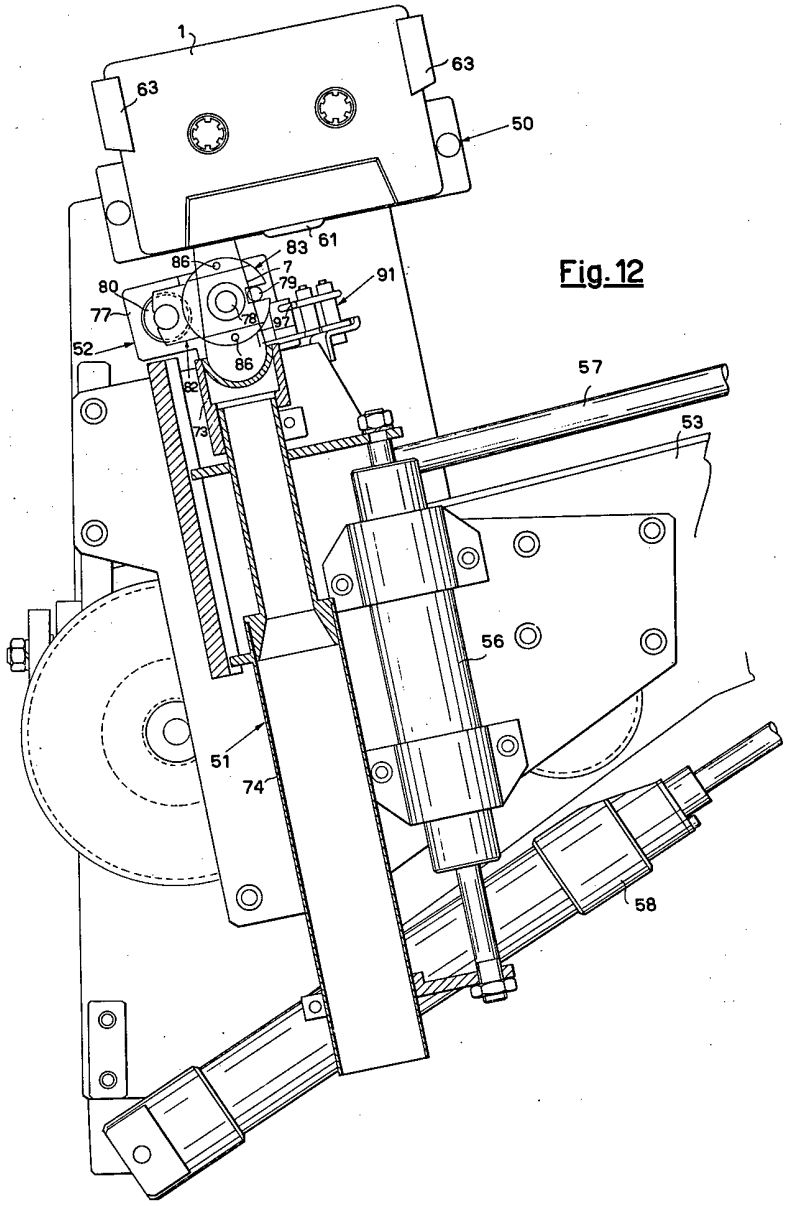
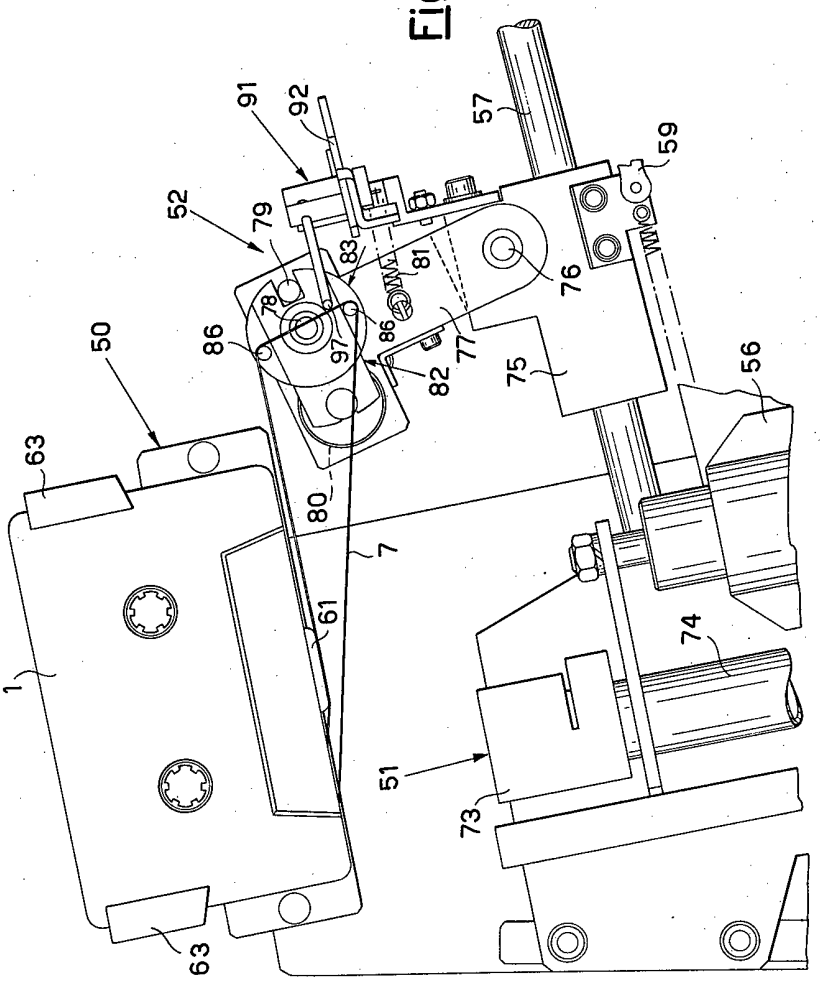


Fig. 12

Fig.13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Sheet 13

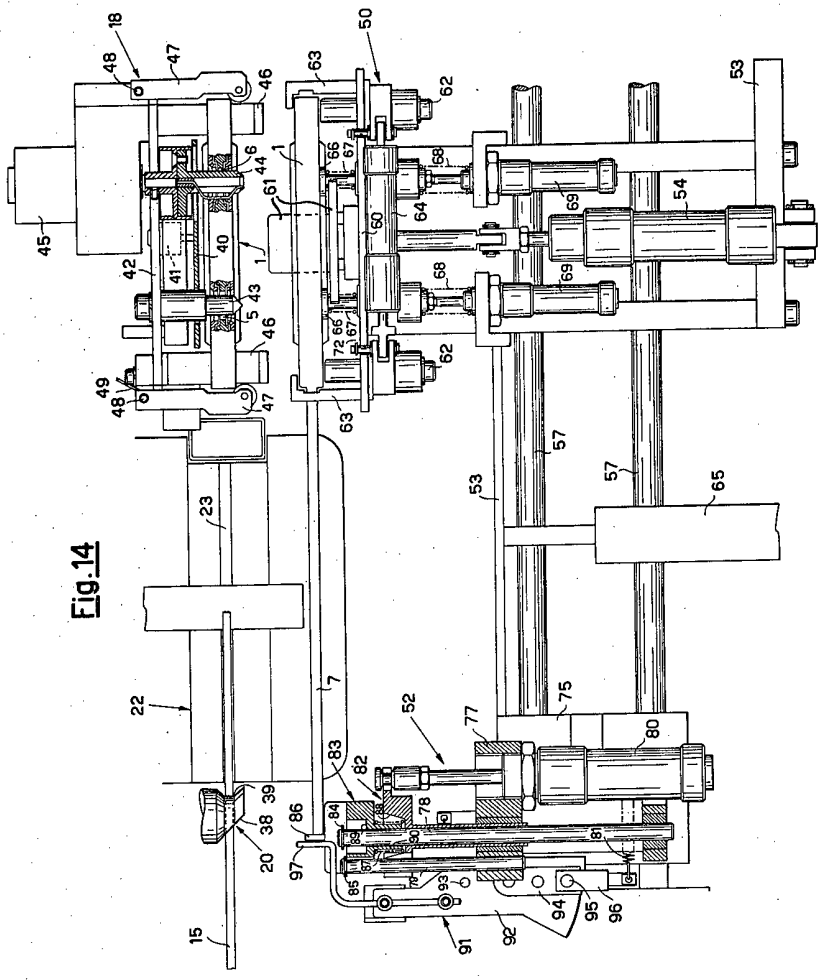

Fig.14

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Sheet 14

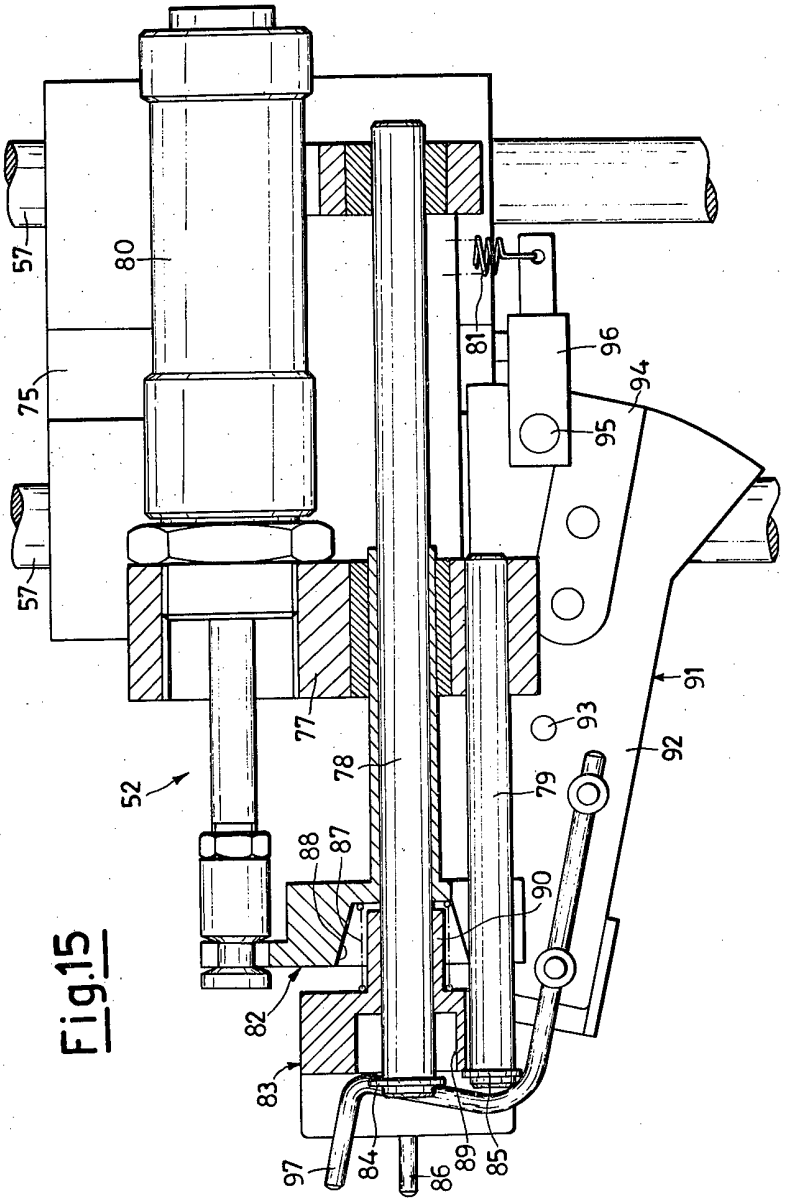

Fig.15

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Sheet 15

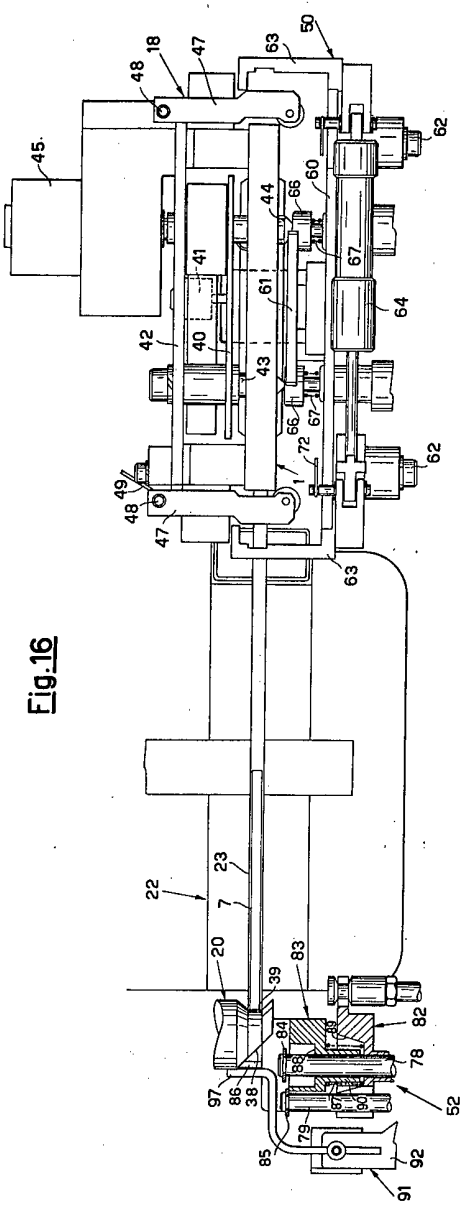

Fig.16

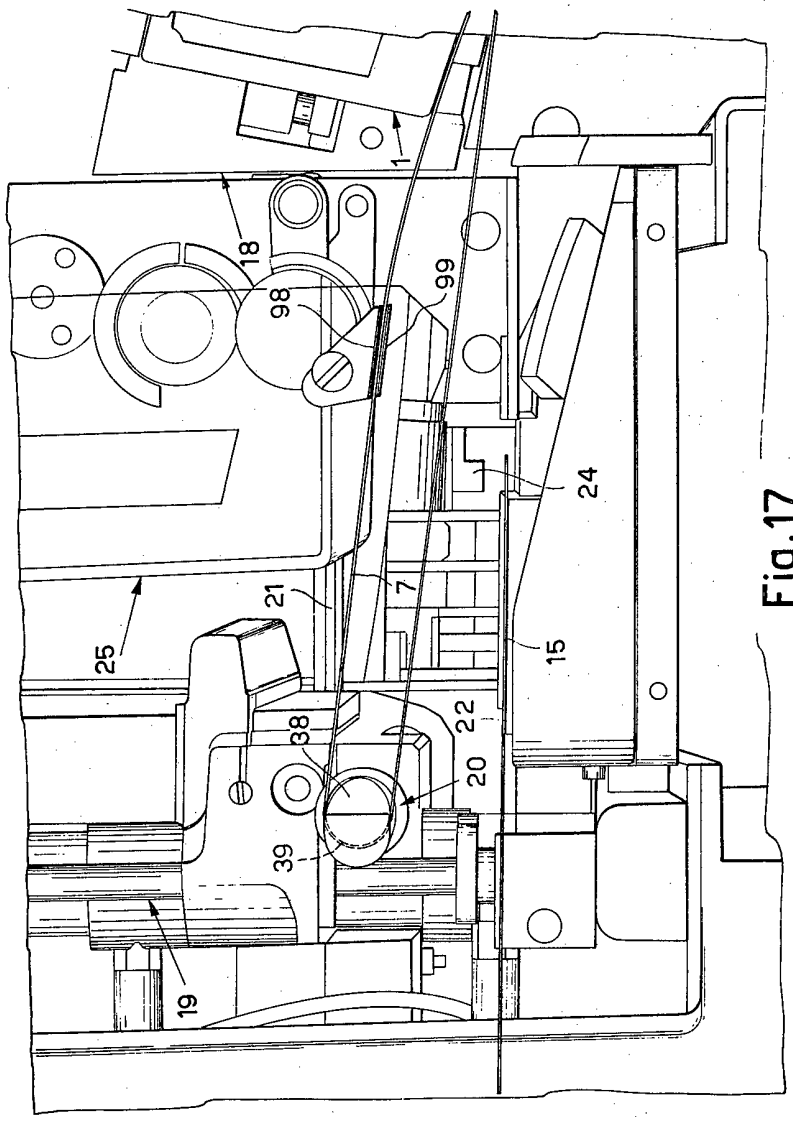

Fig.17

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17 SHEETS This drawing is a reproduction of the Original on a reduced scale
Sheet 17

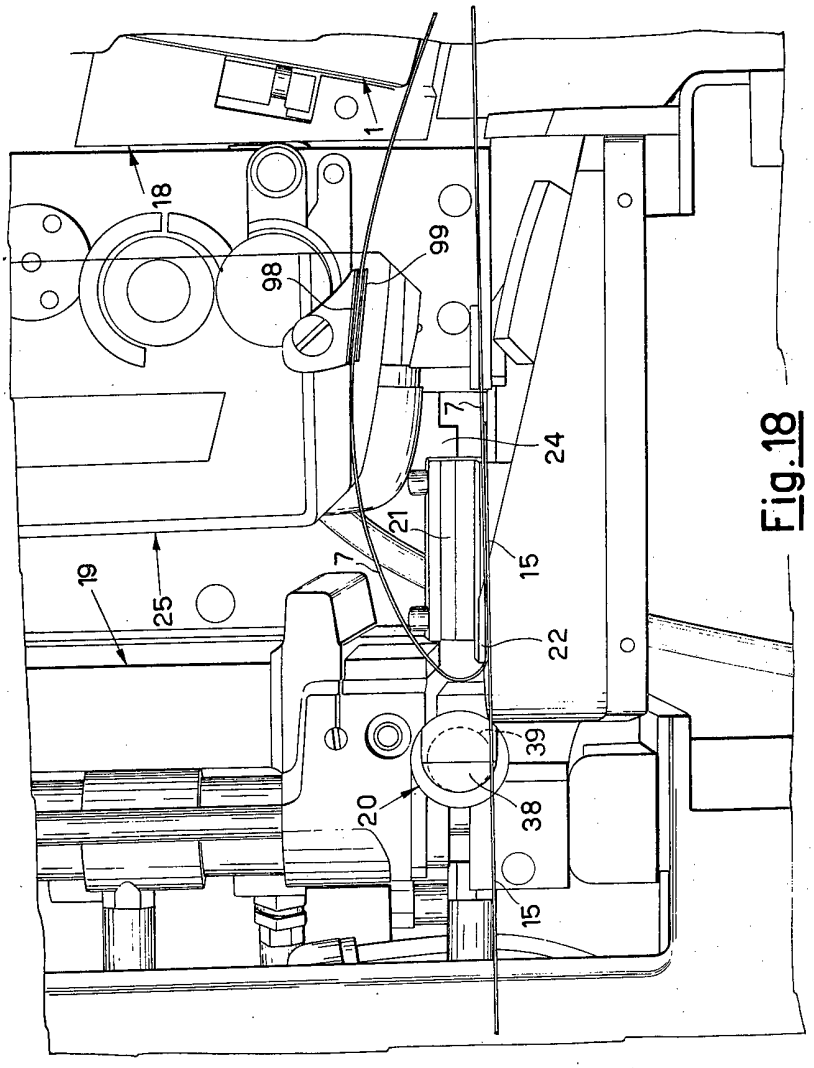

Fig.18