

June 26, 1962

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3,040,876

ASSEMBLING MECHANISM FOR LINECASTING MACHINES

Filed Dec. 28, 1959

3 Sheets-Sheet 1

Fig. 1.

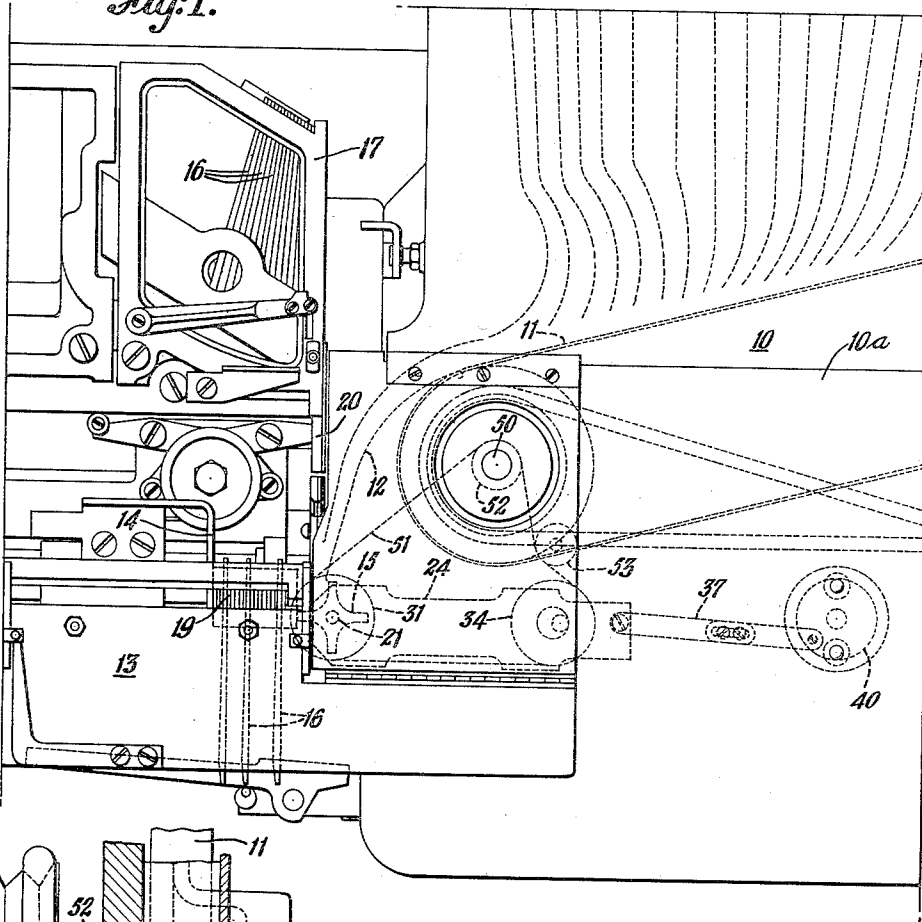


Fig. 4.

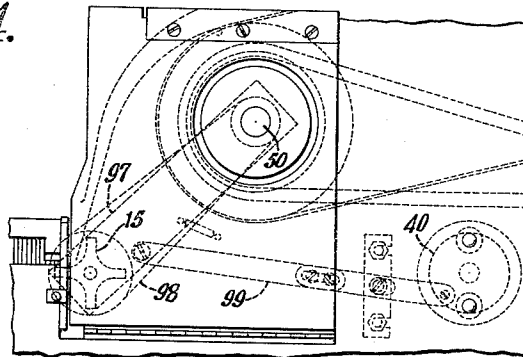
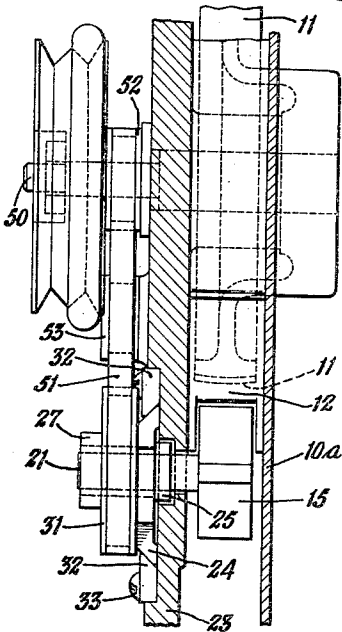


Fig. 6.

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Fig. 2.

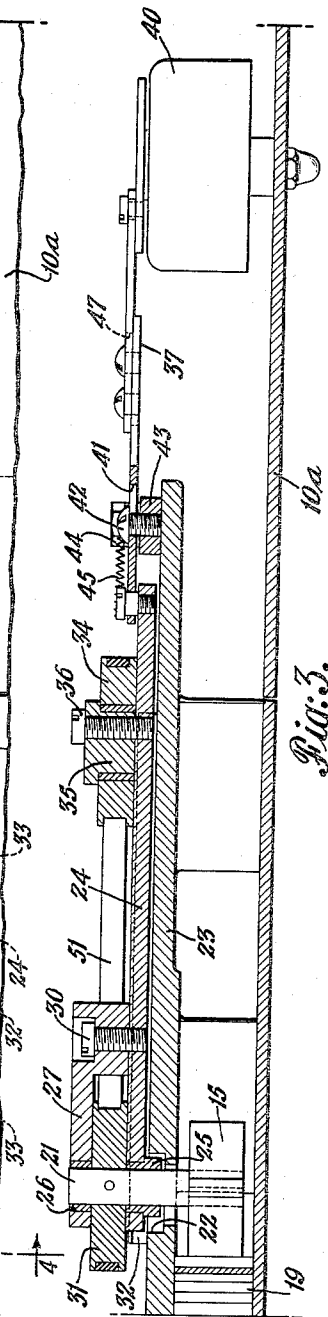
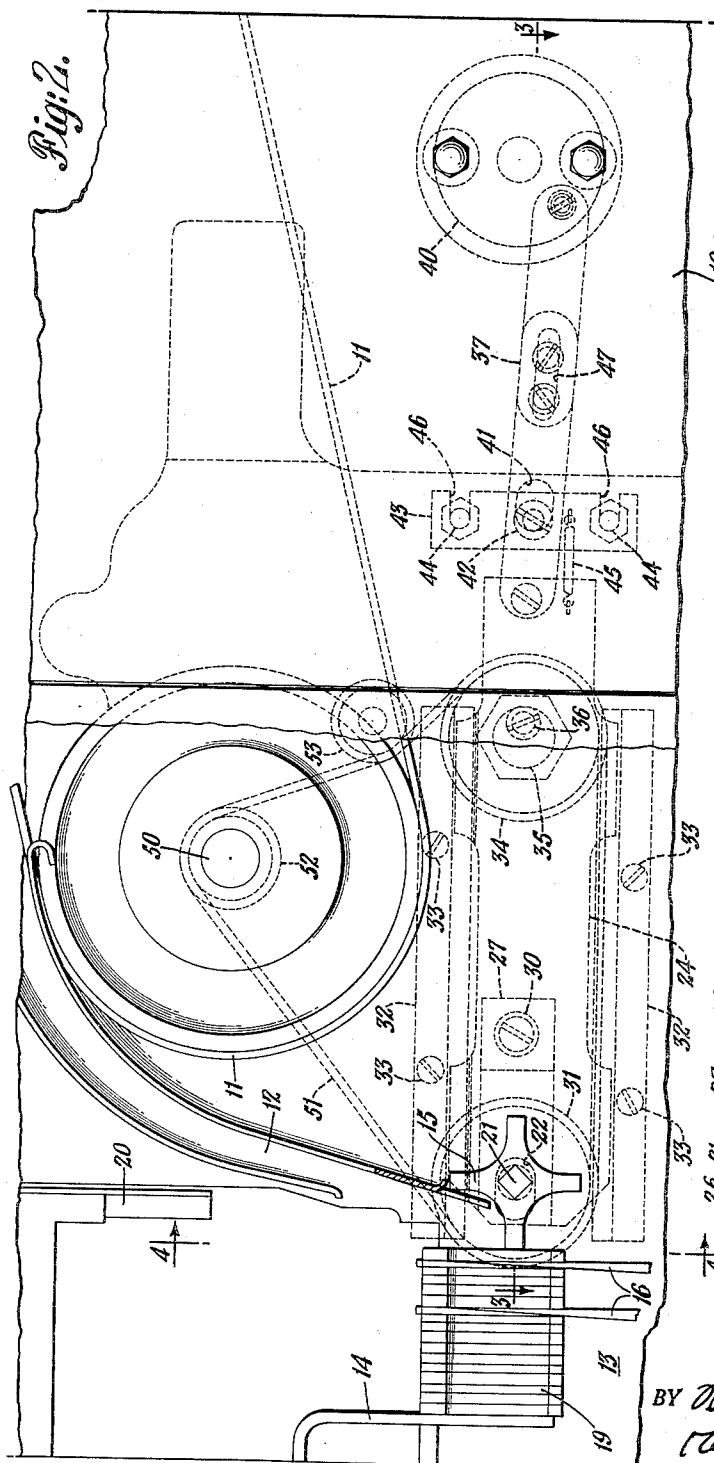


Fig. 3.

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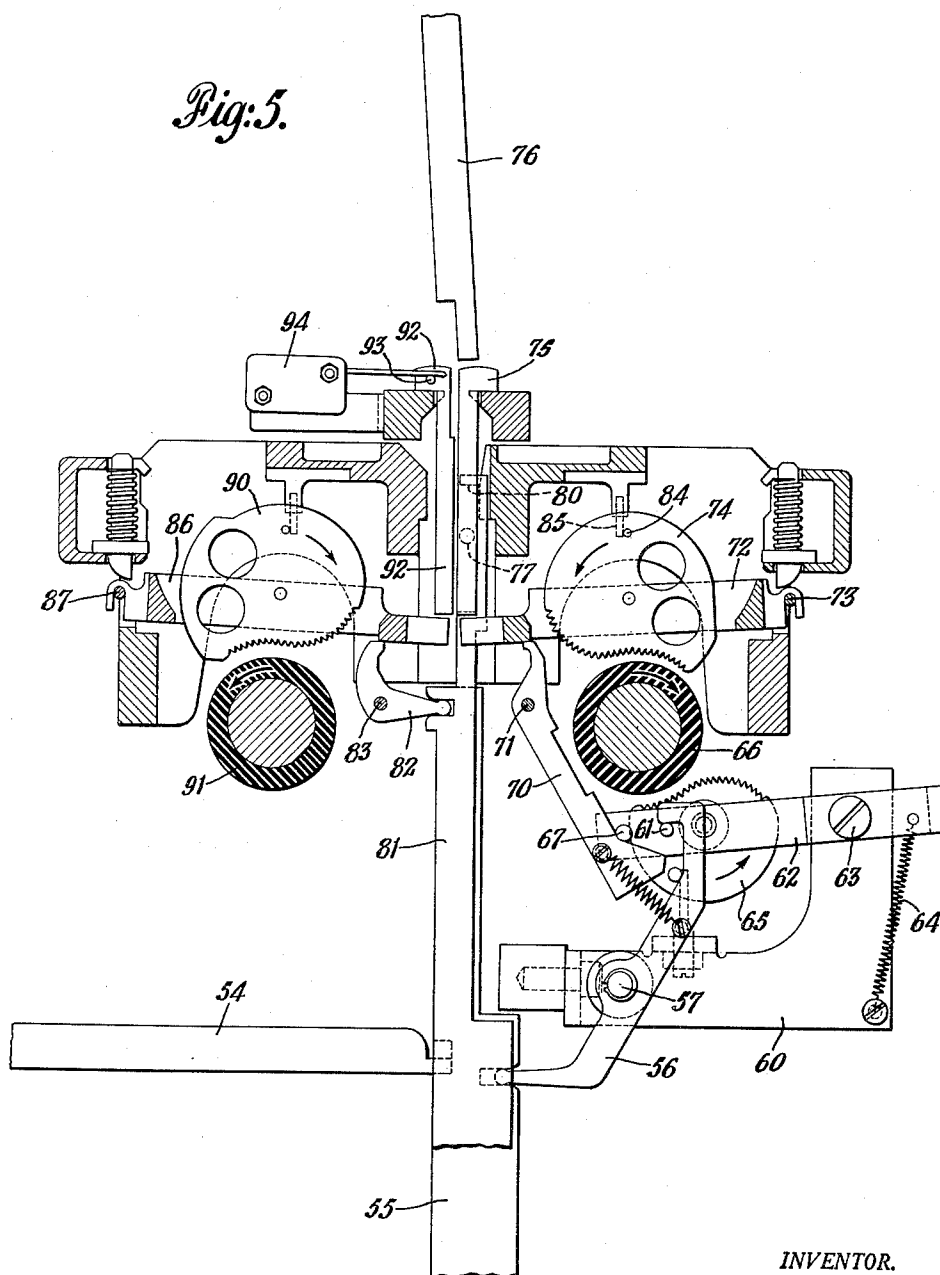
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ASSEMBLING MECHANISM FOR LINECASTING MACHINES

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Fig. 5.



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ASSEMBLING MECHANISM FOR LINECASTING MACHINES

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Filed Dec. 28, 1959, Ser. No. 862,271
14 Claims. (Cl. 199—27)

This invention relates to improvements in the assembling mechanism of typographical composing machines, such as Linotype machines, wherein matrices are released from a magazine and spacebands are released from a storage box in response to the operation of a keyboard, the matrices pass downwardly onto a constantly driven inclined belt which discharges them one after another in the order of their release into an assembler and the spacebands fall by gravity into the assembler from the storage box located directly thereabove, and the matrices and spacebands are composed in line in the assembler under the influence of a constantly rotating starwheel. After the line is completely composed, it is delivered to a casting mechanism, wherein a typographical slug is cast, and thereafter the matrices and spacebands are returned to their respective places of storage.

While the above arrangement has served its purpose for many years, it nevertheless frequently happens, especially during rapid composition in modern high speed machines (which are operated automatically by tape controlled mechanism) that the spacebands upon delivery to the assembler fail to be seated properly therein. The reason for this is that the spacebands of the usual opposed wedge construction are stacked facewise in the assembler by the starwheel against the previously composed matrix, whereby the line in the assembler is advanced against the retarding force of the usual line resistant, and immediately thereafter a subsequent matrix is stacked against the composed spaceband, thus tightly sandwiching the spaceband between the two matrices. As a result, if the projecting ears of the upper wedge section of the spaceband do not seat on the supporting rails of the assembler before the subsequent matrix is composed, the latter may, since it is pressed against the spaceband, prevent the upper wedge section from dropping to its proper position, whereupon the upper wedge section will project above the composed line. Furthermore, if when the spaceband falls from the storage box to the assembler, its lower and longer wedge section strikes the starwheel at an inappropriate moment, it will be abruptly arrested while the upper wedge section of the spaceband will continue its travel in a downward direction. Therefore, the relative positioning of the two wedge sections as the spaceband is stacked in the assembler is such that the lower section projects above the upper section, and hence even if the ears of the upper section seat properly, the lower section will project above the line being composed in the assembler. Since the matrices which sandwich the spaceband in the assembler press the wedge sections against one another, a friction force is produced on the opposed wedge faces and prevents the lower section from dropping to its lowermost position. Consequently, whether it be the upper or the lower section of the improperly seated spaceband which projects above the line, the spaceband will probably be damaged as the composed line is moved through the machine and even of more importance, damage to the machine itself may result.

It is the object of the present invention to obviate the above and other difficulties and toward that end the usual constantly rotating starwheel is made reciprocable along the line of travel of the matrices and spacebands in the assembler. In addition, means are provided for effecting such reciprocation of the starwheel immediately prior to the delivery of a spaceband to the assembler in order to

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advance the line and line resistant and thereby provide a gap at the receiving end of the assembler into which the spaceband is fed by the starwheel. Since the spaceband, as it enters the assembler, does not contact the previously composed matrix, there is no facewise force on the spaceband, and therefore the lower wedge section is free to fall to its lowermost position. Moreover, since the starwheel serves to jog the line each time that it reciprocates, the already assembled spacebands are shaken up and any spaceband which is not properly seated in the assembler will tend to correct itself.

When the composing machine is being operated automatically from tape, the means for reciprocating the starwheel are also activated at the completion of composition of each line, whereby the starwheel serves to push the last composed matrix inside the retaining pawls of the assembler. In addition, when the present invention is utilized in connection with the straight line delivery mechanism disclosed in copending U.S. application Serial No. 830,923, filed July 31, 1959, the end-of-line reciprocation of the starwheel also insures that the entire line is located in front of the position in which the line transfer finger and auxiliary line resistant, of said delivery mechanism, enter the assembler.

The invention will now be more fully described with reference to the accompanying drawings.

In the drawings:

FIG. 1 is a front elevational view of the assembling portion of a typographical composing machine equipped with the present invention;

FIG. 2 is an enlarged view of a portion of FIG. 1;

FIG. 3 is a horizontal cross-sectional view taken on line 3—3 of FIG. 2;

FIG. 4 is a vertical cross-sectional view taken on line 4—4 of FIG. 2;

FIG. 5 is a side elevational view of a keyboard mechanism of a typographical composing machine altered in accordance with the present invention; and

FIG. 6 is an alternative embodiment of the present invention.

Referring now to the drawings and particularly to FIGS. 1 and 2, matrices 19, as they are released from a storage magazine by the operation of a keyboard (magazine and keyboard not shown), pass downwardly through a partitioned assembler front 10 onto a continuously moving inclined conveyor belt 11 which delivers them to a chute 12 leading to the receiving end of an assembler 13. The matrices are stacked in the assembler, against a line resistant 14, by a constantly rotating starwheel 15. Spacebands 16 are released from a storage box 17, in response to the actuation of a special spaceband key lever on the keyboard, and fall by gravity through a chute 20 into the path of the rotating starwheel 15 which stacks them in the assembler along with the matrices.

According to the present invention, the starwheel 15 is adapted to be reciprocated along a horizontal line coaxial with the line of travel of the matrices and spacebands into and through the assembler. In its reciprocation, the starwheel moves from a normal stacking position, shown in FIGS. 1 and 2, to a forward line advancing position closer to the assembler, and then returns to its normal position. It is apparent that the line composed in the assembler is advanced a distance equal to the length of the reciprocating stroke of the starwheel, which distance is preferably made slightly greater than the thickness of the thickest portion of a spaceband. A gap, therefore, is produced between the last composed matrix and the starwheel and as a result the spaceband encounters no resistance to its entry into the assembler 13.

As may be seen in FIGS. 1 to 4, the starwheel 15 is fastened to one end of a rotary stub shaft 21 which passes through an enlarged opening 22 in a bracket 23 fixed in

parallel spaced relation to the assembler front plate 10a. Intermediate its ends, the stub shaft 21 is journaled in a slide member 24, near the forward end of the latter, by means of a bearing 25, and at its other end of the stub shaft 21 is journaled, by means of another bearing 26, in an outrigger 27 fixed to the slide member 24 by a screw 30. Between the bearings 25 and 26, a pulley 31 is keyed to the stub shaft 21.

The slide member 24 is supported between a pair of horizontal gibs 32 which are fastened to the bracket 23 by screws 33. A second pulley 34 is rotatably mounted on a stud 35 which is itself fastened to the slide 24 by an eccentric screw 36. A variable length or slip link 37 pivotally connects the rearward end of the slide 24 to a solenoid 40 mounted on the assembler front plate 10a. The solenoid 40, when energized, pivots in a clockwise direction in FIG. 2 and translates the slide 24 and hence the starwheel 15 forwardly; when deenergized, the solenoid returns to the position shown in the drawings and translates the slide 24 and starwheel 15 rearwardly and thus completes one full reciprocation of the starwheel. An elongated slot 41 in the slip link 37 accommodates a screw 42 projecting from a plate 43 fastened to the bracket 23 by screws 44. When the solenoid 40 is in deenergized condition, the forward edge of the slot 41 in the link 37 bears against the screw 42 under the influence of a tension spring 45 fastened between the slide 24 and the plate 10a. This engagement between the screw 42 and the link 37, therefore, determines the normal stacking position of the starwheel 15, and since the plate 43 (from which the screw 42 projects) is adjustable toward and away from the assembler due to horizontal slots 46 in the plate, the normal position of the starwheel may be adjusted. In addition, the length of the reciprocatory stroke of the slide 24 and hence of the starwheel 15 may be adjusted by varying the length of the slip link 37 by means of its slip connection 47.

The power for rotating the starwheel is transmitted from shaft 50 (which drives the conveyor belt 11) by a continuous belt 51, the latter being trained about the pulley 31 on the stub shaft 21, the pulley 34, and a pulley 52 fastened to the shaft 50. As was mentioned before, the stud 35 upon which the pulley 34 is mounted is itself eccentrically mounted. Therefore, by loosening the screw 36 and rotating the stud 35, the tension in the belt 51 may be adjusted to any desired degree. In addition, an idler roller 53 is so positioned between the pulley 34 and the pulley 52 as to deflect the belt 51 as it travels between those two pulleys, when the starwheel is in its normal position. When the solenoid 40 is energized and the slide 24 moves forwardly, the deflection in the belt 51 caused by the roller 53 tends to straighten out. In this way, once the tension in the belt 51 is determined by means of the stud 35, that tension remains constant throughout the reciprocatory movement of the starwheel 15.

The mechanism for energizing the solenoid 40, as well as for causing the release of a spaceband 16 from the spaceband storage box 17, is shown in FIG. 5. When the spaceband key button on the keyboard is depressed, either manually or by tape controlled means, the portion of the key lever 54 shown in the drawing rises and lifts the rear keyboard bar 55, whereupon the lever 56 (pivoted at 57 on bracket 60) is rotated in a clockwise direction and releases pin 61 projecting from yoke 62 pivotally mounted at 63 on the bracket 60. A tension spring 64 is then free to rotate the yoke 62 clockwise. As a result, the toothed cam 65, rotatably mounted between the tines of the yoke 62, contacts a constantly rotating rubber roller 66 and causes the yoke 62 to be pivoted in a counterclockwise direction against the force of the spring 64. As the left end of the yoke 62 moves downwardly, a pin 67 projecting therefrom engages a trigger lever 70, mounted at 71, and pivots the latter in a clockwise direction. The upper end of the lever 70 then ceases to support yoke 72 and the latter pivots downwardly about rod 73, permitting cam

74 (rotatably mounted between the tines of the yoke 72) to contact the roller 66. The yoke 72 is thereupon pivoted upwardly and its leftward end lifts key reed 75, which in turn lifts a long key rod 76 that conditions means within the spaceband storage box to release a spaceband. The mechanism just described is designed to effect a time delay between the actuation of the spaceband key lever 54 and the release of a spaceband from the storage box, in order to permit the matrix released immediately prior to the release of the spaceband to reach the assembler before the spaceband.

When the key reed 75 rises, a pin 77 projecting therefrom engages a finger 80 disposed at the top of a front keyboard bar 81 and thereby lifts the bar 81 in order to pivot trigger 82 about its pivotal mounting 83. As the cam 74 continues to rotate back to its initial position (wherein it is halted by the engagement of its stop pin 84 with a cam stop 85), the key reed 75 and long key rod 76 fall and a spaceband is released. At about the same time, a third yoke 86 pivots downwardly about rod 87 (since it is no longer supported by the trigger 82) and cam 90 contacts a constantly rotating rubber roller 91. The yoke 86 is thereby pivoted upwardly and its rightward end lifts a key reed 92 carrying a pin 93 which closes the contact of an activating switch 94 for the solenoid 40. The timing is such that the solenoid 40 is energized for an instant and the starwheel 15 caused to be reciprocated before the released spaceband reaches the assembler. Immediately thereafter, the spaceband strikes the starwheel and is stacked in the assembler in the space provided by the reciprocation of the starwheel.

Referring now to FIG. 6, an alternative embodiment of the present invention is shown wherein the starwheel 15, instead of being mounted on the slide 24, is rotatably mounted on a link 97 which is pivotally suspended from the shaft 50. A belt 98 transmits power from the shaft 50 to the starwheel 15. The link 97 is pivotally connected to the solenoid 40 by a variable length link 99 similar to the link 37 of FIGS. 1 to 3. In operation, the solenoid 40 is activated exactly as described above and serves to swing the link 97 about the shaft 50 for one complete reciprocation of the starwheel. As this is done, the starwheel moves forwardly and upwardly in order to advance to line in the assembler and then returns to its normal stacking position. One advantage of this embodiment is that the tension in the belt 98 remains constant throughout the reciprocatory movement of the starwheel without the employment of external tensioning means, such as the roller 53.

According to the present invention, therefore, instead of the line in the assembler being advanced by each matrix and spaceband as it is stacked therein by the starwheel (as is usually the case), the line is advanced by the composition of each matrix and prior to the composition of each spaceband. As a result, the spacebands will not immediately be sandwiched between the prior and subsequently composed matrices, but will have an opportunity (because of the space afforded by the reciprocation of the starwheel) to become properly seated in the assembler. In addition, and as mentioned before, when the machine is being operated by a tape controlled unit, the solenoid 40 is energized each time that composition of a line in the assembler is completed, thus assuring that the last matrix in the line is introduced into the assembler past the retaining pawls thereof. This end-of-line reciprocation of the starwheel also serves, when the present invention is utilized in conjunction with the straight line delivery mechanism of compending application Serial No. 830,923, to provide room for the insertion into the assembler of the line delivery finger and the auxiliary line resistant of that application.

In its broader aspects, the invention does not require that the rotating starwheel or other stacking device be used in effecting the advance of the composed line in the assembler prior to the delivery of each spaceband thereto.

For instance, a special pusher element for the same purpose could be mounted on the reciprocatory slide 24 and the starwheel allowed to remain in its normal position of rest.

The invention has been shown and described in preferred form only and by way of example, but many variations and modifications may be made therein and in its mode of application which will still be comprised within its spirit. It is understood, therefore, that the invention is not limited to any specific form or embodiment, except insofar as such limitations are specified in the appended claims.

What is claimed is:

1. Assembling mechanism for typographical composing machines including an assembler wherein matrices and spacebands are composed in line, a continuously rotating starwheel disposed at the receiving end of said assembler and operative to stack the matrices and spacebands facewise in the assembler, and automatically actuated means for reciprocating the starwheel bodily between its normal stacking position and a supplemental stacking position closer to the assembler immediately prior to delivery of a spaceband to the assembler, whereby the line in the assembler is advanced a corresponding distance to create a space behind the last composed matrix for the stacking of the spaceband when delivered to the assembler.

2. Assembling mechanism according to claim 1, including means for rotating said starwheel continuously throughout its reciprocatory movement.

3. Assembling mechanism according to claim 2, including means for causing said automatically actuated means also to reciprocate said starwheel after the last matrix of the composed line has been delivered to the assembler.

4. Assembling mechanism according to claim 1, including a spaceband storage box disposed above said assembler and means controlled by the release of a spaceband from said storage box for controlling the operation of said automatically actuated means.

5. Assembling mechanism for typographical composing machines including an assembler wherein matrices and spacebands are composed in line, mechanism for releasing spacebands from their places of storage preparatory to their delivery to said assembler, a continuously rotating starwheel disposed at the receiving end of said assembler and operative to stack the matrices and spacebands facewise in the assembler, and automatically actuated means controlled by said spaceband releasing mechanism for reciprocating said starwheel between its normal position of rest and a supplemental stacking position closer to the assembler in order to advance the line in said assembler a corresponding distance prior to the delivery of a spaceband thereto.

6. Assembling mechanism according to claim 5 including a keyboard for controlling the operation of said spaceband releasing mechanism and wherein said mechanism includes means for effecting a time delay between the operation of the keyboard and the reciprocation of said starwheel.

7. Assembling mechanism according to claim 5, wherein said automatically actuated means includes a solenoid adapted to be momentarily energized by said spaceband releasing mechanism.

8. Assembling mechanism according to claim 7 wherein said spaceband releasing mechanism includes a spaceband control portion and a solenoid control portion, and wherein said former portion operates said latter portion.

9. Assembling mechanism according to claim 8, includ-

ing an electrical circuit for energizing said solenoid and wherein said solenoid control portion when operated serves to complete the electrical circuit.

10. Assembling mechanism for typographical composing machines including an assembler wherein matrices and spacebands are composed in line, a slide movable horizontally in the direction of line composition from a normal position of rest to a secondary position nearer the assembler and return, a constantly rotating starwheel mounted on said slide and operative to stack matrices and spacebands facewise in the assembler when said slide is in its normal position of rest, means for adjusting said normal position of the slide, and automatically actuated means for reciprocating said slide between its normal and actuated positions immediately prior to the delivery of a spaceband to said assembler.

11. Assembling mechanism according to claim 10 including means for adjusting the stroke of said slide between its normal and secondary positions.

12. Assembling mechanism for typographical composing machines including an assembler wherein matrices and spacebands are composed in line, means for conveying matrices to said assembler, a horizontally movable slide arranged for reciprocation in the direction of line composition from a normal position of rest to a secondary position nearer the assembler and return, a continuously rotating starwheel mounted on said slide and operative to stack matrices and spacebands facewise in the assembler, a belt for transmitting rotary motion from said matrix delivery means to said starwheel, means for adjusting the tension in said belt, automatically actuated means for reciprocating said slide immediately prior to the delivery of a spaceband to said assembler, and means for maintaining the tension in said belt constant throughout the reciprocation of said slide.

13. Assembling mechanism for typographical composing machines including an assembler wherein matrices and spacebands are composed, a device for stacking the matrices and spacebands in the assembler one by one as they are delivered thereto, and automatic means for advancing the composed line in the assembler a predetermined distance prior to the delivery thereto of a spaceband, said line advancing movement being distinct from and in addition to that which takes place by the stacking of the matrices and spacebands in the assembler, said automatic means being normally inactive and set into operation by said spaceband.

14. Assembling mechanism for typographical composing machines including an assembler wherein matrices and spacebands are composed, a device for stacking the matrices and spacebands in the assembler one by one as they are delivered thereto, means for releasing the spacebands from their storage magazine, and automatic means normally inactive but set into operation by the release of a spaceband from its storage magazine for advancing the composed line in the assembler a predetermined distance prior to the delivery thereto of the released spaceband.

References Cited in the file of this patent

UNITED STATES PATENTS

800,971	Bellows	Oct. 3, 1905
2,693,270	Rossetto	Nov. 2, 1954
2,716,553	Wickbough	Aug. 30, 1955
2,806,584	Rossetto	Sept. 17, 1957
2,845,170	Hilpman	July 29, 1958