Nov. 17, 1953

P. HILPMAN

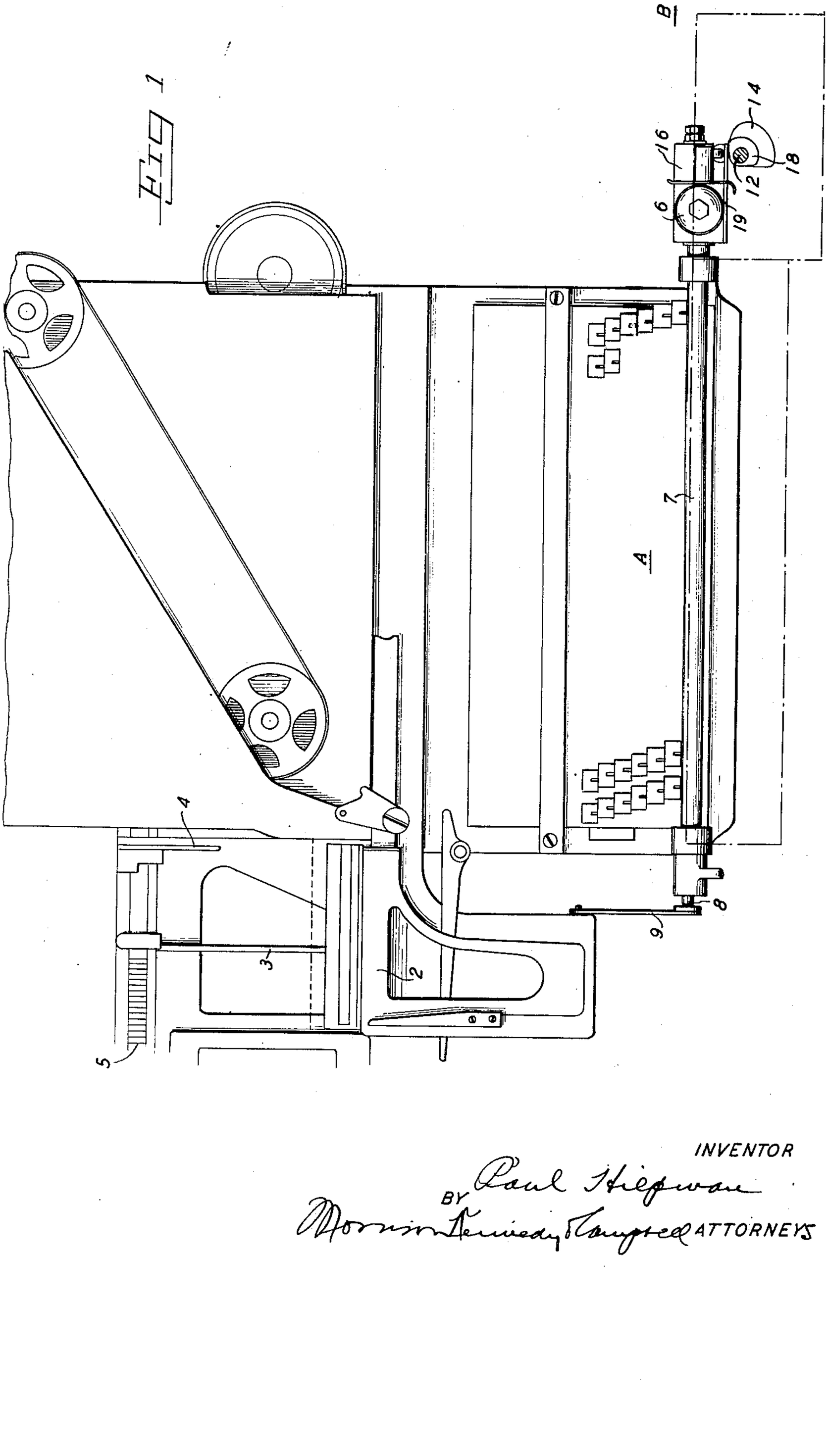
2,659,478

TYPOGRAPHICAL COMPOSING MACHINE

Filed Dec. 21, 1950

2 Sheets-Sheet 1

Fig 1



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2 Sheets-Sheet 2

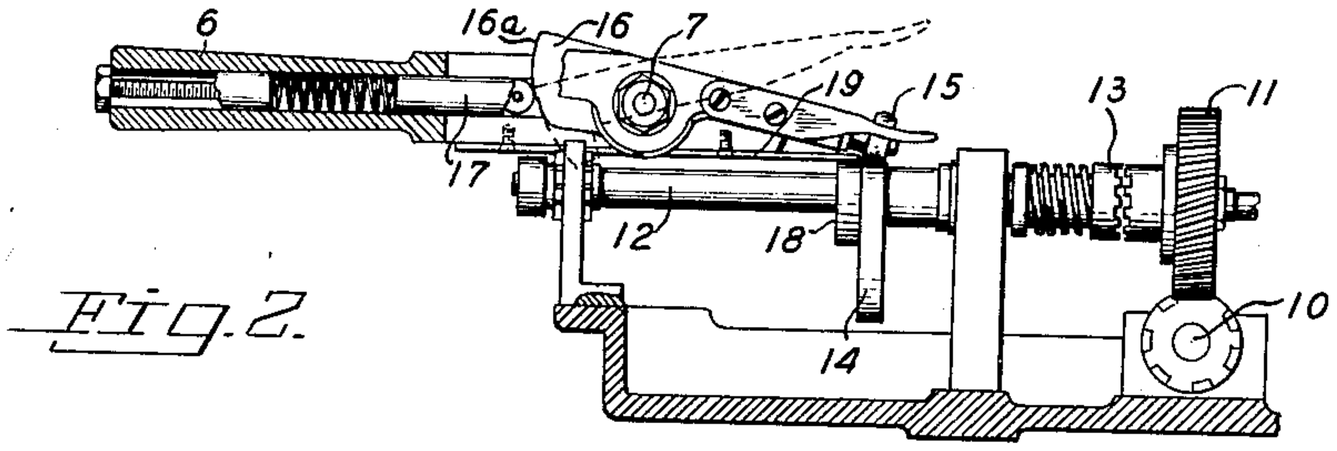
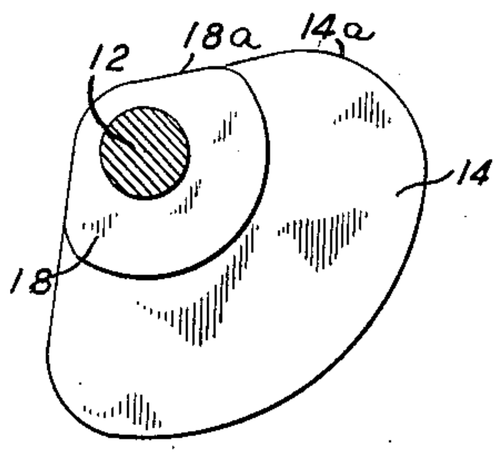


Fig. 2.

Fig. 3.



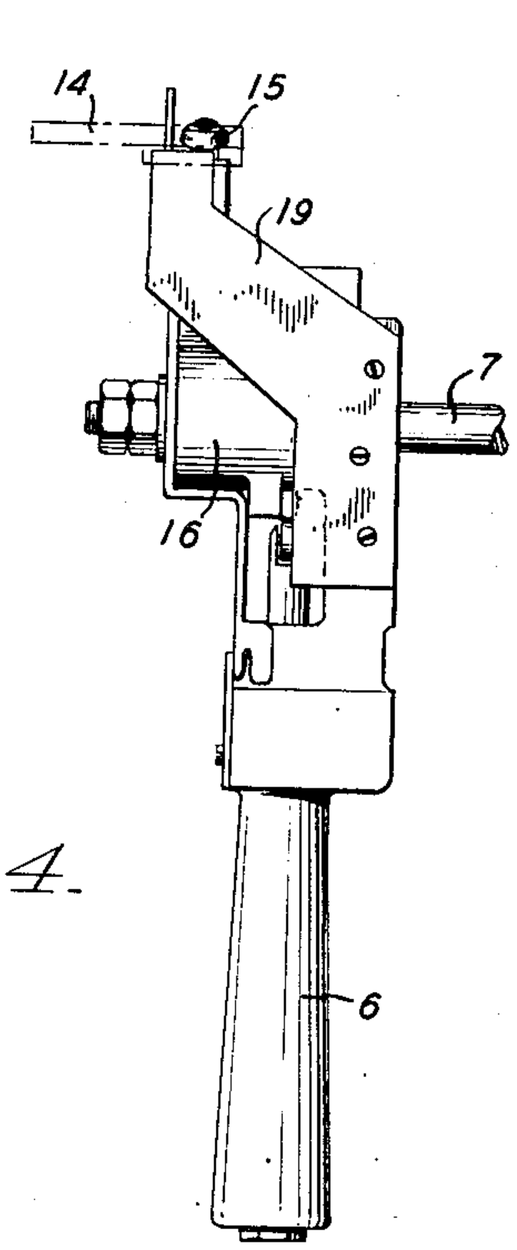


Fig. 4.

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UNITED STATES PATENT OFFICE

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TYPOGRAPHICAL COMPOSING MACHINE

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Application December 21, 1950, Serial No. 202,087

8 Claims. (Cl. 199—18)

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This invention relates to typographical composing machines, such as Linotype machines of the general organization represented in U. S. Letters Patent to O. Mergenthaler, No. 436,532, wherein circulating matrices and expansible spacebands are composed in line in an assembling elevator by the operation of a keyboard, the elevator raised to line transfer position, the composed line transferred therefrom to the face of a mold for the casting of a type bar or slug, and the matrices and spacebands thereafter separated and returned by a distributing mechanism to their places of storage. More particularly, the invention relates to machines of that class equipped with tape control units which automatically operate the keyboard and raise the assembling elevator.

Power for the operation of the control unit is obtained from one of the continuously driven parts of the machine, such as the so-called "intermediate shaft," and distributed to the appropriate parts through the medium of a pair of alternately-acting drive shafts which intermittently advance the tape for the composition of a line and thereafter raise the elevator for the transfer of the composed line therefrom. The raising of the elevator is accomplished by a cam through a control handle, which control handle is designed to yield in case the elevator encounters any obstruction during its upward movement, so as thus to prevent damage to the parts. This elevator lifting mechanism is shown and described with certain minor variations in U. S. Patents Nos. 2,006,848, 2,091,286 and 2,163,390.

The above described device operates satisfactorily as applied to the regular commercial machines, but when applied to a high speed machine, such as shown and described in the application for U. S. Letters Patent of Louis Rossetto et al., Serial No. 184,072, filed September 9, 1950, the increased force required to set the handle into motion from its position of rest is so great as to frequently cause the handle to yield, even during regular safe operation. This condition could, of course, be remedied by decreasing the yielding tendency of the handle, but obviously by so doing the margin of safety afforded thereby would also be reduced.

In accordance with the present invention, the initial load of raising the assembling elevator is applied directly to the handle, instead of through the yielding mechanism. But, almost instantly thereafter, or as soon as the inertia of the lifting mechanism has been overcome, the load of raising the elevator is applied through the yielding

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mechanism, as usual, thereby retaining the yielding feature of the handle mechanism when operating at high speed without any consequent loss in safety.

These and other improvements will be brought out in the drawings and in the following description.

Referring to the drawings:

Fig. 1 is a partial front elevation of a Linotype machine equipped with a Teletypesetter control unit and having the present invention applied thereto;

Fig. 2 is a side view, partly in section, of the power mechanism for raising the assembling elevator, including the present improvements;

Fig. 3 is a front view of the two power operated cams employed; and

Fig. 4 is a bottom plan view of the control handle show in Fig. 2.

The matrices and spacebands are individually released from their storage magazines by the operation of the keyboard A and individually composed in line in the assembling elevator 2, after which the elevator is raised and the composed line transferred therefrom by a pair of fingers 3 and 4 through the line delivery channel 5 to a vertically moving transporter or first elevator (not shown) which conveys the composed line to the casting position.

The assembling elevator 2 is raised and lowered by means of a hand lever 6 which is connected thereto by the long horizontally disposed rockshaft 7, the rock arm 8 mounted at the left hand extremity thereof, and the vertical link 9 pivotally attached to the elevator. The hand lever 6 may also be operated by power, as for example by an automatic Teletypesetter tape control unit, designated generally by the reference character B in Fig. 1. Power for this unit is received from the intermediate shaft of the machine and transmitted to the constantly rotating shaft 10 (see Fig. 2), from which the power for raising the assembling elevator 2 is taken off by the helical gear 11 and imparted to the fore-and-aft shaft 12 through the slidable spring-urged clutch 13. The shaft 12 carries the cam 14 arranged to actuate the pivoted arm 16 through the cam follower 15. The pivoted arm 16 is loosely mounted on the rock shaft 7 and its front end is shaped as a cam 16a having its lower portion of shorter radius than its upper portion. The cam 16a is engaged by the spring-pressed plunger 17 located within the hand lever 6, and the frictional pressure of the plunger holds the otherwise freely swinging arm 16 in

a certain fixed relationsnip with respect to the hand lever.

When the composition of a line has been completed, the engagement of the clutch 13 with the gear 11 is effected from the control tape, in the usual manner, and when the elevator cam 14 is thereby revolved to lift the arm 16, the frictional pressure of the plunger 17 against the arm 16 serves to operate the hand lever 6 to raise the assembling elevator 2 to line transfer position. If, however, the rise of the elevator is impeded, or if for any reason the operation of the hand lever 6 is interfered with, as soon as the frictional pressure exerted by the spring plunger 17 is overcome, the arm 16 will be permitted to yield to the position indicated by the dotted lines in Fig. 2. Hence, the elevator cam 14 may operate without causing any damage to the parts and the machine will thereafter come to a stop in the usual way.

As thus far described, the mechanism is the same as in the commercial Teletypesetter control units, and for a more detailed description thereof reference may be made to the above cited patents.

In accordance with the present invention, an auxiliary cam 18 is mounted on the shaft 12 adjacent to and in front of the elevator cam 14, and a relatively rigid extension arm 19 is secured to the underside of the hand lever 6 (see Fig. 4), with its rear end in engaging relation to the cam 18. This auxiliary cam 18 is so arranged that its cam surface 18a (see Fig. 3) will engage the arm 19 before the roller 15 on the pivoted arm 16 makes contact with the cam 14. In this way, motion is imparted directly to the hand lever 6, for an instant, without danger of yielding at high speeds, but almost immediately thereafter the cam surface 14a of the cam 14 comes into contact with the roller 15 and the remainder of the movement of the hand lever is transmitted thereto through the yieldable plunger 17, whereby the safety feature is retained.

The amount of vertical movement imparted to the assembling elevator 2 by the auxiliary cam 18 can be so regulated as not to exceed the amount of safe yield or play in the power operating mechanism itself; that is to say, in the event that an obstruction prevents any rise of the elevator whatsoever, the movement which would ordinarily be transmitted from the cam 18 to the elevator can be safely absorbed by the yielding of the power transmitting parts. Thus, for example, it has been found by experiment that, on many machines, if the amount of vertical movement imparted to the elevator 2 by the cam 18 is restricted to about one-eighth of an inch, this movement can be safely absorbed by the yielding of the power transmitting parts when the elevator movement is completely obstructed. This figure, i. e. ⅛", is not given as critical. From a practical standpoint, however, obstruction to the rise of the assembling elevator generally occurs near the upper or transfer level due to failure of the fingers 3 and 4 to return to their proper line receiving position, at which time, of course, the transmission of power would be through the yieldable arm 16.

It should be understood that the present invention has been shown only in preferred form and by way of example, but obviously, many variations and modifications may be made therein which will still be comprised within its spirit.

It is to be 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. In a typographical composing machine, the combination of an assembling elevator wherein the line is composed, power driven means for automatically raising said elevator, a yielding power transmitting connection interposed between said power driven means and elevator, and an auxiliary substantially non-yielding power transmitting connection between the power driven means and elevator to initially set the elevator into motion.

2. In a typographical composing machine, the combination of an assembling elevator wherein the line is composed, a handle for manually raising the elevator, power driven means for automatically raising the elevator through said handle, a yielding power transmitting connection between the power driven means and the handle to render the connection ineffective under certain predetermined conditions, and an auxiliary substantially non-yielding power transmitting connection between the power driven means and said handle operative initially to overcome the inertia of the elevator.

3. In a typographical composing machine, the combination of an assembling elevator wherein the line is composed, a handle for raising the elevator, a main power operated cam for automatically raising the elevator, a connecting element between the handle and the elevator cam yieldable upon encountering a certain predetermined resistance to motion, an auxiliary power operated cam operative to set the elevator into motion independently of said yieldable connecting element, and a substantially non-yielding connection between the handle and the auxiliary cam, said connection being broken automatically by the main power operated cam immediately after the elevator is set into motion.

4. In a typographical composing machine, the combination of an assembling elevator wherein the line is composed, a handle for raising the elevator, a power operated cam for automatically raising the elevator, a connecting element between the handle and the elevator cam yieldable upon encountering a certain predetermined resistance to motion, and an auxiliary power operated cam operative to set the elevator into motion independently of said yieldable connecting element, said auxiliary cam acting on the elevator through a non-yielding connection with the handle.

5. In a typographical composing machine, the combination of an assembling elevator wherein the line is composed, a handle for raising the elevator, a power operated cam for automatically raising the elevator, a connecting element between the handle and the elevator cam yieldable upon encountering a certain predetermined resistance to motion, and an auxiliary power operated cam operative to set the elevator into motion independently of said yieldable connecting element, said auxiliary cam acting on the elevator through a non-yielding connection with the handle and in advance of the raising operation of the main cam.

6. In or for a typographical composing machine equipped with an assembling elevator and with a handle for raising the elevator, said handle being provided with a yieldable operating ele-

ment as well as with a substantially rigid operating element, a tape control unit comprising a power driven shaft, and two elevator lifting cams mounted on said shaft, one cam being of small radius and arranged to make momentary contact with the rigid operating element of the handle for imparting an initial upward movement to the elevator, and the other cam being of large radius and arranged to make prolonged contact with the yieldable operating element of the handle for completing the upward movement of the elevator.

7. A tape control unit according to claim 6, wherein the two elevator lifting cams are angularly displaced so that the cam of small radius will act in advance of the cam of large radius.

8. In or for a typographical composing machine equipped with an assembling elevator and a transverse rock shaft connected to said elevator for raising the same, an operating handle

for turning the rock shaft either under manual control or under automatic control to raise the elevator, said operating handle for purposes of automatic control being provided with two operating elements to make contact with power-operated cams of different radii, one of said elements being rigid for imparting a positive turning movement to the rock shaft under control of the cam with the smaller radius, and the other of said elements being yieldable for imparting an impositive turning movement to the rock shaft under control of the cam of the larger radius.

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