

1,052,909.

4 SHEETS—SHEET 1.

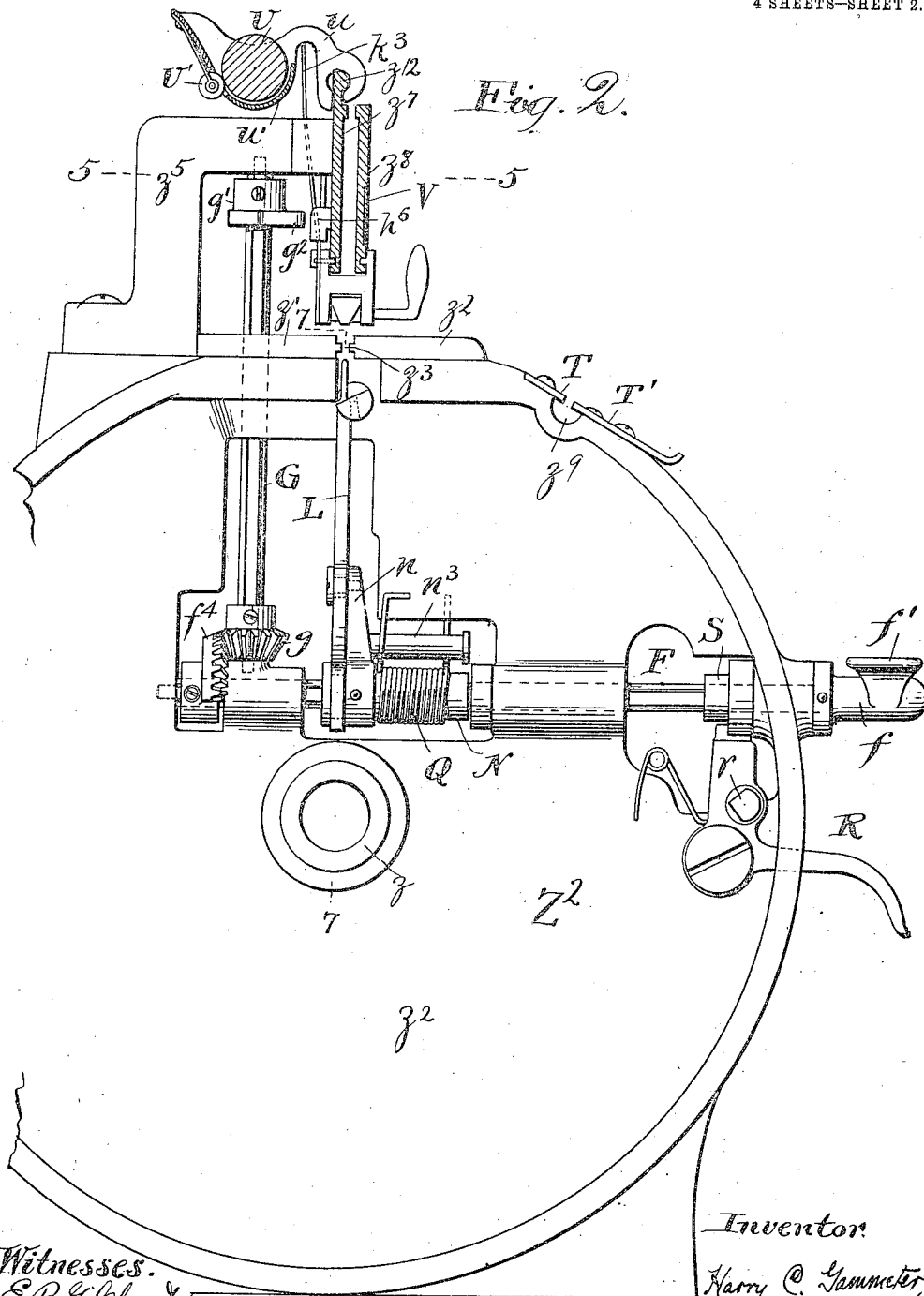


H. C. GAMMETER.
 DUPLICATING MACHINE.
 APPLICATION FILED JAN. 27, 1906.

1,052,909.

Patented Feb. 11, 1913.

4 SHEETS—SHEET 2.

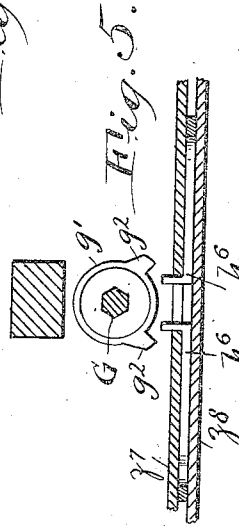


Witnesses.
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4 SHEETS—SHEET 3.



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4 SHEETS—SHEET 4.

Fig. 6.

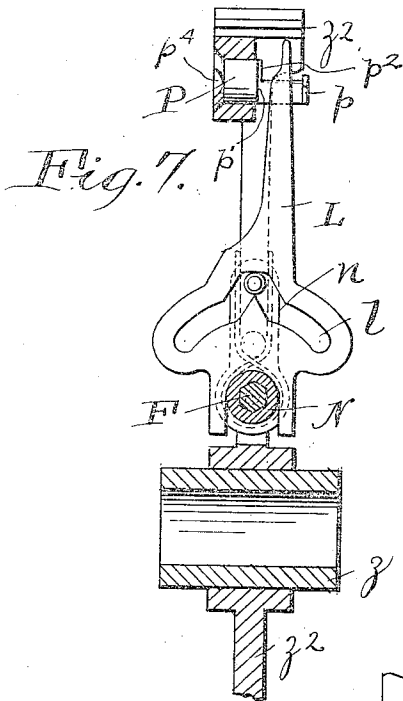
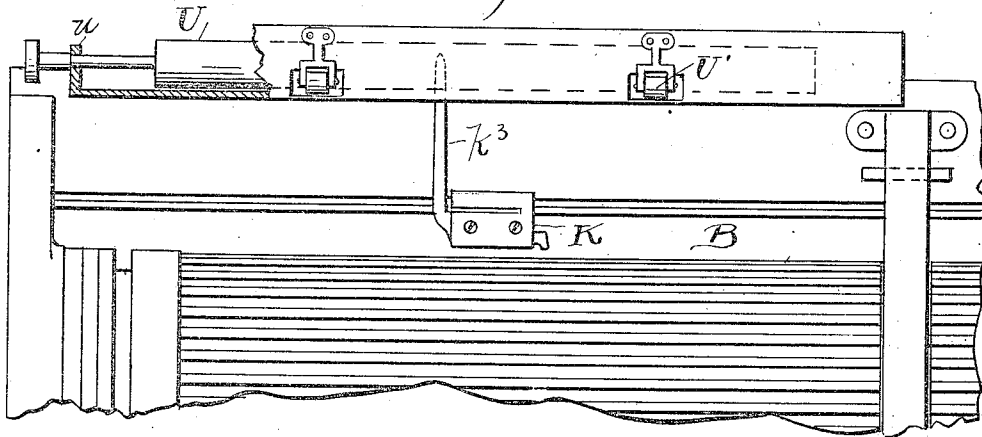


Fig. 8.

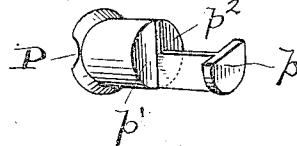


Fig. 9.

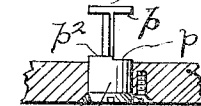


Fig. 10.

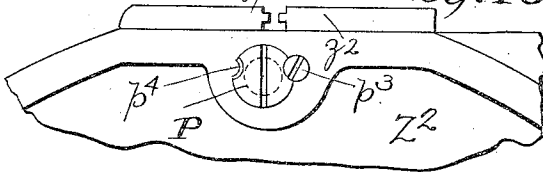
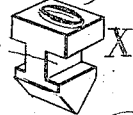
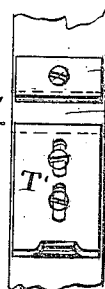


Fig. 11.



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UNITED STATES PATENT OFFICE.

HARRY C. GAMMETER, OF CLEVELAND, OHIO, ASSIGNOR TO THE AMERICAN MULTI-
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DUPLICATING-MACHINE.

1,052,909.

Specification of Letters Patent.

Patented Feb. 11, 1913.

Application filed January 27, 1906. Serial No. 298,121.

To all whom it may concern:

Be it known that I, HARRY C. GAMMETER, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Duplicating-Machines, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

10 The object of this invention is to provide an efficient machine for producing circular letters or similar matter in large quantities, particularly in making many copies of letters which shall have all of the appearances
15 of having been individually written upon the typewriter.

The present machine is an improvement on the machines shown in my Patent No. 722,404, issued March 10, 1903, and my application No. 236,463 filed December 12, 1904.

In its preferred form, the machine comprises two drums,—a supply drum which contains the type arranged in lines of the
25 same letter, and a printing drum—and transfer mechanism for conveying the type individually from the supply drum to the printing drum to make words and spaces and for distributing it from the printing
30 drum to the supply drum after the printing has been accomplished, and a pair of finger keys for accordingly operating the transfer mechanism. After the type has been assembled on the printing drum, the same may
35 be rotated to cause the printing, the paper being drawn between the printing drum and a suitable platen, and there being means for inking the type.

40 The present invention is concerned with the assembling and distributing features of the machine.

In the drawings, Figure 1 is a front elevation of the machine substantially complete. Fig. 2 is a vertical cross section on a
45 plane taken between the supply drum and the central frame plate. Figs. 3 and 4 are front elevations of the comb mechanism which operates to feed the type toward the transfer channel—Fig. 3 being the left hand
50 portion and Fig. 4 the right hand portion. Fig. 5 is a horizontal section on the line 5—5 of Fig. 2. Fig. 6 is a rear elevation

showing the copy holder and a portion of the printing drum. Fig. 7 is a vertical section substantially on the line 7—7 of Fig. 55 2, being in a plane parallel with Fig. 1, and looking toward the front of the machine. Figs. 8, 9 and 10 are detail views showing the adjustable stop for the finger which limits the advancement of the type. Fig. 11 60 is a detail of the extra transfer channel shown in side elevation in Fig. 2. Fig. 12 is a perspective of the type employed.

The supply drum, as a whole, is designated A and the printing drum B. These 65 are arranged so that the type ordinarily stored on the supply drum may be transferred as desired to the printing drum,—a preferable arrangement being that shown in the drawings, wherein the drums are of the 70 same diameter and are placed with their axes in alinement. Each drum has a series of similar longitudinal type holders which may be channels contracted at their outer edges to overhang the type and hold them in 75 place.

The drums are mounted on alined shafts (not shown) which have bearings respectively in the end frame standards Z and Z', and each in the bushing z in the intermediate 80 frame plate Z². The drums are provided with cranks a' and b' respectively by which they may be rotated,—the supply drum being rotated to bring the proper channel into position for transfer of the type 85 from one drum to the other; the printing drum, after assemblage of the type, being rotated to cause the printing. The printing drum is shown as having a recess b² in which is mounted a pair of spools D D' 90 which are adapted to carry an inking ribbon which is passed around the drum after the type are assembled to ink the same and enable them to print on paper drawn between the printing drum and the impression 95 platen,—not shown.

On the upper edge of the central frame member z² are a pair of blocks z' and z² which are separated and are formed at their opposed faces with ribs corresponding to the 100 grooves x in their type X, whereby these blocks provide a transfer channel z³ from one drum to the other. During the transfer of type, the printing drum is held with the

desired channel in alinement with the transfer channel z^3 by reason of the engagement with the gear b^3 on the drum of a pinion e which is rigidly connected with a hand wheel e' with which a detent, (not shown) engages, preventing accidental displacement. This arrangement which is shown and claimed in my application referred to, furnishes means for rotating the printing drum step by step to bring the desired channel into position for transfer, and means also for holding it in such position during the transfer.

The operator causes the transfer from one drum to the other by the depression of either of a pair of finger keys f^1, f^2 . These keys are formed on the ends of a lever f which is rigidly mounted on a rock shaft F journaled in the frame plate Z^2 . At the rear end of this rock shaft is a segmental gear f^4 which meshes with a beveled pinion g on a vertical shaft G , which is journaled in frame standard Z^2 and the bracket z^5 carried thereby. On the shaft G , near its upper end, is formed a head g' having a pair of projecting lugs g^2 . Above the transfer channel z^3 are a pair of stationary plates z^7 and z^8 which extend lengthwise over the two drums. Between these plates are a pair of combs H^1 and H^2 having teeth on their lower sides and having on their upper sides inclined lugs h which engage with recesses in bars h^2 which are allowed a limited sliding movement between the stationary plates. Links h^6 connect with the inner ends of the bars H^1 and H^2 and have toes extending rearward into the path of the lugs g^2 on the head g' .

From the above described mechanism, it results when either finger key is depressed, the head g' is rocked in one direction or the other and thereupon one of the toes g^2 engages the rear end of the corresponding link h^6 , drawing the corresponding comb inward. Friction retards the bar h^2 , wherefore the comb slides downward before the bar moves. When the comb reaches its limit of downward movement, the continued rotation of the head g' moves forward both the comb and bar. When the finger pressure is released on the key, the spring h^7 engaging the links h^6 causes the displaced comb to travel upward and then backward. This arrangement of combs is claimed specifically in my application referred to.

In the channels of the supply drum behind the type are followers J which the teeth of the comb H^1 are adapted to engage. Above the printing drum is a follower block K slidably guided on the plates z^7 and z^8 near their lower edges and having teeth which the comb H^2 is adapted to engage, this block having a pawl k which may engage behind the type in the printing drum. The actuation of either key therefore is to cause

the row of type in the channel of the corresponding drum, which is opposite the transfer channel, to be moved toward that channel, the foremost type passing into the channel. The succeeding actuation of the key again advancing the line of type, shoves another type into the channel, advancing farther the type already therein, so that the type thus pass through the transfer channel into the channel of the opposite drum.

It is essential that for each actuation of the key, the engaged type line be advanced just the thickness of a type so that but one type at a time will be transferred. To accomplish this I provide a limiting finger which enters the transfer channel every time a type is introduced therein and is allowed a movement with the type just equal to the width of that type, thereby preventing over-setting and restricting the advancement to the desired amount. This feature is of great importance as otherwise, if too large a force were applied to the finger keys, the type would be advanced too far by momentum.

The broad idea of the limiting member, combined with the type advancing means is claimed in my aforesaid application. The present mechanism is a simplification of the mechanism there shown and comprises essentially a finger L located beneath the type channel z^3 and forking around a bushing N on the shaft F . Rigidly extending from this bushing is an arm n which carries a roller n' occupying a V-shaped slot l in the finger piece. By this means whenever the shaft F is rocked, the roller passes into one side or the other of the slot l . The first portion of this slot into which the roller passes, extends diagonally downward, approaching the axes of the shaft; then the slot extends concentrically of the shaft. By this means, the rocking of the shaft first causes the elevation of the finger L into the path of the type to be transferred; then the further rocking of the shaft has no effect on the finger which is advanced with the type by means of the combs already described. After the shaft F is rocked by its finger key, it is returned by the spring Q which surrounds the bushing M and has ends extending across the pin n^3 projecting from the arm n , the ends of the spring extending beyond this pin on to opposite sides of the frame plate Z^2 .

To limit the advancement of the finger L to the distance equal to just the width of a type, I provide the limit stop P which has shoulders p, p' , which the finger engages. The movement allowed to the finger L is made variable for different fonts of type by providing the stop P with a plurality of shoulders p', p^2 extending different amounts, the stop being rotatable to bring either of the shoulders into the path of the finger. As shown, the stop provides adjust-

ment for two sizes of type to be transferred, the adjustment being easily made by removing the locking screw p^3 , Fig. 9, and turning the stop P about half a rotation and replacing the locking screw in the notch p^4 of the block. I have found that this adjustment by a plurality of definite amounts is preferable to an adjustment screw or similar stop which might work loose or be

wrongly adjusted. To prevent the inopportune actuation of the finger piece, I provide a latch R which is normally in engagement with a notch in a collar S rigid on the shaft F. The finger latch R must be drawn upward to release the collar S before either of the finger keys can be depressed. This same movement of the latch may cause a beveled projection r thereon to engage one of a series of corresponding notches in the supply drum to lock the same into position, as shown in my application referred to.

Some of the channels in the supply drum become exhausted much quicker than others, owing to the frequency with which certain letters are employed. To enable the refilling of empty channels, I have several channels on the supply drum which store lines of frequently used letters and I provide an extra transfer channel between the two drums, so that whenever in the operation of assemblage, a channel in the supply drum becomes exhausted, the corresponding storage channel may be simply brought opposite the additional transfer channel and the storage line shoved through the transfer channel on to the printing drum. Then the exhausted channel on the supply drum is brought opposite the extra transfer channel and the storage line is shoved back into the proper place in the supply drum. This extra transfer channel should be normally closed to prevent type in either drum accidentally working into it and interfering with the rotation of the drums. This feature is claimed broadly in my application referred to; it is shown herein in an improved form.

In the edge of the frame member Z^2 is a recess z^0 . Overlapping this recess are a pair of plates T and T'. The plate T is rigid, while the plate T' has a limited movement by means of its securing screws passing through slots in the plate. When this plate T' is drawn downward, as shown in Figs. 2 and 11, a transfer channel is provided corresponding in form to the channel z^3 . When the plate T' is shoved upward, the channel is closed, and a gate is thus formed, preventing the type from either drum passing into the channel.

In distributing the type it is very desirable to have some means for indicating which character is in the printing drum adjacent to the transfer channel, to relieve

the operator from the necessity of reading the type. In assembling the type it is also desirable to have a copy indicator as a guide and check, increasing the speed and preventing mistakes. For this purpose I may employ mechanism invented by Henry C. Osborn and described and claimed in his application #295,332, filed January 10, 1906. One embodiment of such mechanism is shown herein and provides a copyholder in which is inserted a sheet of printed copy, the follower block K being provided with a pointer k^3 adapted to stand opposite the letter in the printed page corresponding to the type next to be transferred to or from the supply drum. The copyholder, as shown, comprises a roller U mounted in a pair of arms u which are carried by the frame members z^7 . A suitable plate u' connects the arms u , and spring pressed rollers U' provide the necessary friction for the paper.

A simple method for providing the necessary adjustment between the copy holder and pointer is to make the copy holder slidable on the frame member z^7 , the pointer being rigid on the follower block. To accomplish this, there is formed a head z^{12} along the upper edge of the frame member z^7 , and the arms u are arranged so that they extend over this beaded edge and embrace it. The bead is cut away at two points shown at z^{13} to free the arms u and allow the removal of the copy holder.

Along the front side of the frame member z^8 is formed a chart V of the different characters in the channels of the supply drum, and a suitable pointer W is provided which is adapted to travel along over the chart, being so connected with the supply drum that it points to the character on the chart corresponding to the channel in the supply drum which is opposite the transfer channel z^3 . Suitable mechanism between the supply drum and pointer is shown and claimed in my application referred to.

In the operation of the machine the supply drum is turned by its crank to bring the channel containing the proper letter into alinement with the transfer channel z^3 ,—the pointer W, indicating the position. Then the latch R is drawn upward, locking the supply drum and releasing the finger key, and finger key f is depressed. This brings downward and forward the comb H' which engages the follower J and shoves forward the line of type, causing the foremost type to pass into the channel z^3 . At the same time the limiting finger L enters the channel in advance of the type and moves with the type just the thickness of the type, preventing oversetting by momentum. This operation is continued for each letter in the line, the type passing through the transfer channel into the alined channel of the printing

drum. When the channel in the printing drum is filled, a new channel is brought into place by the action of the hand wheel *e'*. Any exhausted channel in the supply drum is replaced from a storage channel therein by means of the gate *T'* and an empty channel on the printing drum, as heretofore explained. After the type has been assembled on the printing drum the pinion *e* is swung away from the gear *b*³, freeing the printing drum. The ribbon carried by the spools *D* and *D'* is passed around the printing drum and wound upon the spools. The printing drum is then ready to be rotated by its crank to cause the printing on paper being drawn between the drum and a suitable platen. After the printing has been accomplished, the ribbon is restored to its idle position, passing directly from one spool to the other. To distribute the type the first line in the printing drum is brought opposite the transfer channel and there held by the detent pinion *e*, and a sheet of the printed matter is inserted in the copy holder and the corresponding line turned into proximity to the pointer *k*³. The follower block *K* is then shoved along to engage the type in the line, and the copy holder is adjusted lengthwise until the pointer *k*³ is properly positioned to indicate the character corresponding to the foremost type in the line to be distributed. The pointer *k*³ therefore indicates to the operator which channel of the supply drum should be opposite the transfer channel, and he turns the supply drum accordingly, raises the latch *R* and depresses the finger key *f*², causing the transfer.

I claim:

1. In a duplication machine, the combination of a supply mechanism, a printing mechanism, means for transferring type from one to the other, a member adapted to engage the type during the transfer and prevent oversetting, and means for varying the movement of said member.

2. In a duplication machine, the combination of supply mechanism, printing mechanism, a type channel between them, means for feeding the type through the channel, a member adapted to engage the type in the channel and limit the movement thereof, and an adjustable stop for said member.

3. The combination of means for feeding type, a member adapted to limit the movement of the type, and a stop for limiting the movement of said member, said stop having a plurality of faces adapted to be respectively engaged by the member.

4. The combination of means for advancing type, means for limiting a single advancement to the thickness of a type, and means for varying such limit by a definite amount corresponding to the difference between different fonts.

5. In a duplicating machine, the combina-

tion of a type channel, a member adapted to engage the type in the channel, and a rotatable stop having different shoulders which may be presented to said member, and means for locking the stop in position.

6. In a duplicating machine, the combination of supply and printing mechanism with a channel between them, a limiting member adapted to engage the type in the channel to prevent oversetting, and a stop adapted to engage said member and limit the movement thereof in opposite directions, said stop having two pairs of shoulders different distances apart whereby the throw of the member is varied by the position of the stop.

7. The combination of a type channel, means for feeding type along the same, a limiting member adapted to engage the type, a rock arm, said arm and member having a cam-connection with each other whereby the rocking of the arm moves the member to engage the type.

8. In a duplicating machine, the combination of supply mechanism, printing mechanism, a channel between them, means for feeding type from one mechanism to the other through the channel, a rock shaft operatively connected with the feeding mechanism, a limiting member adapted to engage the type and standing normally below the channel, said member having a V-shaped slot whose arms approach the rock shaft, and an arm on said rock shaft carrying means extending into said slot, whereby the rocking of the shaft raises the limiting member.

9. The combination of a type channel, a limiting finger adapted to engage type therein, a rock arm, and a pin and cam-slot connection between the arm and finger, and means for feeding the type along said channel operating concurrently with said arm.

10. In a duplication machine, the combination with a transfer channel, of a limiting finger normally below the channel, a rock shaft, said finger forking around the rock shaft, an arm carried by the rock shaft, and a pin and slot connection between the arm and finger whereby the rocking of the shaft raises the arm.

11. In a duplicating machine, the combination of a channel through which the type may be fed, a limiting finger normally out of the way of the type, a rock shaft, mechanism operated thereby to feed the type through the channel, an arm on said rock shaft, a V-shaped slot in the finger extending away from the type channel, there being extensions to the arms of said slot which are arcual about the axis of the rock shaft, and a member on said arm occupying said slot.

12. In a duplicating machine, the combination of mechanism for carrying a supply of type, printing mechanism, two guides forming a type conveyer between them, one of said guides being a slidable plate which

is adapted to be separated from the other guide or to be moved substantially against it to close the passageway.

13. In a duplicating machine, the combination with supply mechanism and printing mechanism of a frame member between them, a recess in the edge of said member, a stationary member overhanging the recess on one side and a movable member adapted to overhang it on the other side, whereby when such members are apart, a suitable type channel is provided, and when they are together the channel is closed.

14. In a duplicating machine, the combination of a supply drum and a printing drum placed end to end, a vertical frame member between the drums, a recess in the edge of said frame member, a pair of plates secured to the frame and adapted to overhang the recess, whereby a channel is provided for type grooved on its opposite sides, one of said plates being slidable to or from the other to close the channel or open it.

15. In a duplicating machine, the combination of a supply mechanism, a printing mechanism, type transferable between them, a member adapted to engage the type during the transfer and prevent oversetting, and means for varying the movement of said member.

16. In a duplicating machine, the combination of supply mechanism, printing mechanism, a type channel between them, type transferable from one mechanism to the other through said channel, a member adapted to engage the type in the channel and limit the movement thereof, and an adjustable stop for said member.

17. In a duplicating machine, the combination of a supply mechanism, a printing mechanism, type transferable between them and having beveled feet, a member adapted to engage such beveled feet and pass between the type during the transfer and prevent oversetting, and means for varying the movement of said member.

18. In a duplicating machine the combination of supply mechanism, printing mechanism, a type channel between them, type transferable from one mechanism to the other through said channel, said type having transversely beveled feet, a member adapted to be projected between the feet of the type and thus engage the type in the channel and limit the movement thereof, and an adjustable stop for said member.

19. The combination of means for advancing a line of type and separating the forward type therefrom, a member adapted to engage each individual type at the forward end of the line and move with it, and adjustable means for limiting the movement of such member.

20. The combination of a type holder, means for feeding type therein, a member

adapted to engage each individual type to limit the movement thereof, and an adjustable stop for limiting the movement of the member.

21. The combination with a type holder, means for intermittently feeding a line of type along the same, a member adapted to engage individual type in said line, and adjustable means for limiting the movement of said member to a distance dependent upon the thickness of the type.

22. The combination of a type holder, a finger key for feeding a line of type along the same, mechanism for engaging each type, and adjustable means for limiting the movement of said mechanism.

23. The combination of a type holder, means for feeding type which are carried thereby, means for engaging each type, a finger key for operating such engaging means, and an adjustment means to limit the movement of the engaging means.

24. The combination of means for feeding type, means engaging each type for limiting the feed to an amount equal to the thickness of a single type, and means for varying said limit by definite steps corresponding to the difference between different fonts of type.

25. The combination of means for advancing type and means for regulating such advancement by definite amounts corresponding to the difference between different fonts of type.

26. In a transferring mechanism adapted for use with either of two fonts of type, each font having individuals with bodies of the same width, the combination of means for advancing such type, and means for limiting each advancement to an amount equal to the thickness of a type in one font or the other.

27. The combination with means for advancing type of either of a plurality of fonts, and means adjustable by steps corresponding to the difference between individuals of the respective fonts for accordingly limiting the advancement.

28. The combination of a supply member, a printing member, a type channel between them, finger keys and mechanism operated thereby for feeding the type from either member into said channel, a member adapted to engage the type in the channel, and a movable stop adapted to variably limit the movement of said engaging member.

29. In a duplicating machine, the combination with a supply member and a printing member, of a type channel between them, a member adapted to engage the type in the channel, and a movable stop having different shoulders which may be engaged by said member, and means for locking the stop in position.

30. In a duplicating machine, the combination of supply and printing mechanism with a channel between them, a limiting

member adapted to engage the type in the channel to prevent oversetting, and an adjustable stop adapted to engage said member and limit the movement thereof in opposite
5 directions.

31. The combination of a type channel, means for feeding type along the same, a limiting member adapted to engage the type, a rock arm, said arm and member having
10 a cam-connection with each other whereby the rocking of the arm moves the member to engage the type, and an adjustable stop for regulating the movement of said limiting member.

32. The combination with a type channel, of a member adapted to engage the type, a rock arm, said arm and member having a cam-connection with each other whereby the rocking of the arm moves the member
20 to engage the type.

33. The combination with a guide along which type may be moved, a rock shaft, and a type-controlling member adapted to engage type on said guide and having a cam
25 connection with the rock shaft.

34. The combination with a type-guide, means for feeding type along the same, a rock arm, and a type-controlling member having a cam connection with the rock arm.

30 35. The combination with a type-guide and a rock shaft, of a member having a two-armed slot non-concentric with the rock shaft, and means carried by the rock shaft extending in said slot.

35 36. The combination with means for supporting type, of a finger adapted to engage such type, said finger having a slot, and means in said slot movable in a path intersecting the seat for moving the finger
40 toward the type support.

37. The combination of a type-guide, a limiting finger therefor having a V-shaped guide, and operating means coöperating with said guide.

38. The combination with a type support, 45 of a limiting finger adapted to control type thereon, a rock arm and a pin and cam-slot connection between the arm and finger.

39. The combination of a type guide, a type controlling member having a V-shaped 50 guide, an operative rock arm, and means engaging said V-shaped guide and controlled by the rock-arm.

40. The combination of type controlling means, of a rock shaft, a member having a 55 two-armed slot which is V-shaped at a certain point, the end of the V continuing approximately concentric with the rock shaft, and an arm carried by the rock shaft and having means adapted to enter said slot.

41. In a type controlling mechanism, the combination of an operative rock shaft, a type controlling member guided by said rock shaft, a rock arm on the rock shaft, and means on the rock arm for intermediately 65 engaging the member to operate it.

42. In a duplicating machine, the combination of supply mechanism, printing mechanism, a type channel between them, mechanism for feeding type from one of said 70 mechanisms to the other through said channel, a rock shaft operatively connected with the feeding mechanism, a limiting member adapted to engage type individually and standing normally out of said channel, an 75 arm on said rock shaft, a cam connection between said arm and member, whereby the rocking of the shaft projects said member into the channel and allows it to move therein, and means for adjusting the movement 80 of said member.

In testimony whereof, I hereunto affix my signature in the presence of two witnesses.

HARRY C. GAMMETER.

Witnesses:

ALBERT H. BATES,
W. L. MCGARRELL.