Oct. 23, 1962 O. SCHNELLMANN 3,059,750

TYPEWRITER FOR METALS AND PLASTICS

Filed Sept. 1, 1959 6 Sheets-Sheet 1

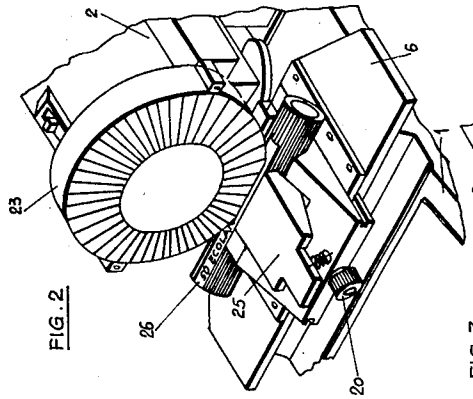


FIG. 2

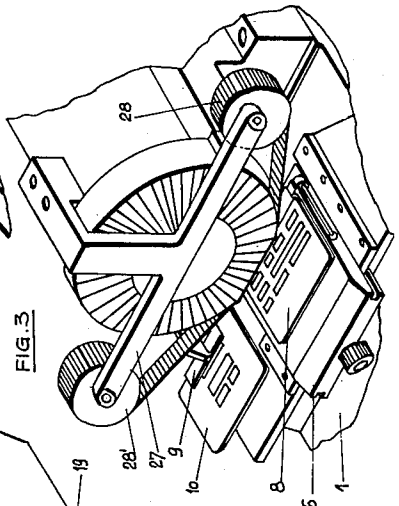


FIG. 3

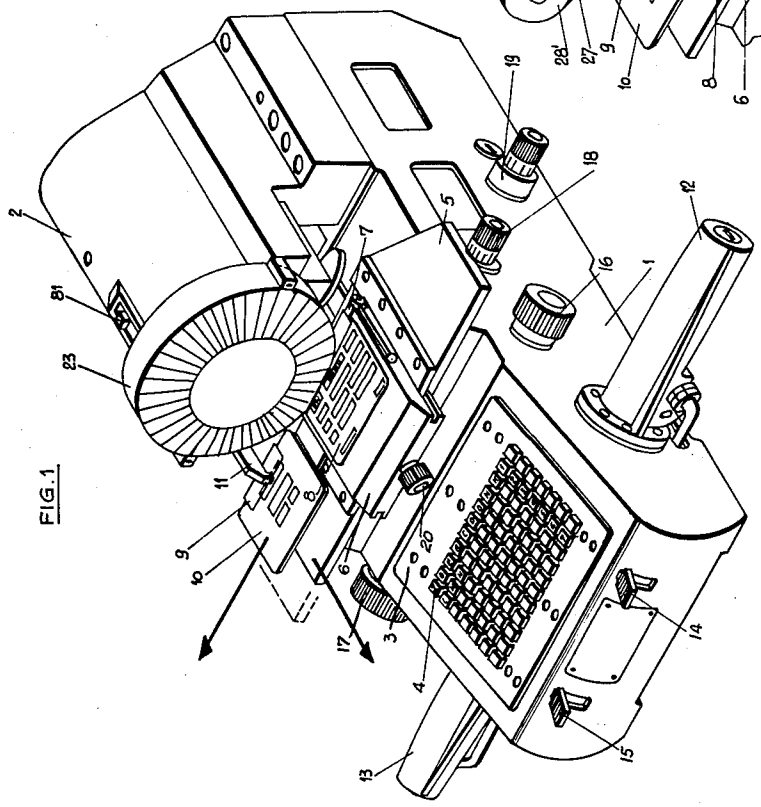


FIG. 1

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BY Karl F. Ross

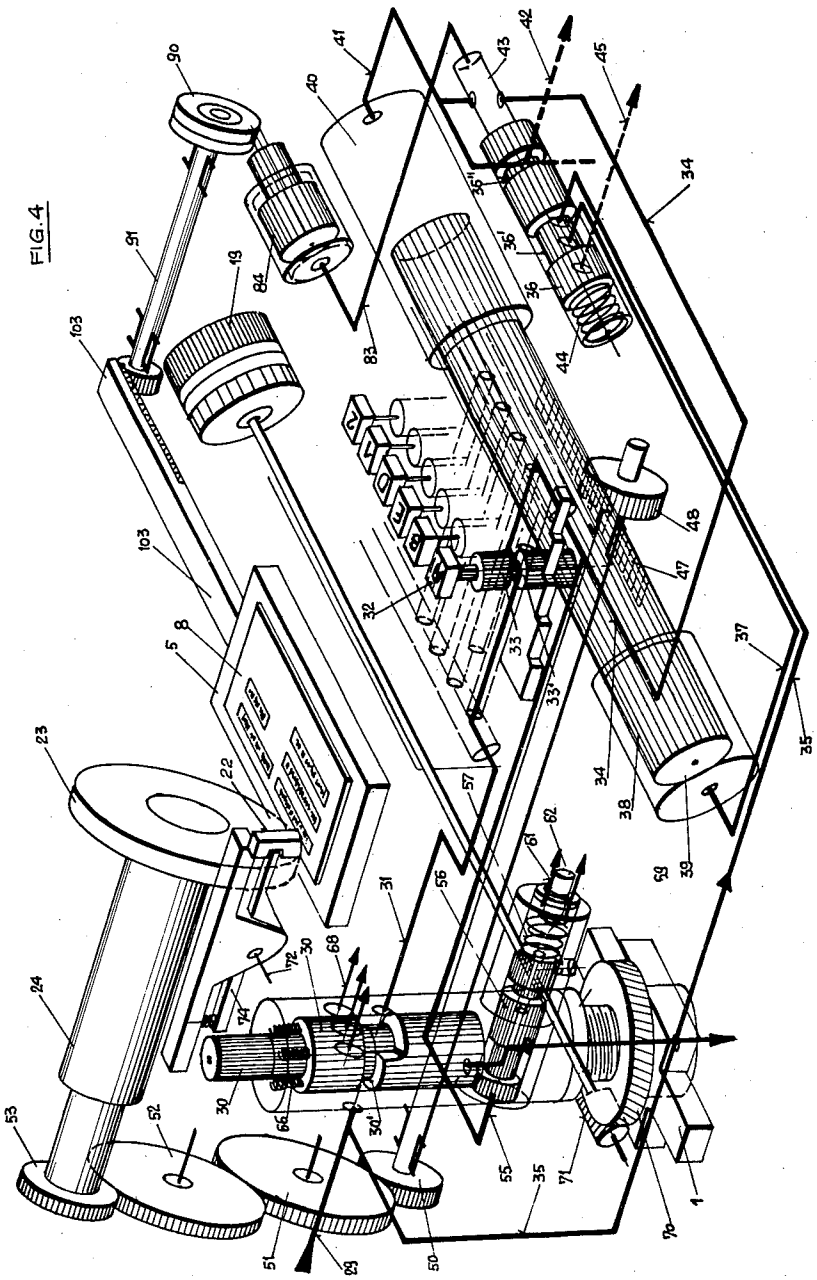
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TYPEWRITER FOR METALS AND PLASTICS

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FIG. 4



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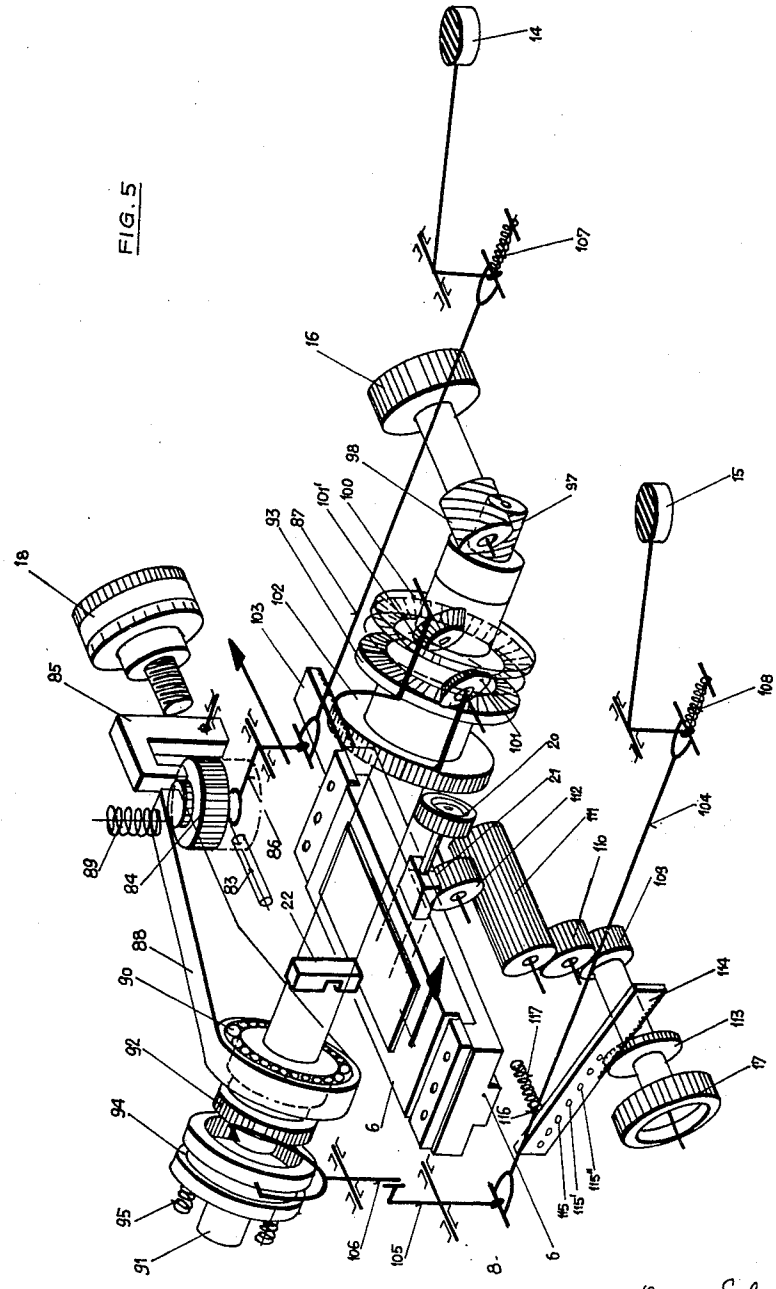
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TYPEWRITER FOR METALS AND PLASTICS

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FIG. 5



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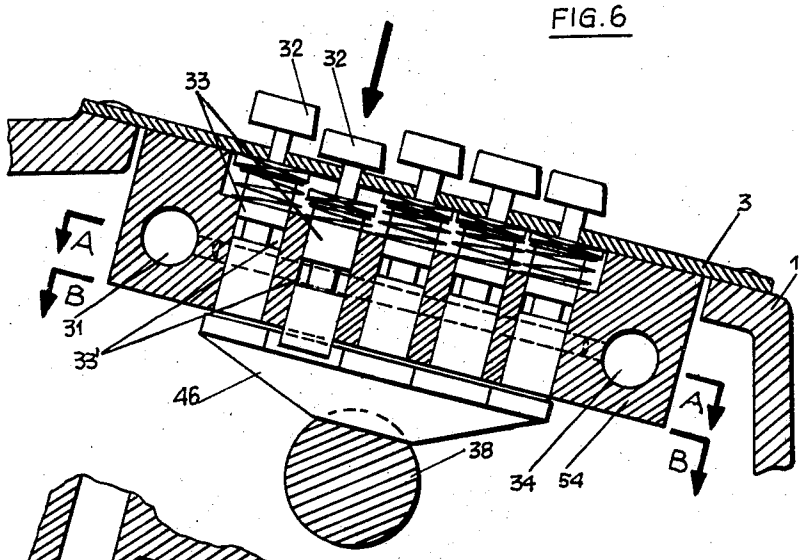
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TYPEWRITER FOR METALS AND PLASTICS

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FIG. 6



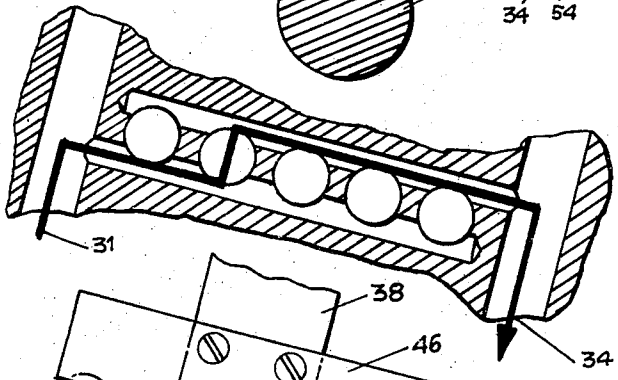


FIG. 7

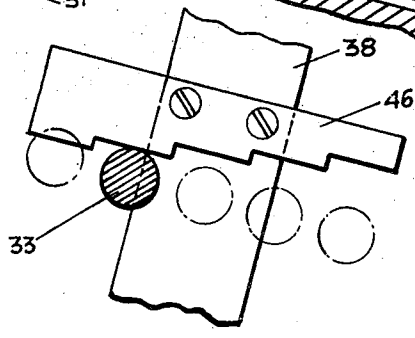


FIG. 8

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TYPEWRITER FOR METALS AND PLASTICS

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FIG. 9

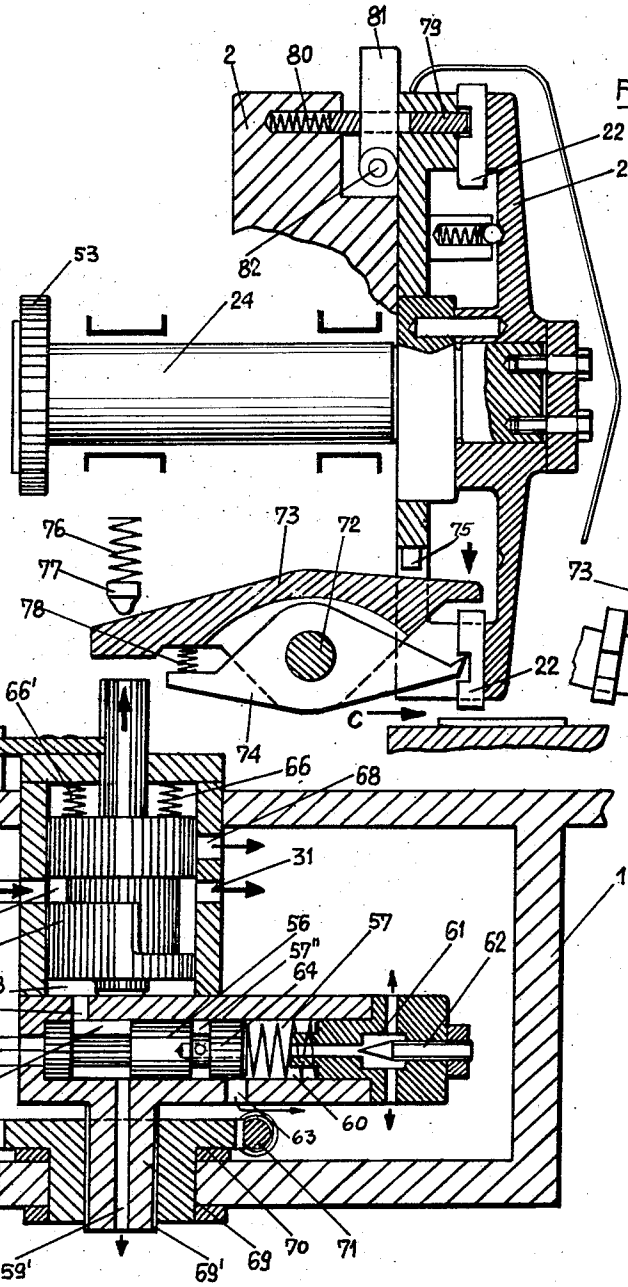
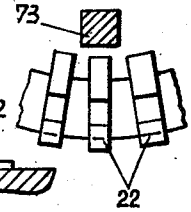


FIG. 10



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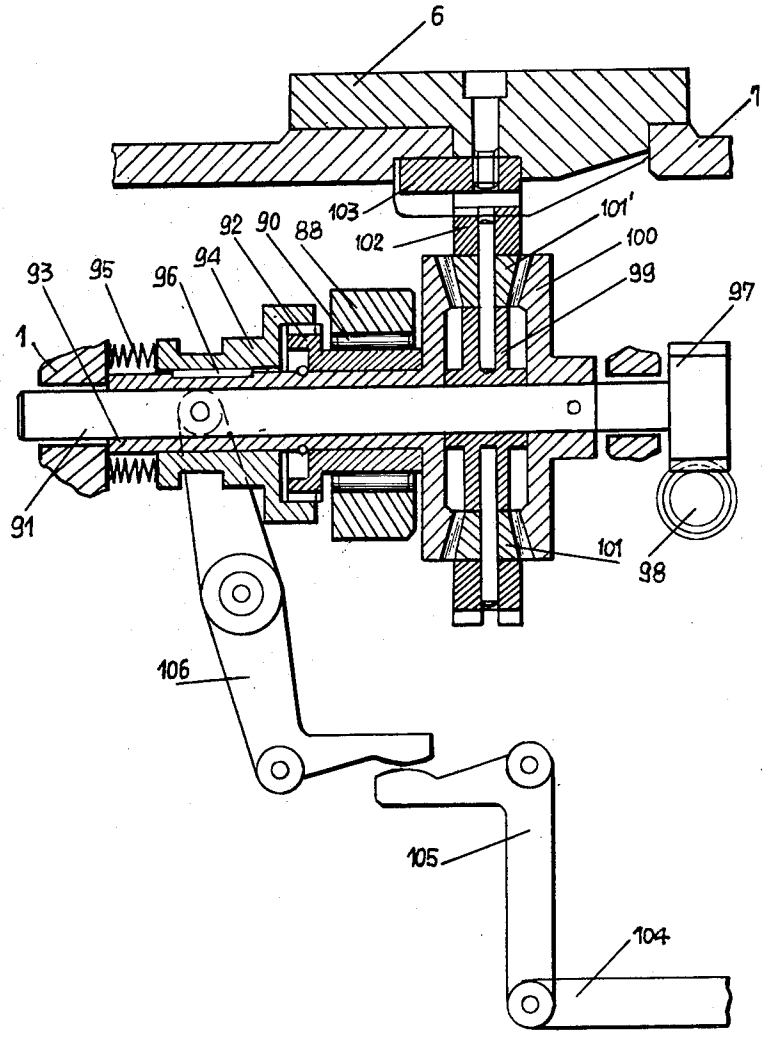
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TYPEWRITER FOR METALS AND PLASTICS

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FIG. 11



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United States Patent Office 3,059,750 Patented Oct. 23, 1962

3,059,750

TYPEWRITER FOR METALS AND PLASTICS

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Filed Sept. 1, 1959, Ser. No. 837,532
Claims priority, application Switzerland Sept. 3, 1958
14 Claims. (Cl. 197—6.6)

Lettering name and data plates for machines, motors and various other elements has hitherto involved much work and trouble especially if such identification plates were to receive consecutive changes of designation and numbering. For motors, switchgear units and machines it is customary to use anodized plates upon which sundry data such as year of construction, serial number, special performance data, electrical specifications, etc. are applied in printed texts. At present such lettering is still largely carried out by stamping the type characters by hand or by engraving them with the aid of suitable adapted machines. Both methods are inefficient because in the first instance uniform lettering depends largely on the skill of the worker and in the second instance the method of engraving is very time-consuming since the number types have to be composed on the machine. With round machinery parts such as steel specimens it is also customary to mark them with various information as to their composition and make.

The object of the present invention is to provide a typewriter for metals and plastics. Similar to the conventional typewriter, the machine according to the invention can be operated by the well-known system of operating keys and permits efficient and neat lettering of flat and round parts for single-piece and series production. By means of a special type, lettering can also be carried out on parts of other shape. For all functions the control of the machine is effected by compressed air including the impact motion so that the operators will not suffer from fatigue. The typewriter is provided with a complete set of upper and lower case letters as well as all numeral types and various special symbols such as are customary in the electrical industry. The control of the impact motion as well as of the line spacing motions can be regulated by the compressed air ensuring uniform lettering of even thin-walled and fragile materials. The marking types are replaceable permitting quick change-over to other characters. Thus lettering on machinery name and data plates or on other elements having consecutively varying markings in series production can be carried out efficiently and neatly. In addition, the machine can be provided with an ink-ribbon arrangement so that simultaneously with the lettering operation it is possible to color the characters.

By way of example, apparatus embodying the invention is illustrated in the accompanying drawings in which:

FIG. 1 is a perspective view of the typewriter having a carriage for supporting flat work;

FIG. 2 is a perspective view of a portion of the typewriter showing a carriage for supporting round work;

FIG. 3 is a perspective view of the typewriter and its ink-ribbon arrangement;

FIG. 4 is a diagrammatic view of the compressed-air control system for displacing the moving elements of the apparatus;

FIG. 5 is a diagrammatic view of the adjusting means for controlling line spacing and type spacing;

FIG. 6 is a vertical section through the operating-key carrier;

FIG. 7 is a horizontal section through the operating-key carrier taken on the line VII—VII of FIG. 6 and showing the path of the compressed air;

FIG. 8 is a horizontal section through the operating key carrier taken on the line VIII—VIII of FIG. 6 showing the notched scanning plate;

FIG. 9 is a vertical section through the type drum and the impact and control pistons;

FIG. 10 is a detail view of the embossing type drum viewed in direction C of FIG. 9, and

FIG. 11 is a vertical section through the automatic type-spacing mechanism.

The machine illustrated in FIGS. 1 to 11 consists of a machine body **1** and a top part **2**. In the front of the machine body **1** there is fitted a keyboard **3** with operating keys **4** and, in addition, a slide **5** with a cross slide **6** provided with a clamping appliance **7** for securely holding the machine name plate **8** to be lettered. A further clamping appliance **9** is secured to the slide **5** and engages a previously embossed machine name plate **10**. A position indicator **11** of Plexiglas is secured to the top part **2** so that with transverse motion of the slide **5** the character to be imprinted can be read off from the master plate **10**. Also fitted to the machine body **1** are two setting cylinders **12** and **13**, an operating key **14** for type spacing, an operating key **15** for free traversing motion of the slide **5**, an operating knob **16** for setting the slide **5** by hand, an operating knob **17** for setting the line spacing of the slide **6**, a setting screw **18** for the mechanical type spacing limit and a setting screw **19** for the impact stroke adjustment. By means of a screw spindle **20** according to FIG. 5 the slide **6** can be finely adjusted through a rack **21** permitting accurate adjustment of the machine name plate **8** relative to the impact type position **22**. A drum **23**, in which impact types **22** are displaceably positioned, is mounted on a shaft **24** in the top part **2**. According to FIG. 2 a clamping appliance **25** for clamping round elements **26** can also be used selectively on the slide **5**. Furthermore there is the possibility of using an ink ribbon arrangement **27** with ink ribbon reels **28** and **28'** which can be provided with an automatic follow-up device according to FIG. 3. According to FIG. 4 compressed air taken from a compressed air supply with a gauge pressure of three to four atm. is fed into the machine through pipe **29**. When a piston **30** is in the position shown in FIG. 4, compressed air can flow through an annular groove **30'** into the pipe **31**. On depressing a key valve **33**, the compressed air can flow through an anular groove **33'** into a pipe **34**. From pipe **29** compressed air also flows into a pipe **35** and through a piston groove **36'** and a pipe **37** to impinge on a piston **38** on the side **39** thereof. On the key **32** being in the released position, the piston **38** is displaced to the right in FIG. 4. In this position of said piston, the air in chamber **40** flows through a pipe **41**, an annular groove **36''** and a pipe **42** to atmosphere. On depressing the key valve **33** a chamber **43** is put under pressure through the pipe **34** by which a piston **36** is displaced to the left and is spring-urged in this position by a spring **44**. In this position of the piston **36** the compressed air in the cylinder chamber **39** is released to atmosphere through the pipe **37**, the annular groove **36'** and the pipe **45**. At the same time, compressed air from chamber **43** and pipe **41** is fed into the cylinder chamber **40** on the right-hand side of piston **38**. Consequently piston **38** moves to the left until notched plate **46** abuts against the key valve **33**. The piston **38** is provided with a toothed rack **47** engaging a spur wheel **48**. The movement of piston **38** thus causes a rotary motion of spur wheel **48**. Spur wheel **48** is rigidly connected to spur wheel **50** by means of shaft **49** so that the rotation is transmitted to spur wheel **53** through the idler wheels **51** and **52**. The spur wheel **53** is rigidly connected to the impact type drum **23** through a shaft **24**. One complete axial displacement of piston **38** corresponds to one full revolution of impact

type drum 23. FIG. 6 shows the arrangement of the key valve 33. On depressing key valve 33, compressed air can flow from pipe 31 through the annular groove 33' into the pipe 34 to cause the piston 38 to move to the left as already mentioned. On depressing valve 33, the lower part of this valve projects beyond housing 54 so that the notched plate 46 (FIG. 8) runs up against this part and the piston 38 comes to rest in this position respectively. Each key valve 33 corresponds to a certain rotary movement of the impact type drum 23 so that each key 32 corresponds to an impact type. The present machine is provided with seventy-seven type keys 32 so that also seventy-seven different impact type characters can be used on the machine. Furthermore the pipe 34 is also connected to pipe 55 so that the compressed air can also flow to piston 56. In the position shown in FIGS. 4 and 9, the piston 56 is held in the released position to the left by the spring 57. Air from chamber 58 can flow to atmosphere through the annular groove 57' and the duct 59' (FIG. 9). On supplying compressed air through pipe 55 to the piston 56, the latter is forced to the right and compresses the air in chamber 60 which then flows to the atmosphere through the throttle chamber 61. This throttle chamber 61 is provided with an adjustable orifice so that the flow-off time can be set selectively and thus constitutes a time-delay mechanism. After a certain movement of piston 56 to the right, the annular groove 57'' is connected with duct 63 so that air still present in chamber 60 can flow directly to the atmosphere through the duct 64. In this position of piston 56, the regulating orifice 62 is no longer effective so that the piston 56 moves to the right with a jerk. In this position the compressed air from pipe 55 is led through the duct 65 to the impact piston 30 and the impact stroke is induced upwards. In the normal position, the impact piston 30 is held down by the springs 66 and 66'. When the impact piston 30 moves upwards, the compressed air connection from pipe 29 to pipe 31 is interrupted and the pressure still present in the pipe system of cylinder 38 drops and the air can flow to the atmosphere through pipe 31, chamber 67 and pipe 68 and consequently the pressure on piston 56 also drops so that it is again moved to the left by spring 57. Cylinder 69 is provided with a screw thread 69' and a gear wheel 70 rotatably mounted in the body 1. By means of a setting screw 19 rigidly connected with worm 71 the cylinder 69 can be adjusted vertically to alter the impact stroke of piston 30. On shaft 72 in the top part 2 a hammer 73 is pivotally mounted and, on the same shaft 72, a type retainer 74 is also pivotally fitted. On the one hand the hammer 73 is held in the neutral position by a stop 75, on the other hand by a spring 76 and a pin 77; the type retainer 74 is held against the embossing type 22 by spring 78 and thus keeps the type 22 in the raised position. At the top of the type drum 23 a pin 79 is axially displaceable in the top part 2 and is held in a groove of the type by spring 80. A segment 81 on pin 82 and held in a slot of pin 79 permits withdrawal of pin 79 and removal of impact type 22 upwards. On depressing key valve 33, compressed air flows into chamber 43 and forces the valve piston 36 to the left and the piston 38 is displaced until the notched abutment plate 46 abuts against the depressed key valve 33. This movement of the indexing abutment induces the rotary motion of type drum 23 via transmission 47, 48 and 50–53. At the same time compressed air is led to the retarding valve and induces the impact stroke from piston 30 through hammer 73 to impact type 22 with a predetermined time-delay. By the upward movement of the impact piston 30, the compressed air supply in the whole system is interrupted and consequently all the elements are returned to their initial position. From chamber 43 compressed air is led through pipe 83 to piston 84 so that with each operating motion of key valve 33 piston 84 is also operated. According to FIG. 5, the stroke of piston 84 can be adjusted by means of segment 85 and setting screw 18. Movement of piston 84 can also be effected by hand operation of the rocker 86, the operating rod 87 and the operating lever 14. With every stroke of piston 84 the segment 88, urged downwardly by spring 89, is lifted. A roller clutch 90 is built into the segment 88, said roller clutch 90 being mounted on shaft 91 and effective in one direction only. Thus with each lifting motion of piston 84 an intermittent stepped movement of shaft 91 is obtained. According to FIGS. 5 and 11 the shaft 91 carries roller clutch 90 via a gear 92 which is rotatably mounted on bevel-gear sleeve 93, said bevel-gear sleeve 93 being in turn also rotatably mounted on the shaft 91. An integral gear 94 is axially displaceably mounted on the bevel-gear sleeve 93 and is held in engagement with gear 92 by springs 95, the gear 94 being secured against angular displacement on the bevel-gear sleeve 93 by a key 96. According to FIG. 11 a helical gear 97 meshing with the helical gear 98 is secured to the righthand end of shaft 91 and in addition a bevel gear 100 is rigidly and a supporting cage 99 for the differential gear is rotatably mounted on shaft 91. On rotating the setting knob 16, shaft 91 is positively driven via the helical gears 97 and 98; consequently the bevel gear 100, which meshes with the differential pinions 101 and 101' mounted on the supporting cage 99, is driven so that a movement of ring gear 102 is obtained, said ring gear 102 meshing with the toothed rack 103 rigidly connected with the slide 5. When the piston 84 is operated, a rotary movement of ring gear 102 is obtained via segment 88, roller clutch 90, gear 92, coupling gear 94, bevel-gear sleeve 93 and bevel pinions 101 and 101'; thus the rack 103 is longitudinally displaced by a distance corresponding to the pre-set movement of slide 5 for type-spacing when embossing plate 8. By means of the operating lever 15, operating rod 104, and segments 105 and 106 the gear 94 can be moved to the right according to FIGS. 5 and 11 and in this position is no longer in mesh with gear 92. In this position, the slide 5 can be displaced freely by hand into any desired position of its operating range. As shown in FIG. 5, the operating levers 14 and 15 are held in their position of rest by the springs 107 and 108 respectively. According to FIG. 5, the setting knob 17 is rigidly connected with the spur gear 109 which meshes with the gear 112 via the spur gears 110 and 111, the gear 112 in turn meshing with the toothed rack 21. Thus rotation of the setting knob 17 causes a linear displacement of the cross slide 6 to obtain line spacing when embossing the plate 8. Connected to the setting knob 17, there is also a gear 113 meshing with a control bar 114, said control bar 114 being exchangeable and provided with holes 115, 115' and 115'' spaced to agree with the line spacing of the desired lettering. Built into the machine body 1 there are the detent balls 116 with the detent springs 117 so that on rotary displacement of the setting knob 17 the necessary line spacing is ensured by the detent balls 116.

What I claim is:

1. In a typewriter for metals and plastics, in combination, a plurality of keys, valve means operatively coupled with said keys, a source of fluid pressure, first conduit means connecting said source with said valve means, a rotatably displaceable type magazine, a plurality of type faces in said magazine displaceable past a predetermined impact position, each of said type faces being associated with a respective key and alignable with said position in a predetermined angular position of said magazine, fluid-pressure-responsive indexing means connected to said valve means for detecting an actuated one of said keys, said indexing means being provided with a movable abutment positively engageable with said actuated key, and transmission means positively coupling said abutment with said magazine angularly displacing same to locate a re-

spective one of said type faces at said impact position in response to the actuation of said one of said keys.

2. The combination according to claim 1, further comprising fluid-pressure-responsive hammer means at said impact position, said hammer means being adapted to engage a type face at said impact position, and second conduit means interconnecting said valve means and said hammer means whereby actuation of said one of said keys triggers said hammer means, said second conduit means including time-delay valve means adapted to induce an interval between the instant of actuation of said one of said keys and the instant of activation of said hammer means sufficient to permit the positioning of said one of said type faces at said impact position.

3. The combination according to claim 2 wherein said hammer means comprises a piston, means for transmitting the impact of said piston to said one of said type faces at said impact position, and adjustment means for regulating the effective stroke of said piston.

4. The combination according to claim 1, further comprising a carriage for supporting an object adapted to be imprinted with the characters of said type faces, fluid-pressure-responsive first shifting means connected to said carriage for letter-spacing displacement of said carriage past said impact position, and second conduit means connecting said shifting means with said valve means, said shifting means including a reciprocable piston, intermittently operable unidirectional clutch means connected to said piston, and mechanism interconnecting said clutch means and said carriage for advancing it with substantially constant increments upon intermittent operation of said clutch means.

5. The combination according to claim 4, further comprising manually operable means for adjusting the letter-spacing displacement of said carriage.

6. The combination according to claim 4, further comprising a cross-slide slidably mounted on said carriage, and second shifting means connected to said cross-slide for line-spacing displacement of said cross-slide past said impact position in a direction generally perpendicular to the direction of displacement of said carriage.

7. The combination according to claim 6, further comprising manually operable means for adjusting the line-spacing displacement of said cross-slide.

8. The combination according to claim 4 wherein said carriage is provided with fastening means adapted to engage said object.

9. The combination according to claim 8 wherein said carriage is provided with a substantially planar anvil surface adapted to support said object.

10. The combination according to claim 8 wherein said carriage is provided with a convex anvil surface adapted to support said object.

11. The combination according to claim 10 wherein said convex surface is provided with at least two angularly spaced grooves adapted to engage opposite longitudinal edges of said object.

12. The combination according to claim 4, further comprising an ink ribbon interposable between said one of said type faces and said object.

13. In a typewriter for metals and plastics, in combination, a plurality of keys, valve means operatively coupled with said keys, a source of fluid pressure, first conduit means connecting said source with said valve means, a rotatably displaceable type magazine provided with a plurality of type faces displaceable past a predetermined impact position, each of said type faces being associated with a respective key, fluid-pressure-responsive indexing means connected to said valve means for positioning one of said type faces at said impact position in response to the actuation of a respective one of said keys, fluid-pressure-responsive hammer means at said impact position engageable with a type face disposed at said position, second conduit means interconnecting said valve means and said hammer means whereby actuation of said one of said keys triggers said hammer means, said indexing means including first restoring means and said hammer means including second restoring means, and pressure-relief valve means connected to said first and second conduit means and operatively connected to said hammer means for venting said first and second conduit means upon triggering of said hammer means, thereby restoring said indexing means and said hammer means to respective rest positions.

14. In a typewriter for metals and plastics, in combination, a plurality of keys, valve means operatively coupled with said keys, a source of fluid pressure, first conduit means connecting said source with said valve means, a rotatably displaceable type magazine provided with a plurality of type faces displaceable past a predetermined impact position, each of said type faces being associated with a respective key, fluid-pressure-responsive indexing means connected to said valve means for positioning one of said type faces at said impact position in response to the actuation of a respective one of said keys, fluid-pressure-responsive hammer means at said impact position engageable with a type face disposed at said position, and second conduit means interconnecting said valve means and said hammer means whereby actuation of said one of said keys triggers said hammer means, a valve member connected to each of said keys, said indexing means comprising a fluid-responsive piston, a notched selector plate secured to said piston and adapted to sweep said array and to engage the valve member of said one of said keys, and transmission means interconnecting said piston and said type magazine whereby the displacement of said selector plate into engagement with the valve member of said one of said keys upon the actuation of the latter is translated into a displacement of said magazine thereby positioning said one of said type faces at said impact position.

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