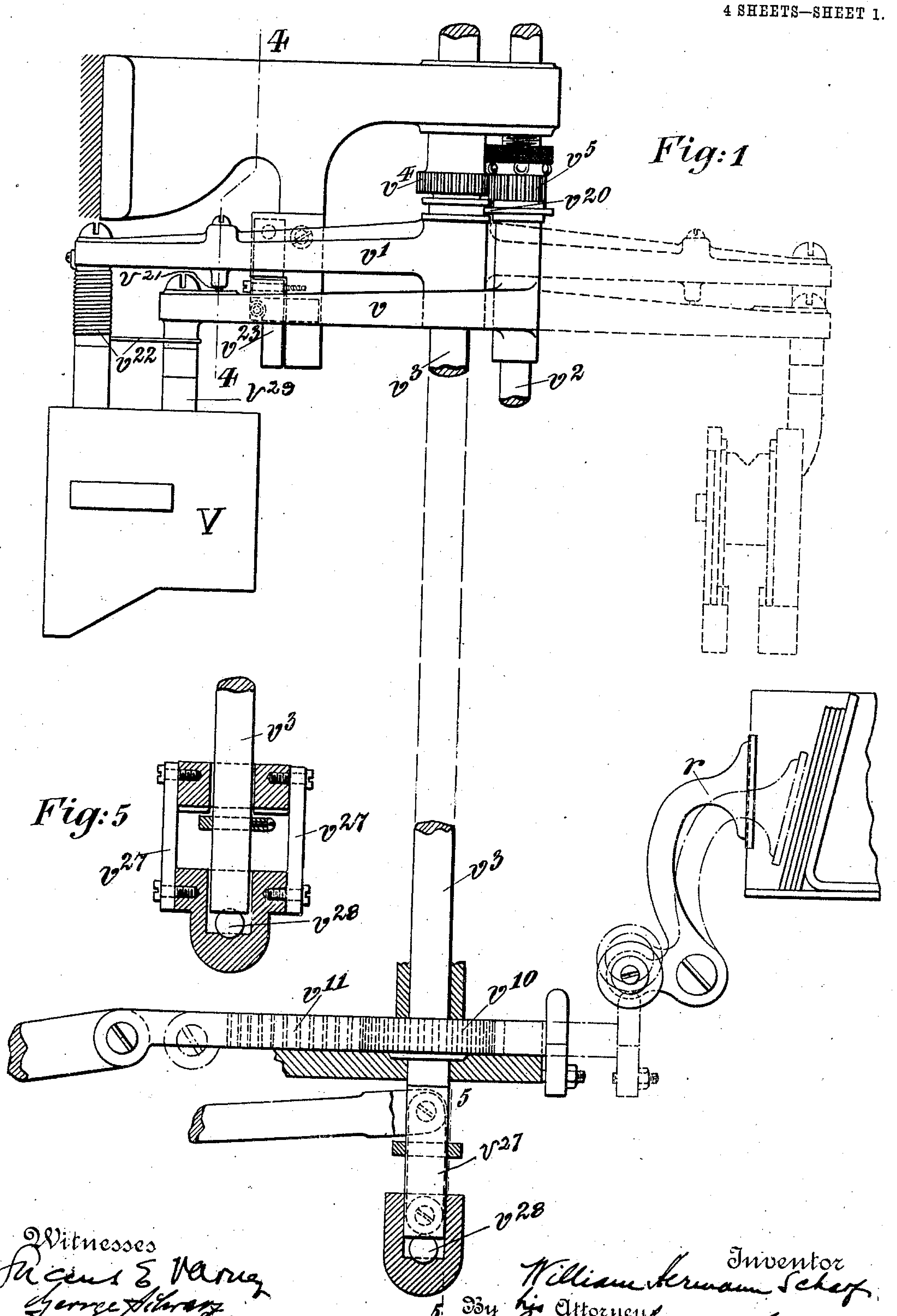
No. 886,646. PATENTED MAY 5, 1908.

W. H. SCHARF.

LINOTYPE MACHINE.

APPLICATION FILED MAR. 22, 1906.

4 SHEETS—SHEET 1.



Witnesses

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4 SHEETS—SHEET 2.

Fig: 2

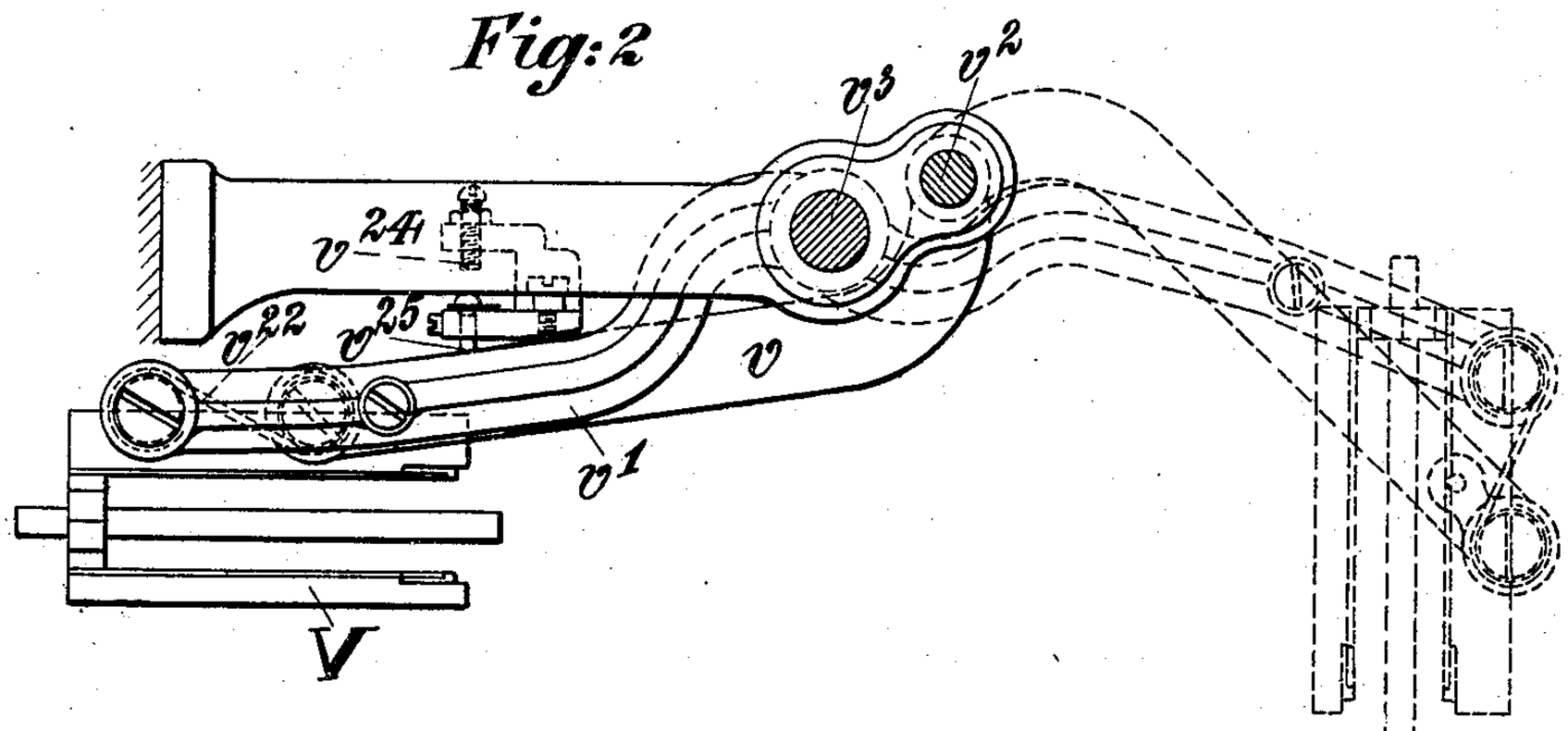


Fig: 3

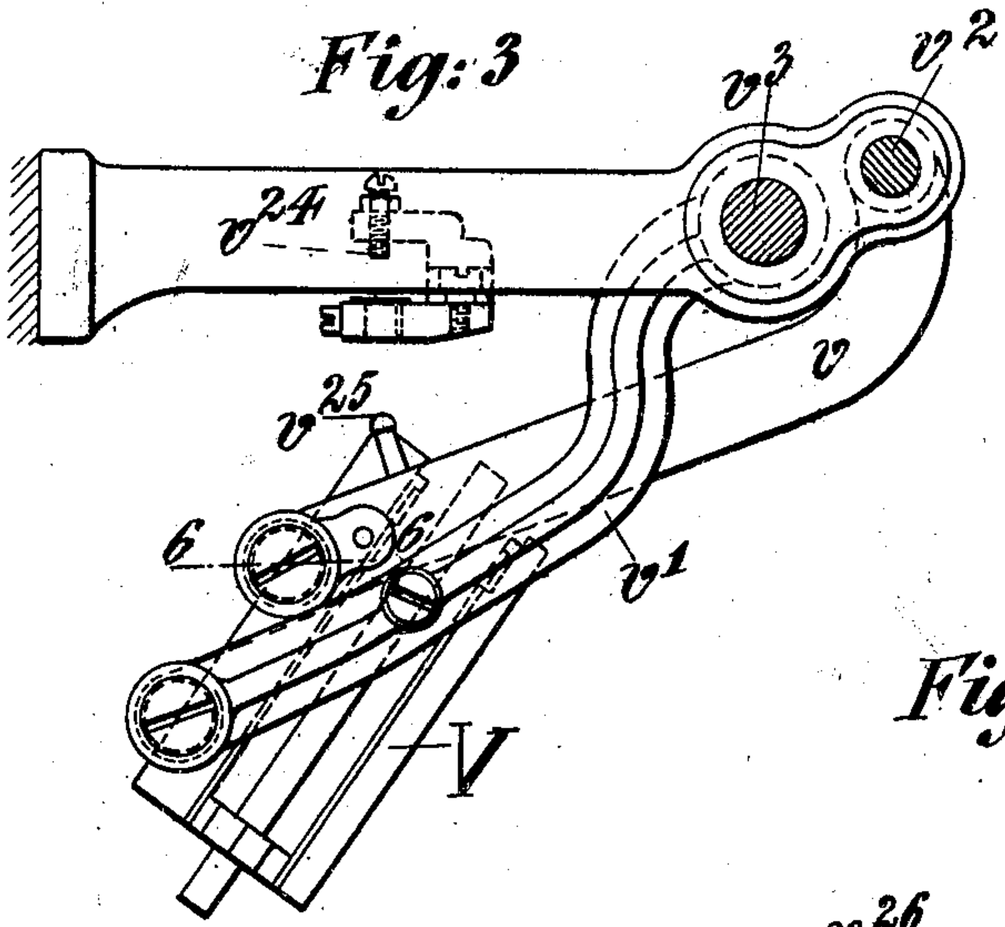


Fig: 4

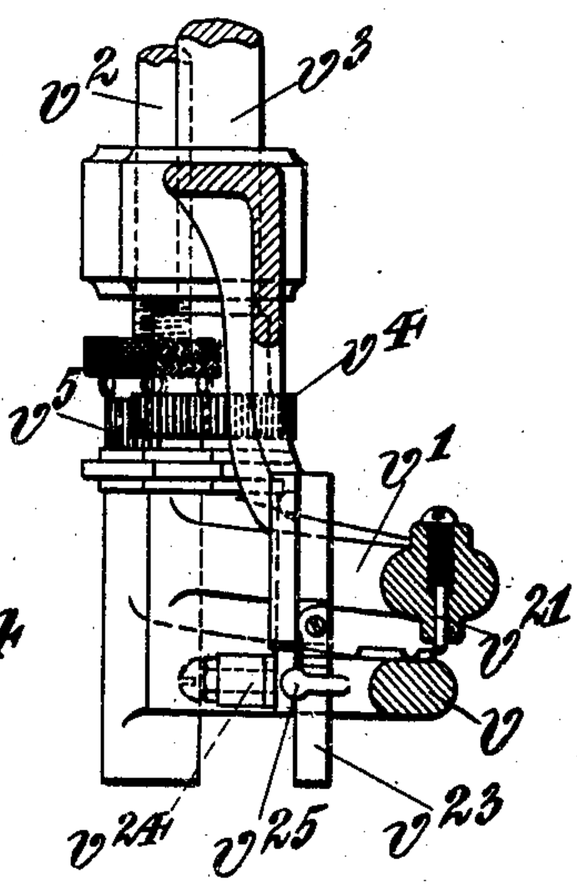
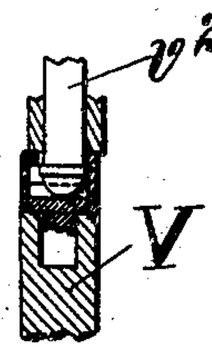


Fig: 6



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4 SHEETS—SHEET 3.

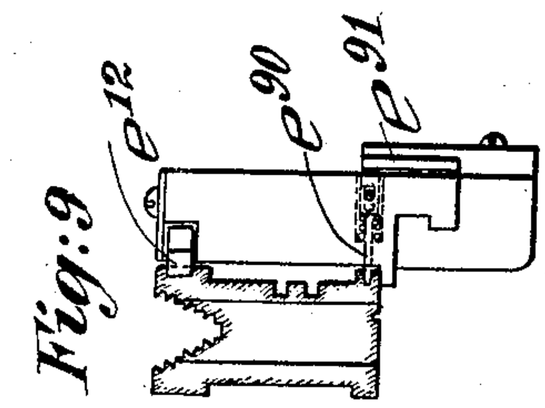

Fig: 9

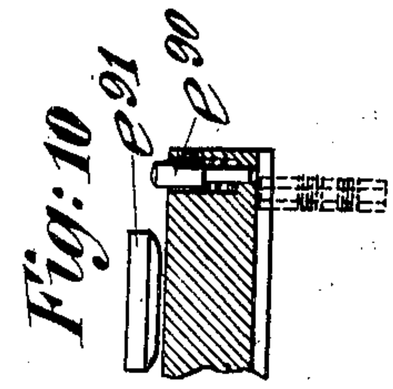

Fig: 10

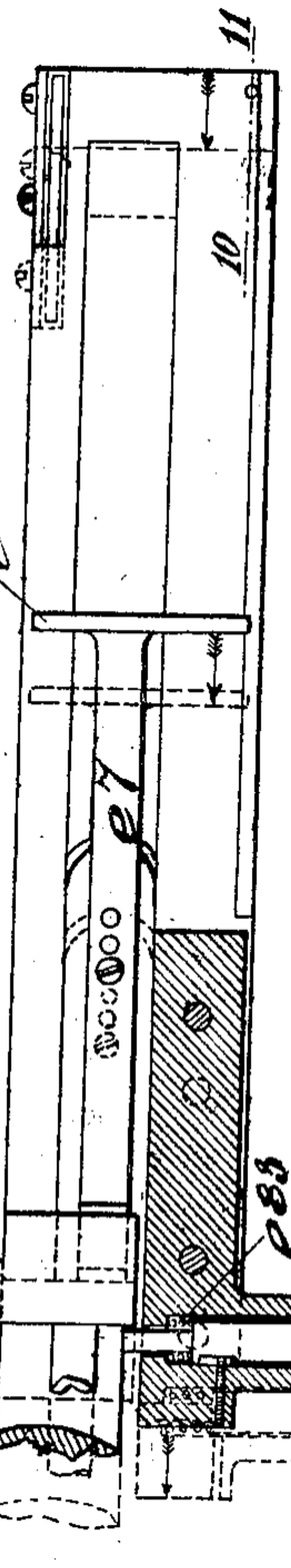

Fig: 8

Fig: 11

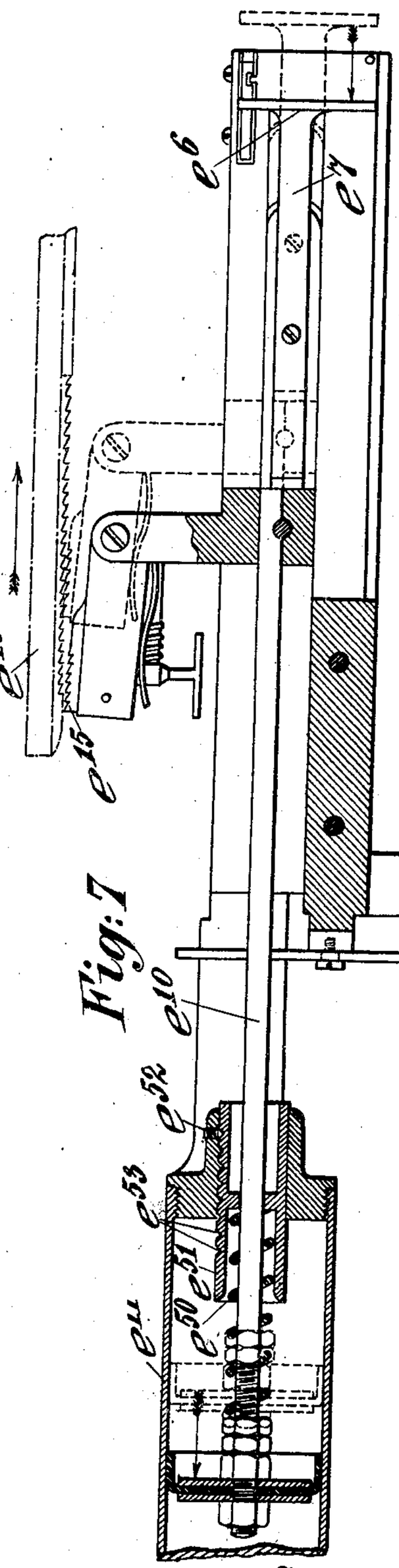

Fig: 7

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4 SHEETS—SHEET 4.

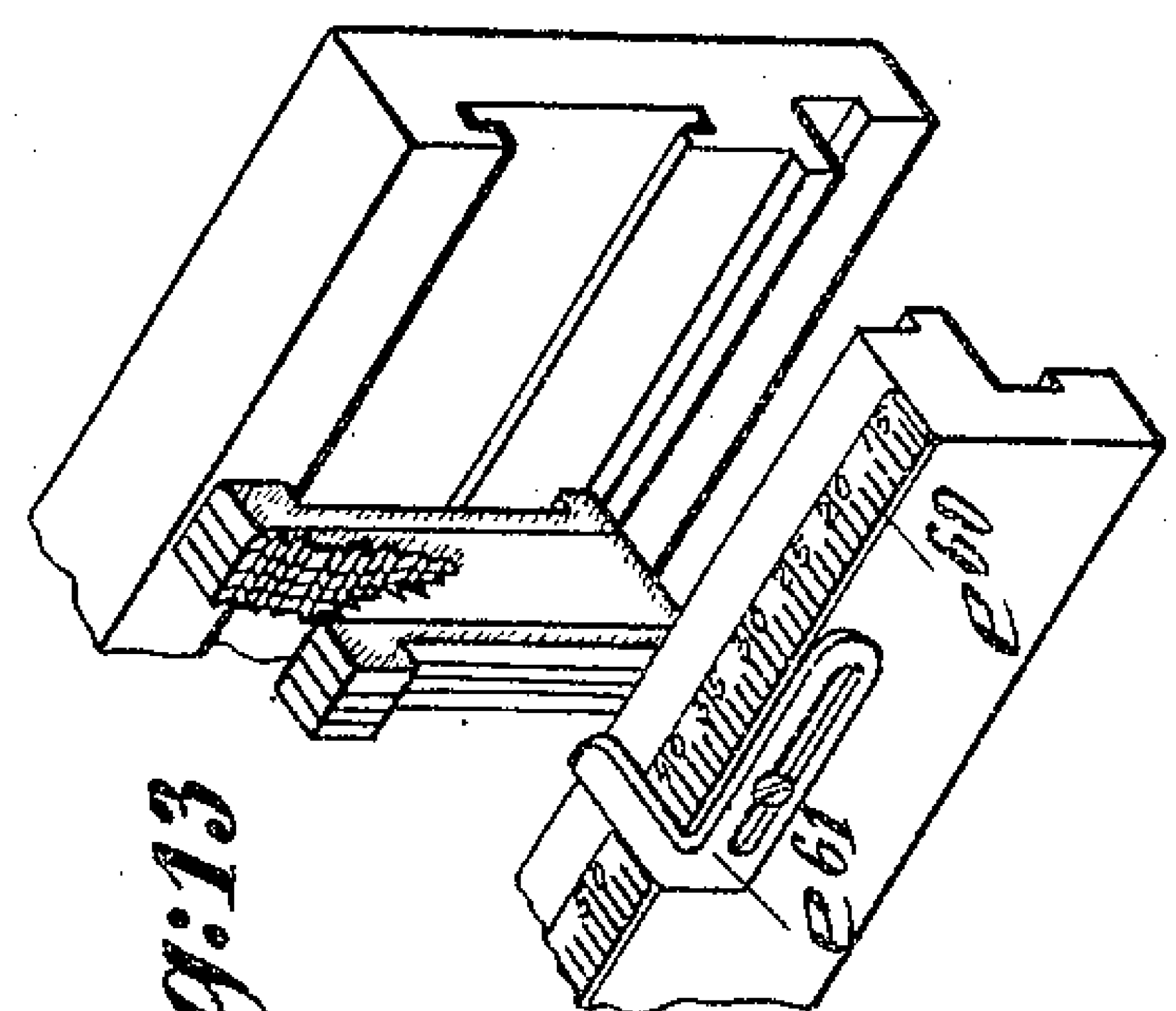

Fig:13

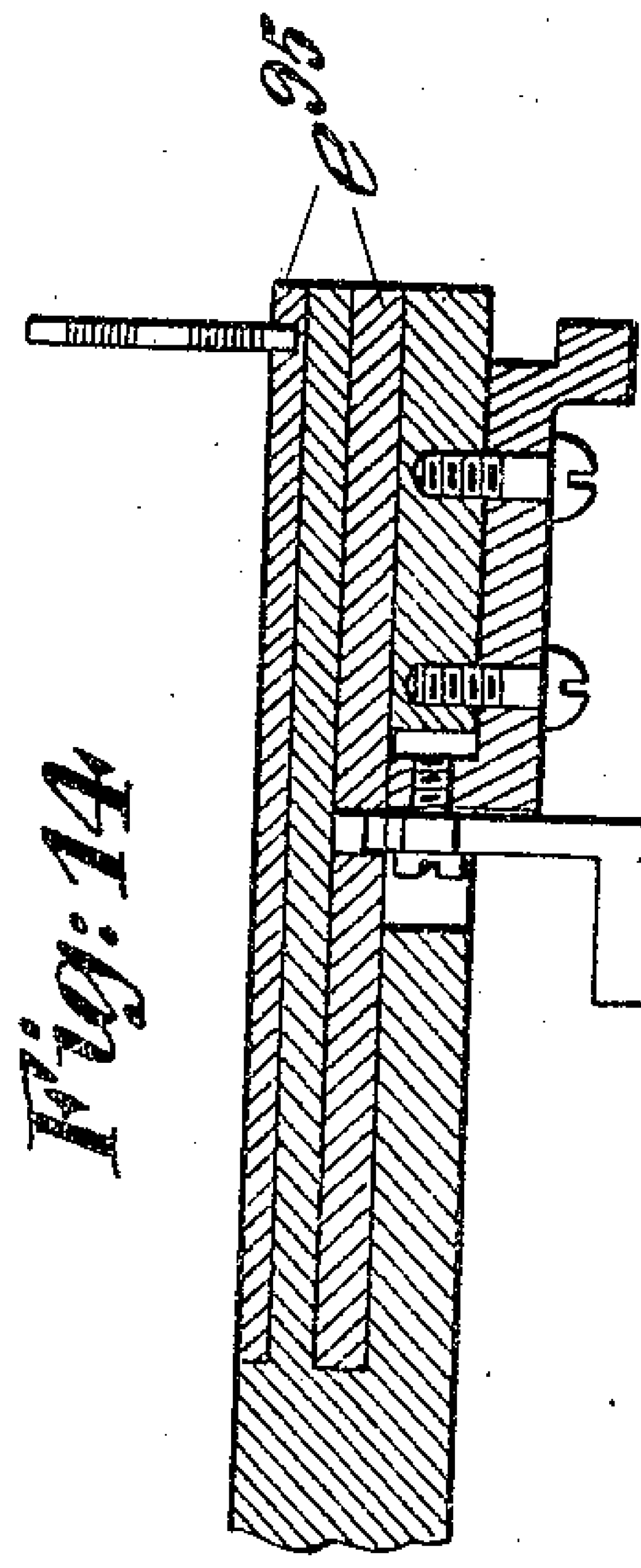

Fig:14

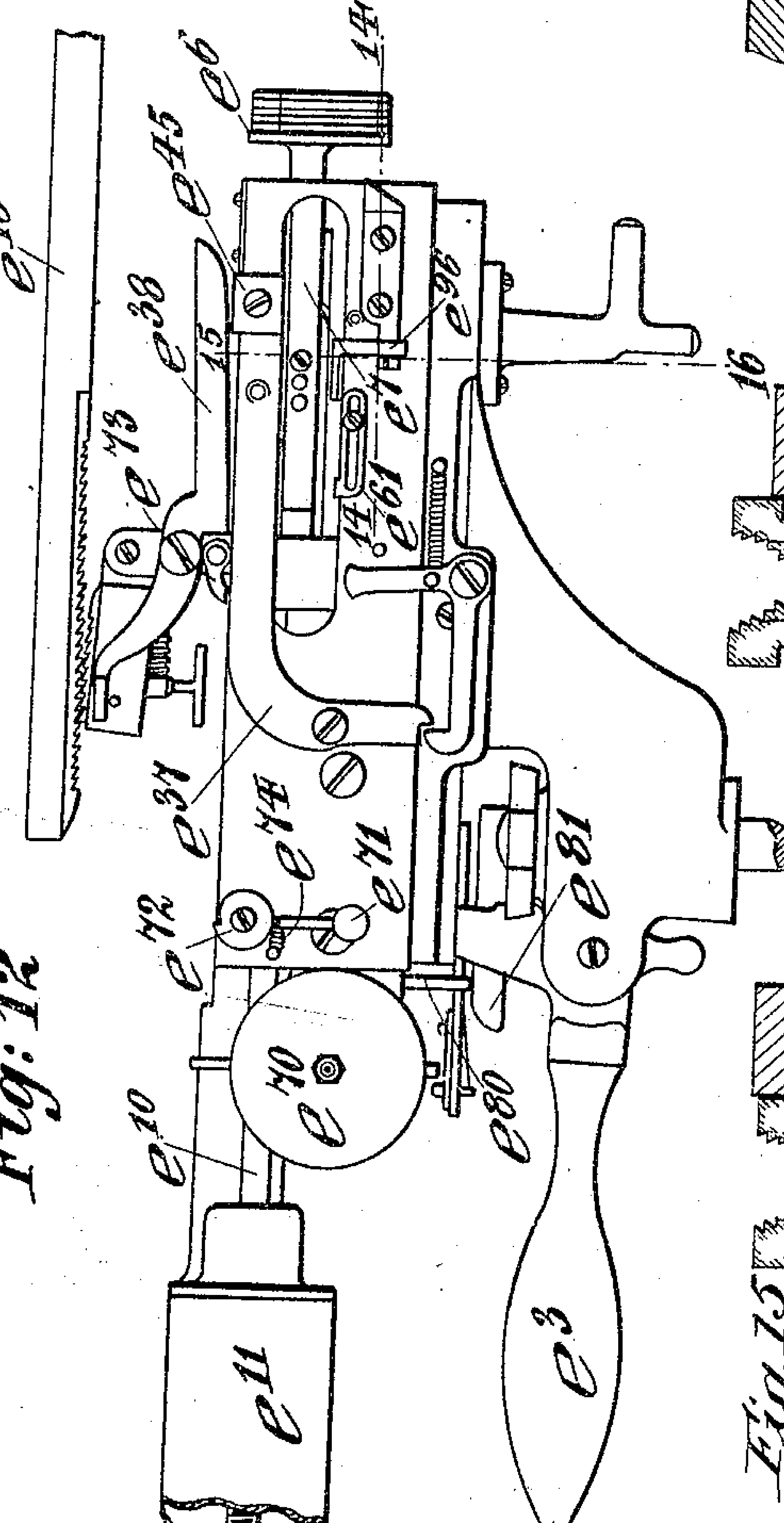

Fig: 12

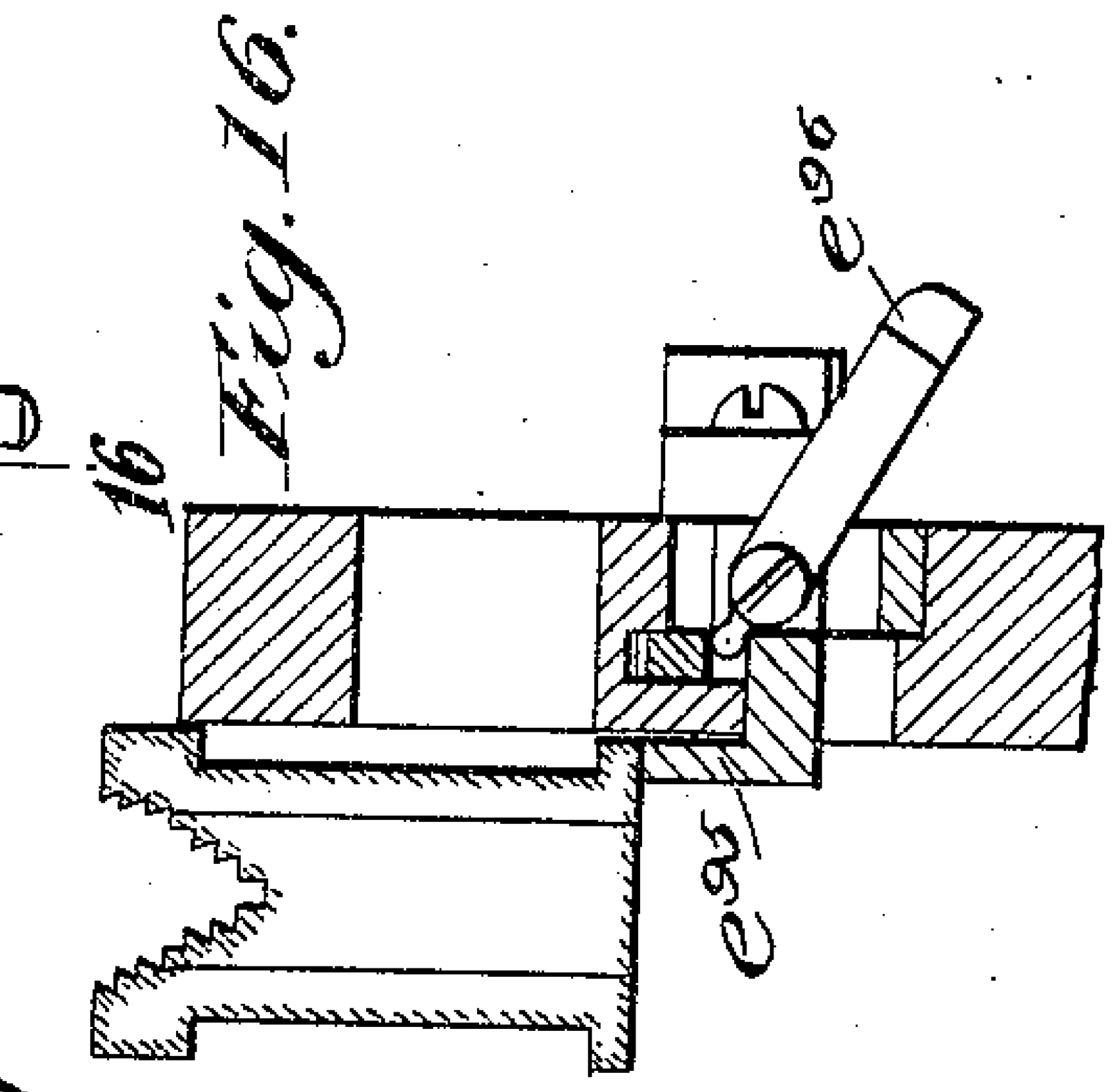

Fig. 16.

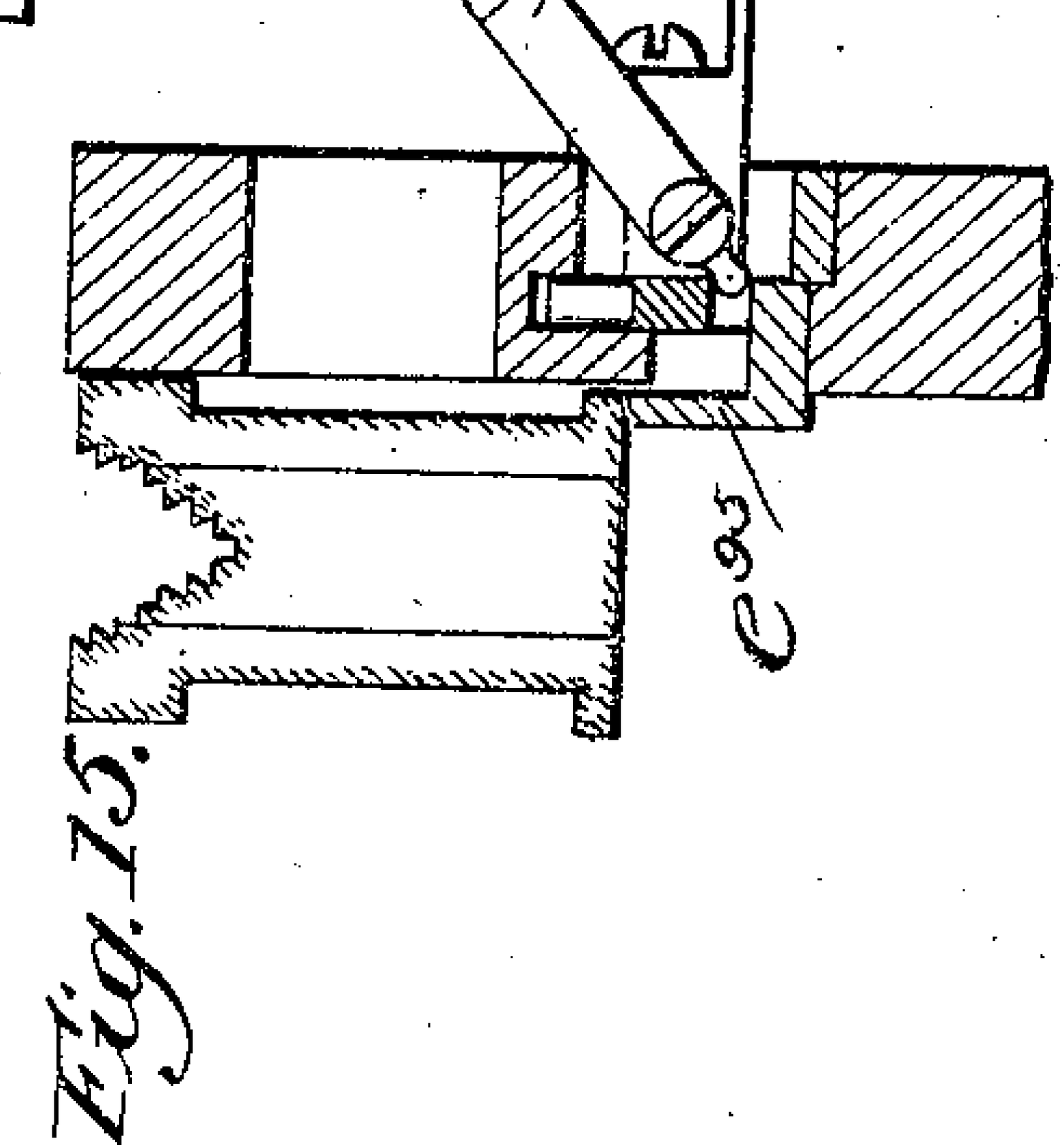

Fig. 15.

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UNITED STATES PATENT OFFICE.

WILLIAM HERMANN SCHARF, OF MONTREAL, QUEBEC, CANADA, ASSIGNOR TO TORONTO TYPE FOUNDRY COMPANY, LIMITED, OF TORONTO, CANADA, A CORPORATION OF CANADA.

LINOTYPE-MACHINE.

No. 886,646. Specification of Letters Patent. Patented May 5, 1908.

Application filed March 22, 1906. Serial No. 307,358.

To all whom it may concern:

Be it known that I, WILLIAM HERMANN SCHARF, a subject of the King of Great Britain, and a resident of Montreal, in the Province of Quebec and Dominion of Canada, have invented certain new and useful Improvements in Linotype-Machines, of which the following is a specification, reference being had to the accompanying drawings, forming a part thereof.

One object of the invention is to improve in various particulars the linotype machine shown and described in the Poe and Scharf United States Letters Patent, No. 734,746, dated July 28, 1903. In this machine, the mechanism for transferring the space bands from the assembler box back into the space band box has been found to have a tendency to stick at the point where it starts to turn from the angle for receiving the space bands from the assembler box to the angle for the delivery of the space bands into the space band box. This tendency to stick is caused by the particular relation which the pivots for the supporting arms for the space band elevator bear to each other in this position, and such sticking, when it occurs, not infrequently results in the jamming or breaking of the parts. It is thus particularly desirable to obviate it as well as to provide a substantially frictionless mechanism for effecting the raising and lowering of the space band elevator.

It is also desirable for purposes of simplification, to provide other connections for operating the slug lever or pusher than those illustrated and described in said Letters Patent which are operated from the melting pot leg; and accordingly in the present case the slug lever or pusher is so connected as to be operated from the rack which serves to furnish the rotary movement to the space band elevator.

The invention also includes other improvements relating particularly to the assembling mechanism of linotype machines and in the embodiment of these improvements special reference is made herein to the assembling mechanism shown and described in the aforesaid Letters Patent and in my application for Letters Patent Serial No. 237,427, filed Dec. 19, 1904.

All of the improvements will be more fully described hereinafter with reference to the accompanying drawings in which they are illustrated as conveniently and practically embodied.

In said drawings: Figure 1 is a view in elevation of the space band elevator, with the mechanism for effecting the rotation and the raising and lowering thereof shown partly in elevation and partly in section, the dotted lines indicating the position of the elevator for delivering the space bands to the space band box. In this figure the galley and slug pusher or lever are also partially shown in elevation and in the relation which they occupy to the space band elevator mechanism. Fig. 2 is a plan view of the space band elevator mechanism shown in Fig. 1. Fig. 3 is also a plan view of this mechanism showing the elevator as it is advancing to deliver the space bands to the space band box. Fig. 4 is a detail sectional view, the plane or planes of which are indicated by the line 4—4 in Fig. 1. Fig. 5 is a detail sectional view, the plane of which is indicated by the line 5—5 in Fig. 1. Fig. 6 is a detail sectional view, the plane of which is indicated by the line 6—6 in Fig. 3. Fig. 7 is a sectional view taken longitudinally through the center of the assembler or assembler box, a portion of the actuating bar for transferring the matrix line being shown. Fig. 8 is a similar view, with the actuating bar, dash pot and some of the other parts omitted, the section taken showing the positive stop for the sliding parts of the assembler and the relation of the stop to a cam on the assembler support. Fig. 9 is an end view of this section showing the end of a matrix line. Figs. 10 and 11 are detail sectional views of the end of the assembler, the plane of both sections being indicated at 10—11 in Fig. 8. Fig. 12 is a view in side elevation on a smaller scale of the assembler and its support with the actuating bar indicated and with a portion of the dash pot broken away. Fig. 13 is a detail perspective showing particularly the adjustable scale upon the assembler. Fig. 14 is a horizontal section through one side of the assembler, the plane of the section being indicated by the line 14—14 in Fig. 12. Figs. 15 and 16 are detail sectional views of this same side of the assembler, the plane of these sections being indicated by the line 15—16 in Fig. 12.

Referring first to Figs. 1 to 5 inclusive, the improved mechanism for transferring the space bands from the assembler to the space band box will be described. For a complete description of this mechanism, reference should be had to the Letters Patent above mentioned for in the present case only so much of the mechanism will be referred to as is necessary to a complete understanding of the improvements. The elevator proper or box V is supported by two arms v and v' respectively, which are pivoted thereto, the latter v' being secured to a shaft v^3 which is provided with a pinion v^4 meshing with another pinion v^5 held in frictional engagement with a guide v^2 upon which the arm v is free to move and rotate. The shaft v^3 is substantially vertical and is mounted to move longitudinally and has a movement of rotation imparted to it through suitable means such as a pinion v^{10} and a rack v^{11}. Through a collar and groove connection v^{20} between the two arms v and v', the two arms are compelled to rise and fall together while they are permitted to turn horizontally about their different centers. By the rotation and the rising and falling of the shaft v^3 the elevator V is shifted from its position for receiving the space bands fro the assembler to its position for delivering the space bands to the space band box and back again, being brought in both positions to precisely the proper angle for receiving the space bands and for delivering them respectively. When the elevator V is at rest between its successive operations, it is in the position illustrated in dotted lines in Figs. 1 and 2. After a line has been cast, it turns in a substantially horizontal plane to the position indicated in full lines in those figures and then descends directly downward, without turning, until it has reached the assembler and has received the space bands which are to be transferred to it from the assembler. When the space bands have been transferred, it rises again and, without turning, ascends to the position of the full lines in Figs. 1 and 2. Then the rotation of the shaft v^2 commences again and causes the assembler together with its supporting arms to move from the position in full lines to the position indicated in dotted lines in these figures, in which position it is ready to deliver the spacers to the space band box. All of this has been fully described in the Letters Patent above referred to.

In the rising and falling of the elevator just described, it is desirable that its angular position be undisturbed by the vibrating of the machine and the like, so that it will properly position itself with respect to the assembler and will return to its first position after receiving the space bands without change. This result is effected by means of a connection between the two arms which may consist of a spring actuated pin v^{21} in one of the arms engaging in a corresponding recess in the other of the arms. After the elevator V has thus risen to the full line position with space bands contained therein, the rotation of the shaft v^3, as was said before, commences. It will be observed particularly from Fig. 2 that in this position the four points, the two at which the two arms are pivoted and the two at which the elevator V is pivoted to said arms, are very nearly in line with each other and it will not be difficult, therefore, to understand why the mechanism tends to stick and jam when the elevator commences to turn. It is practically "on center" and means are provided in accordance with this invention to throw the mechanism off center just as the shaft v^3 starts its rotation. This mechanism may comprise a spring v^{22} so coiled about the wrists upon the arms v and v' that it will tend to push the upper arm v' forward and the lower arm v backward, means being also provided to sever the connection v^{21} between the two arms as the shaft v^3 commences to rotate. This means may consist of a catch v^{23} pivoted upon the frame of the machine and movable backward but held from forward movement by its square upper edge. Said means may further include a lug v^{25}, with an enlarged and preferably round head, upon the lower arm v which lug, when the elevator rises, rides behind the catch. The latter is provided with an inclined cam surface so that when the elevator has reached its highest point the lower arm v will have been drawn back sufficiently to sever the connection v^{21} (Fig. 4). At this moment the spring v^{22} comes into operation and still further separates the two arms and the rotation of the shaft v^3 commences. The catch is so formed, as will be seen from the drawings, as to permit the passage of the head of the lug v^{25} past the same when the rotation commences. When the space bands have been delivered to the space band box, the elevator remains at rest in the dotted line position until the next line has been cast, when it returns from the position indicated in the dotted lines to the position of the full lines to receive the space bands from the next line, the lug v^{25} pushes the catch v^{23} back out of the way. The head of the lug v^{25}, when it returns to this position, strikes a set screw v^{24} adjustable in a suitable bracket, so as to stop the movement of the two arms at exactly the proper point, to bring the arms into the correct relation which they should occupy with respect to each other as the elevator descends. In this position, as already stated, the pin v^{21} drops into its recess.

In order to facilitate further the proper operation of the turning movement of the

elevator, a loose or sliding connection may be made between the lower arm v and the elevator proper V. This connection may consist, as shown in Fig. 6, of a stud v^{26} firmly secured to the wrist v^{29} on the arm v and provided with an eccentric head engaging in a slot formed on the elevator V and adapted to slide freely to and fro therein. This free connection will obviously eliminate the rigidity present in the original mechanism.

The rising and falling of the shaft v^3 is effected, as described in the Letters Patent above recited, through a suitable cam, connections being made between the cam and the lower end of the shaft. In the present case, in order to render the mechanism as frictionless as possible, a journal seat v^{27} (Fig. 5) is provided for the bottom of the shaft and a ball bearing v^{28} is inserted, between the bottom of the shaft and the journal seat. The connection to the cam is made with the journal seat whereby, as will be readily understood, the shaft may be raised and lowered (Figs. 1 and 5).

In the pr[illegible] case furthermore, the connections fo[illegible] rating the slug pusher or lever r, which reciprocates to act as a stacker for the slugs in the galley, are simplified. Instead of connecting said lever and the melting pot leg, these connections comprise a suitable cam on the end of the rack v^{11} which coöperates with a roller upon one member of the two armed slug pusher r to effect the intermittent movements of said pusher.

The improvements upon the assembler box or assembler are illustrated in Figs. 7 to 16 inclusive. Referring to Fig. 7, the mechanism for drawing back the head of the slide e^6 into the assembler will first be described. After the assembled line has been discharged and the lever e^{37} and its associated parts have operated to disengage the pawl e^{15} from the actuating or transfer bar e^{16}, this slide e^6, as will be understood, is in its forward position and but for the mechanism about to be described would project out of the forward end of the assembler, as indicated by the dotted lines in Fig. 7; and by striking or jamming against the adjacent parts of the machine, would prevent the assembler from being turned back properly from its discharging to its receiving position. To obviate this, some such element as a spring e^{50} is provided, preferably inside the dash pot e^{11}, one end of the spring bearing against the forward end of the dash pot, and the other end against a nut upon the piston rod e^{10} of the dash pot. Inasmuch as the slide e^6, is made adjustable with reference to the sliding parts which carry the pawl e^{15} so that the machine may be adapted for casting lines of different lengths, means are provided to adjust the tension of the spring e^{50} so that whatever may be the position of the slide e^6 upon the sliding parts, this spring will always act to draw back the slide at the proper time in the manner just described. For this purpose a bushing e^{51} is provided at one end of the dash pot and in said bushing a seat for the spring is formed. Means such as a screw e^{52} in the end of the dash pot adapted to engage notches e^{53} in the exterior of the bushing may also be provided to adjust the position of the bushing in the end of the dash pot and thus to vary the position of the forward end of the spring. The dotted lines in Fig. 7 indicate the position of the head e^6 and the piston just before the pawl e^{15} is disengaged from the bar e^{16} and the full lines indicate the position of the same parts just after the pawl has been disengaged from the bar and the spring e^{50} has performed its function of drawing in the end of the slide.

In Figs. 12 and 13, a scale e^{60} and a finger or line indicator e^{61} adjustable upon the side of the assembler are illustrated. By this means it is possible to gage the length of the assembled line and to adjust accurately the relation of the parts for lines of different lengths. One side of the assembler is preferably slotted so that the line is clearly visible therein, and the scale is formed upon or secured to the lower slide of the slot. The finger is secured upon the side of the assembler and projects through into the slot. For the purpose of making the finger adjustable, it may itself be provided with a slot and may be secured to the side of the assembler by a screw the shank of which projects through this slot. In this way, whatever the length of the line to be cast, the gage may be so set as to indicate clearly when such a line is completely assembled or to indicate the partial assembling of the line, or to measure the line or any part thereof, or to indicate the position of the slide e^7 upon the sliding parts for a line of predetermined length.

As it is desirable to know just when the limit of any line, no matter what the length, is being approached, an alarm is provided. This alarm may comprise a bell e^{70}, and a hammer e^{71} pivoted upon the side of the assembler and provided with a cam e^{72} adapted to be engaged by a pawl e^{73} operatively connected with the slide e^6, just before the assembled line is completed. The arrangement is such that the pawl e^{73} will ride over the cam e^{72}, moving the hammer against the action of a spring e^{74} and releasing the same so that the hammer under the actuation of the spring will strike the alarm just before all of the matrices and space bands have been gotten into the assembler which go to make up the line. This will allow one or two more matrices or space bands to be inserted after the alarm is given.

In order to limit positively the length of a line so as to make doubly sure that no line

will be presented to the mold which is too long, a positive stop is provided in the assembler and this is illustrated particularly in Fig. 8. This stop may consist of a pin e^{80} vertically slidable in the assembler and held, when the assembler is in its receiving position, so that the upper end thereof will project sufficiently into the assembler to engage the sliding parts and prevent the slide e^{7} from moving backward more than a predetermined distance. In order to hold this slide in such a position during the assembling of the line, a horizontal piece e^{81} may be provided upon the assembler support and the end of the same may be rounded so as to form a cam surface e^{82} over which the pin rides when the sliding parts of the assembler are drawn backwardly by the depression of the handle e^{3}, as is explained in my application for Letters Patent above referred to. After the pin has left the supporting piece e^{81} it drops either of its own weight or on account of a spring e^{83}, and the top of the pin is thus withdrawn from the interior of the assembler so as not to interfere with the action of the sliding parts during the discharge of the line. When the assembler is turned back to its original position and the handle e^{3} is released, the upper part of the assembler slides forward and draws the pin back over the cam e^{82} and upon the supporting piece e^{81} again. The dotted lines indicate the position of the parts while the handle e^{3} is depressed and the full lines indicate the position of the parts while the line is being assembled with the handle e^{3} in its normal position.

The lever e^{37} serves with the lever e^{38} and its associated parts (Fig. 12), as was explained in the application aforesaid, to release the pawl e^{15} from the bar e^{16} after the line has been transferred. Inasmuch as the position of the slide e^{7} is changed from time to time with reference to the pawl e^{15}, that is with reference to the sliding parts, to adapt the assembler for lines of different lengths, it will obviously be necessary to provide some such means as a rider e^{45} adjustable upon the lever e^{37} or the lever e^{38} in order that these two levers shall always properly cooperate to release the pawl e^{15} after the line has been delivered from the assembler.

In order to prevent the pieing of the assembled line during the turning of the assembler from its receiving position to its discharging position, the end of the line is held both at the top and at the bottom. In the Letters Patent above referred to, pawls e^{12} were described to hold the end of the line at the top. In the present case, in addition to these pawls for holding the line at the top, a sliding member or pawl actuated by a spring is provided to hold the bottom of the line. This member may comprise a pin e^{90} slidable in the upper part of the assembler with its outer end normally projecting (Fig. 10). Upon the lower or fixed part of the assembler a cam piece e^{91} may be secured in such a position that when the upper part of the assembler is drawn back by the depression of the handle e^{3} (and this will take place, it will be remembered, when the line has been completed and is ready to be transferred from the assembler to the line support for the casting), the projecting end of the pin e^{90} will ride upon the cam piece and the pin will be slid into the assembler so that its other end will project into the interior of the assembler box and act as a stop for the lower end of the matrix line (Figs. 9 and 11), by engaging one of the shoulders on the lower edge of the end matrix.

It sometimes happens in the assembling of a line that one or more matrices or spaces will get into the wrong position or for some reason will have to be removed or changed. The removal or replacing of any matrix, which has been brought into the assembler and forms a part of the assembled line, has been heretofore more or less of a clumsy operation for the operator. He has had to dig down into the assembler with one finger or with some tool in order to raise the matrix which he wishes to remove. To obviate this difficulty, the assembler is provided with a member e^{95} (Figs. 14 and 15) upon which the bottom of the matrix line rests to some extent, so that by raising this member the whole line will be raised to such a position as will permit the operator to remove any matrix without difficulty. In the present case said member is preferably trough-shaped, as shown in Figs. 14 and 15, and a lever e^{96} is pivoted upon the assembler and engages the trough-shaped member e^{95} whereby by the depression of the lever the member e^{95} will be raised and with it the line of matrices.

The several improvements are obviously capable of other embodiments than those shown and described herein, and it is understood that the present illustrations and descriptions are explanatory, there being no intention of limiting the invention thereto. It will be clear too that some of the improvements may be employed in other linotype machines than those shown and described in the Letters Patent and in the application for Letters Patent referred to hereinbefore.

I claim as my invention;—

1. In a linotype machine, the combination with a space band elevator having two supporting arms pivoted thereto for transferring the elevator from one position to another, of a connection to fasten the two arms in a particular relation to each other, and means to unfasten said arms.

2. In a linotype machine, the combination with a space band elevator having two supporting arms pivoted thereto and to the machine for transferring the elevator from one

position to another, of a connection to fasten the two arms in a particular relation to each other with the pivots nearly in line, and means to move the arms off center when the arms have been unfastened.

3. In a linotype machine, the combination with a space band elevator having two supporting arms pivoted thereto for transferring the elevator from one position to another, of a pin to hold the two arms in a particular relation to each other, a stud and catch to unfasten said arms, and a spring to move said arms when they have been unfastened.

4. In a linotype machine, the combination with a space band elevator, a rack for imparting rotary motion to the same, a galley, a slug lever operating as a stacker for the slugs in the galley, and means whereby said lever is operated intermittently from the rack.

5. In a linotype machine, the combination with a turning assembler having a slide acting against one end of the assembled line and for discharging the same, of means to retract said slide after the discharge of the line.

6. In a linotype machine, the combination with a turning assembler having a slide acting against one end of the assembled line and for discharging the same, of a spring to retract said slide after the discharge of the line.

7. In a linotype machine, the combination with a turning assembler having a slide acting against one end of the assembled line and for discharging the same, of a dash pot operatively connected to the slide, and a spring within the dash pot to retract said slide after the discharge of the line.

8. In a linotype machine, the combination with a turning assembler having a slide acting against one end of the assembled line and for discharging the same, of a spring to retract the slide, and means to adjust the spring for long and short lines.

9. In a linotype machine, the combination of an assembler having sliding parts to transfer the line, a transfer bar, operative connections between said parts and bar, and means to sever said connections adjustable for long and short lines.

10. In a linotype machine, the combination of an assembler having sliding parts to transfer the line, a transfer bar, operative connections between said parts and bar, and a lever on the assembler operating to sever said connections, a rider thereon to adjust said lever for long and short lines.

11. In a linotype machine, the combination with an assembler box of a stop to limit the line, a handle to control the discharge of the line, and means under control of the handle to remove the stop from interference with the discharge of the line.

12. In a linotype machine, the combination with an assembler box of a stop to limit the line, means to control the discharge of the line including a handle and a sliding portion of the assembler box, and a cam in operative relation with the stop whereby as the sliding portion of the assembler box is moved through the operation of the handle, the stop is removed from interference with the discharge of the line.

13. In a linotype machine, the combination with a turning assembler, of a movable member to limit the length of the line, and a fixed cam upon which said member is supported during the composition of the line, the turning of the assembler in one direction being adapted to move said member off the cam and the turning of the assembler in the opposite direction being adapted to restore said member upon the cam.

14. In a linotype machine, the combination with a turning assembler, of a sliding pawl in the end of the assembler to engage the lower end of the assembled line to retain the matrices during the movement of the assembler, and means to slide said pawl into engagement with the line when the assembler is moved.

15. In a linotype machine, the combination with a space band elevator having two supporting arms pivoted thereto for turning the elevator from one position to another, of means to push one arm in advance of the other as the arms start to turn the elevator.

16. In a linotype machine, the combination with a space band elevator having two supporting arms pivoted thereto and to the machine for turning the elevator from one position to another, said arms in one position having their pivots substantially in line with each other, of means to push one arm in advance of the other as the arms start to turn the elevator from said one position.

17. In a linotype machine, the combination with a space band elevator having two supporting arms pivoted thereto and to the machine for turning the elevator from one position to another, said arms in one position having their pivots substantially in line with each other, of a spring to push one arm in advance of the other as the arms start to turn the elevator from said one position.

18. In a linotype machine, the combination with a turning assembler having a sliding portion to receive the matrices, means for securing the end of the matrix line at the top, and a spring actuated pawl in the sliding portion to engage the end of the line at the bottom, said pawl being adapted to be moved into engagement with the end of the line against the action of its spring by a fixed portion of the assembler when the sliding portion is thrown into the assembler.

19. In a linotype machine, the combination with an assembler, of means to elevate all of the matrices therein at the same time, said means being located in the bottom of the

assembler and forming a portion of the supporting means for the matrices.

20. In a linotype machine, the combination with the assembler of a trough-shaped member therein upon which the matrices are adapted to rest, and a lever to raise and lower said member.

21. In a linotype machine, the combination with a space band elevator having two supporting arms pivoted thereto for transferring the elevator from one position to another, means to impart rotary motion to the arms, and adjustable means to stop the rotation of the arms when they are in a particular relation to each other and just previous to their descent.

This specification signed and witnessed this 20th day of March 1906.

WILLIAM HERMANN SCHARF.

Signed in the presence of—

JOHN SPEAR,

L. C. SUTCLIFFE.