J. DORNETH.

TYPOGRAPH MATRIX SETTING AND LINE CASTING MACHINE.

APPLICATION FILED FEB. 6, 1911.

1,030,878.

Patented July 2, 1912.

6 SHEETS—SHEET 1.

Fig. 1.

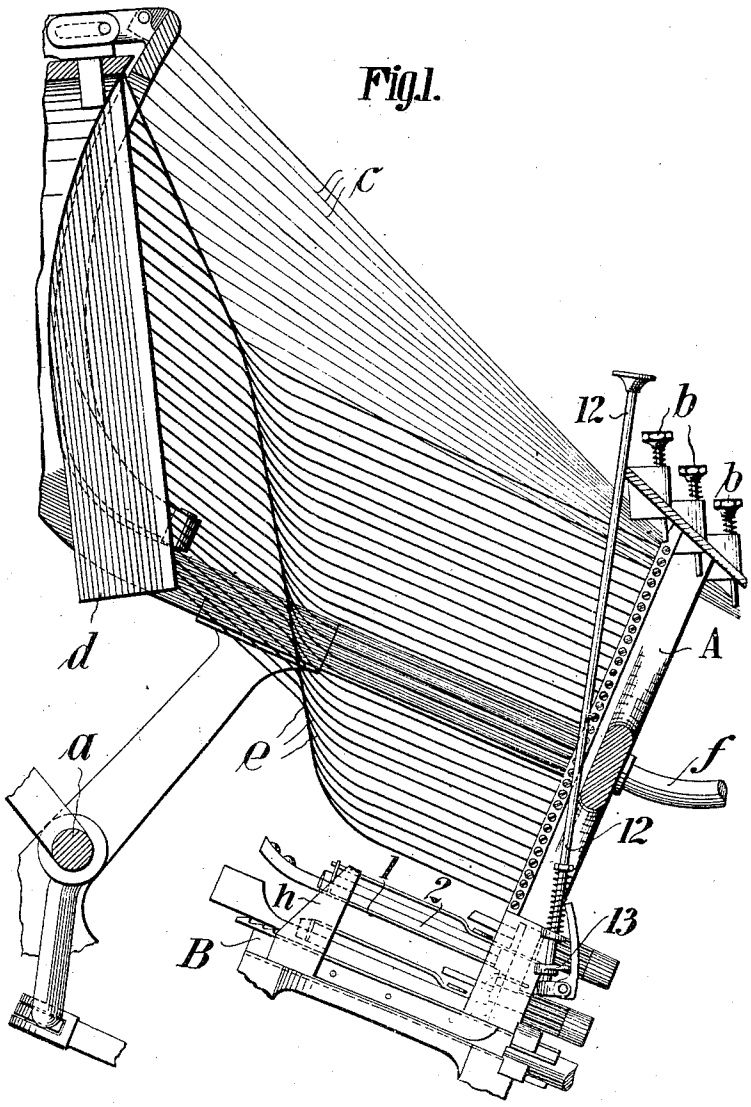

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Fig. 3.

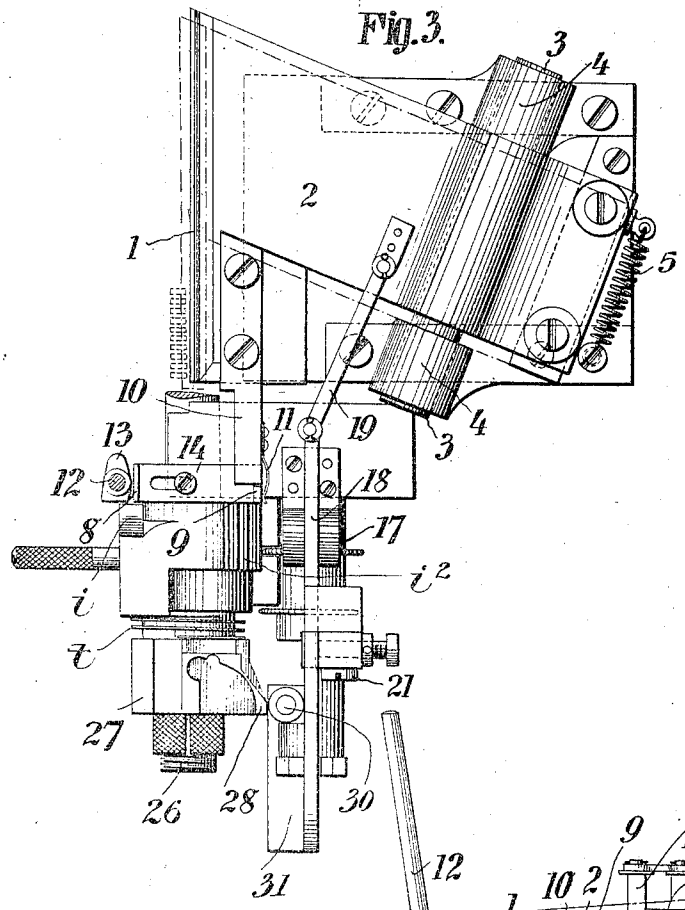


Fig. 2.

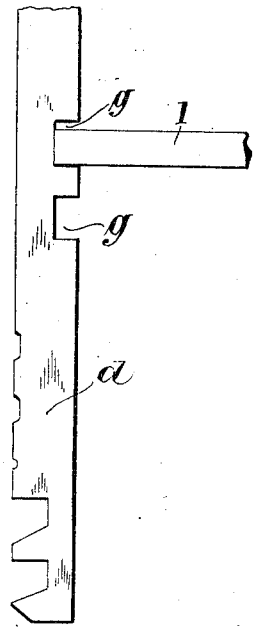
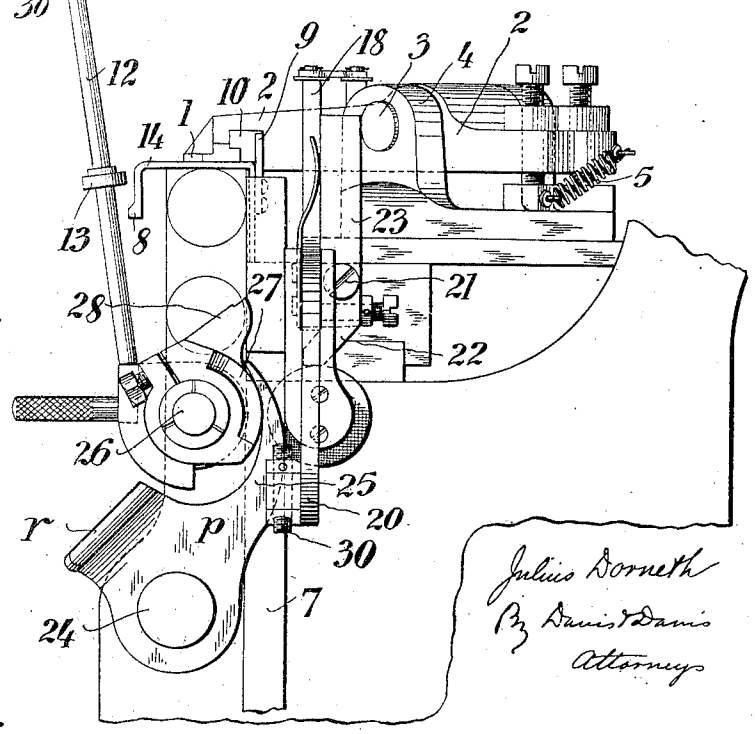


Fig. 4.



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6 SHEETS—SHEET 3.

Fig. 5.

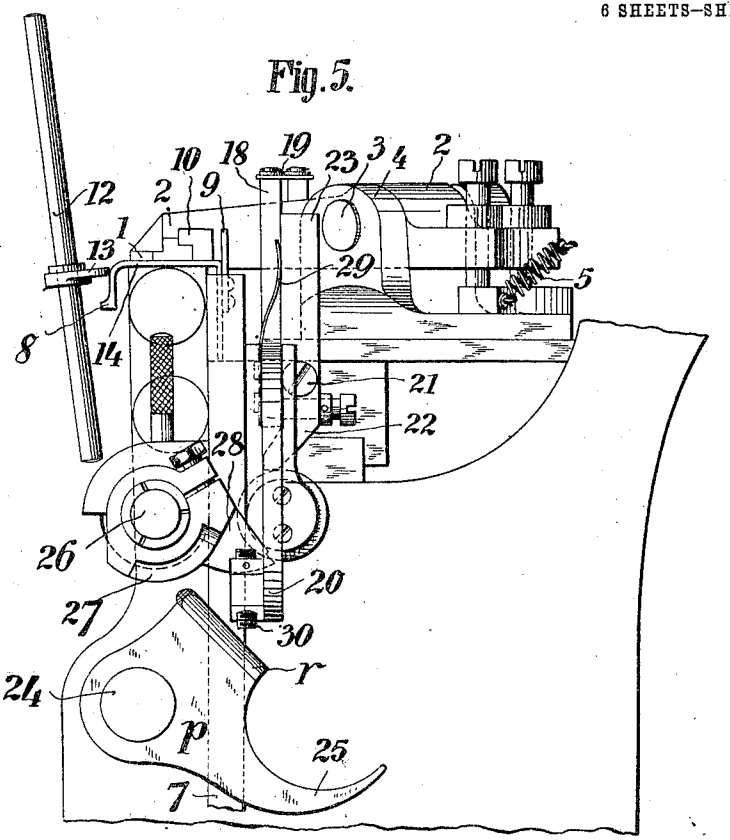
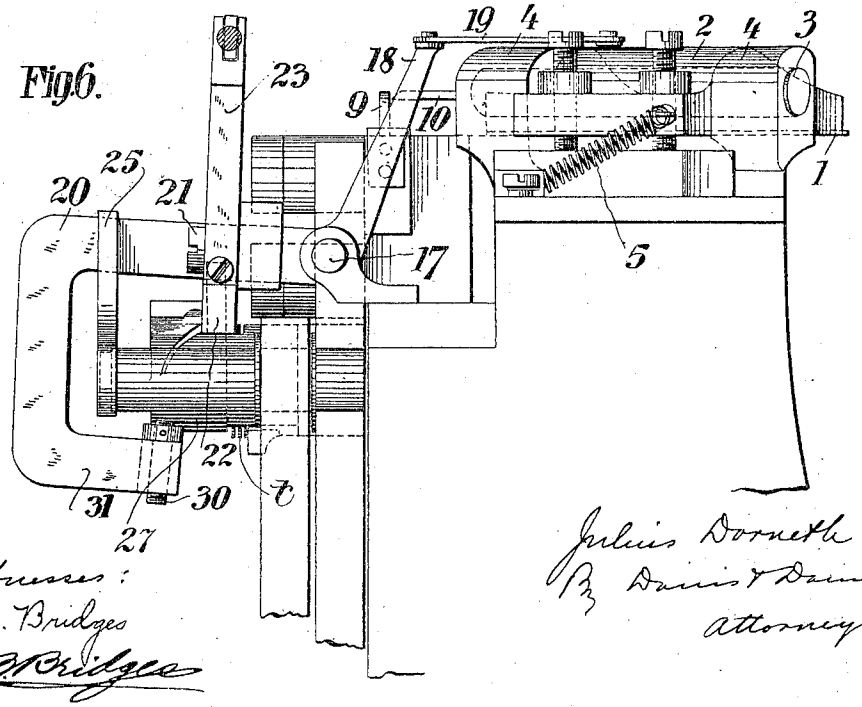


Fig. 6.



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6 SHEETS—SHEET 4.

Fig. 7.

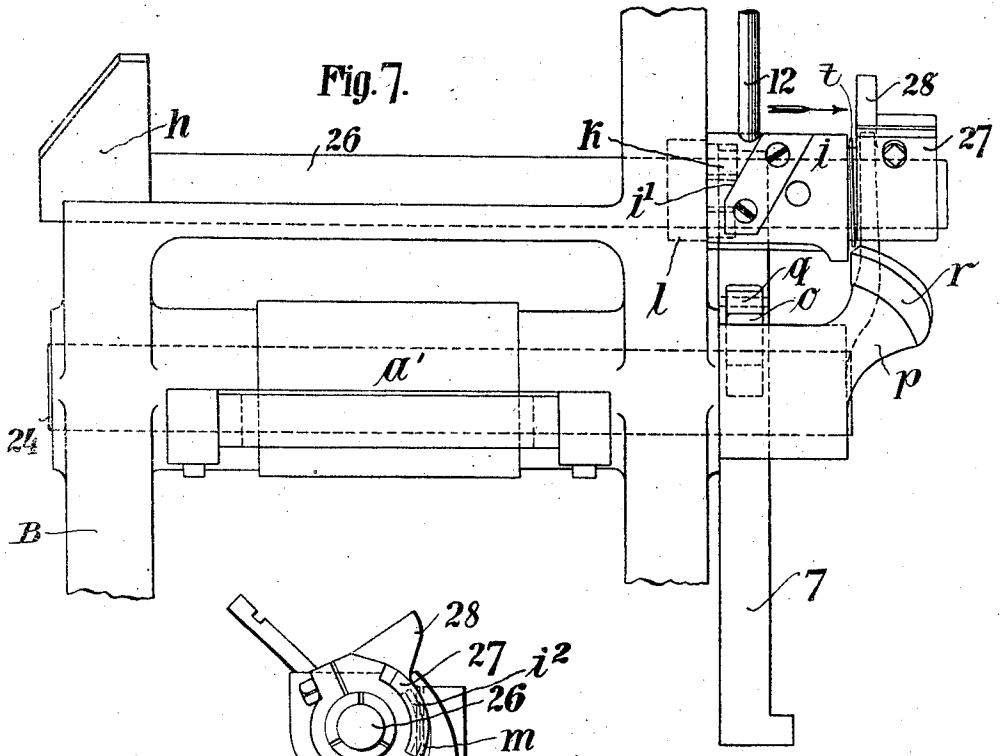
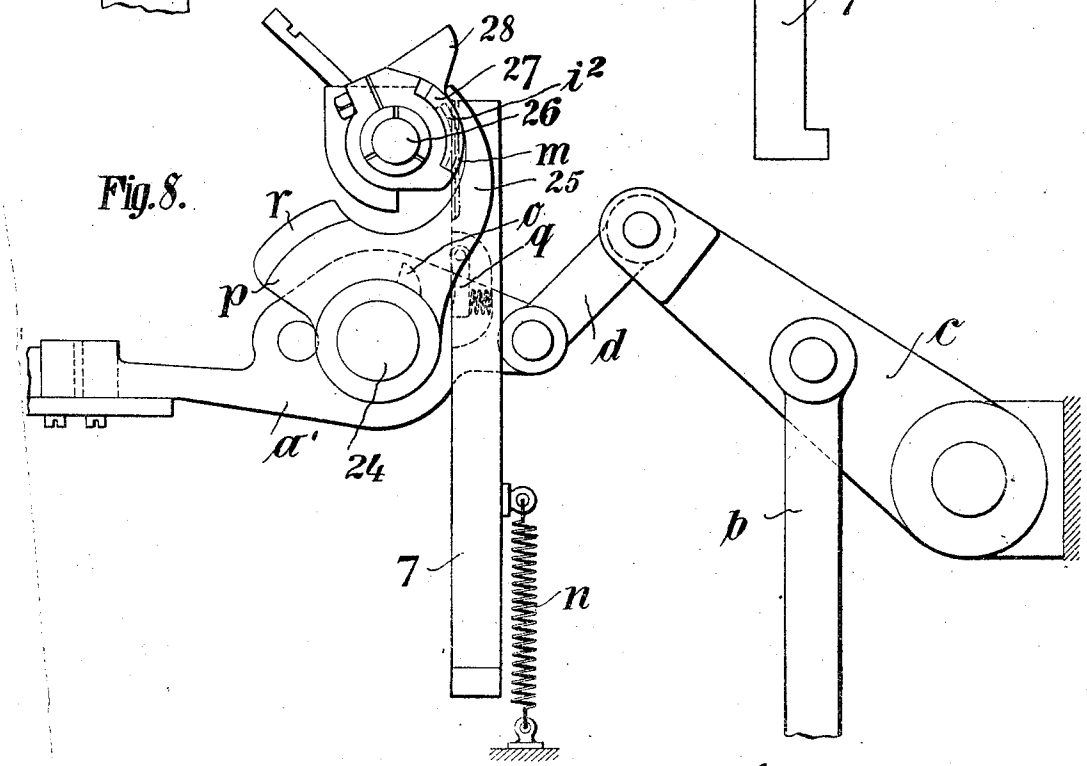


Fig. 8.



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6 SHEETS—SHEET 5.

Fig. II.

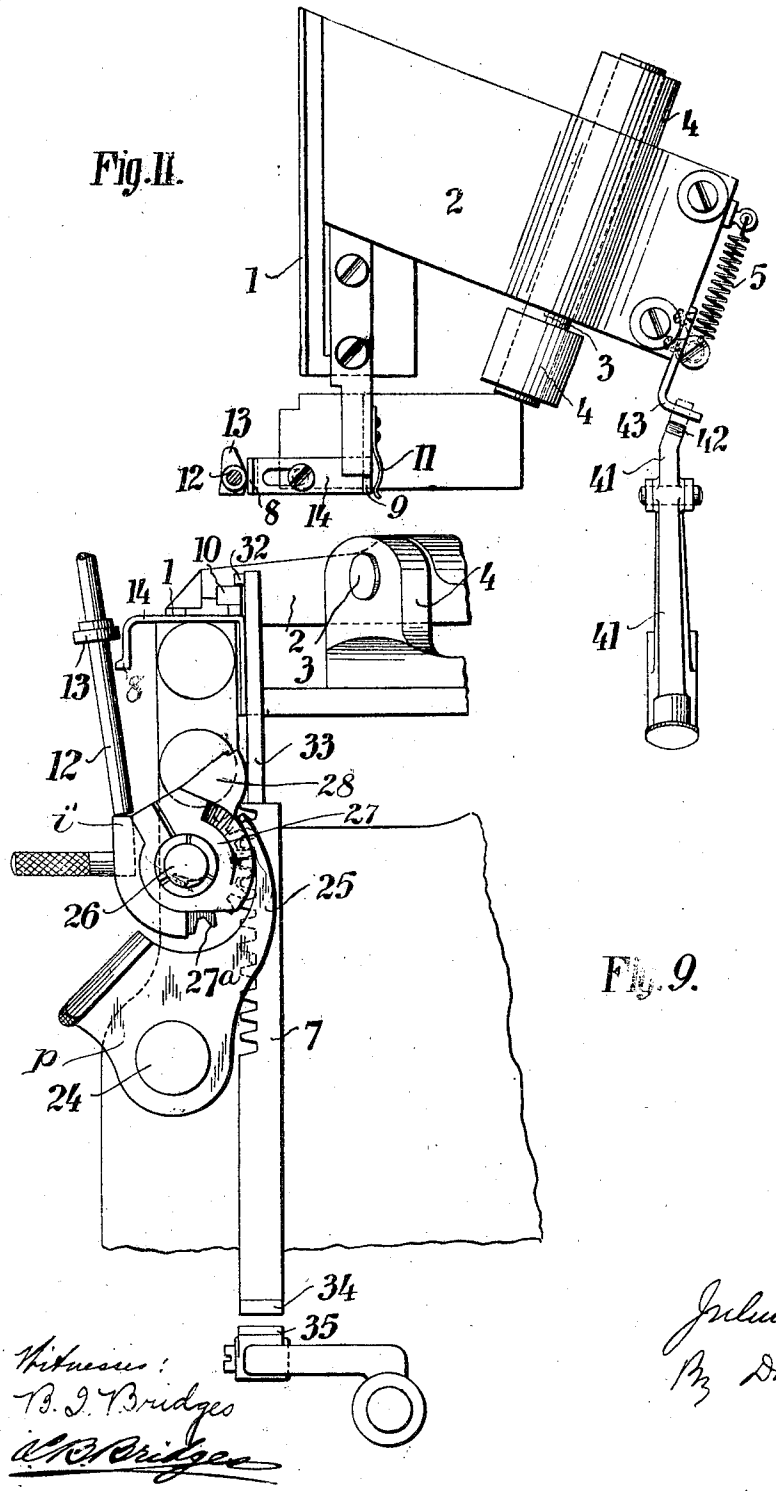

Fig. 9.

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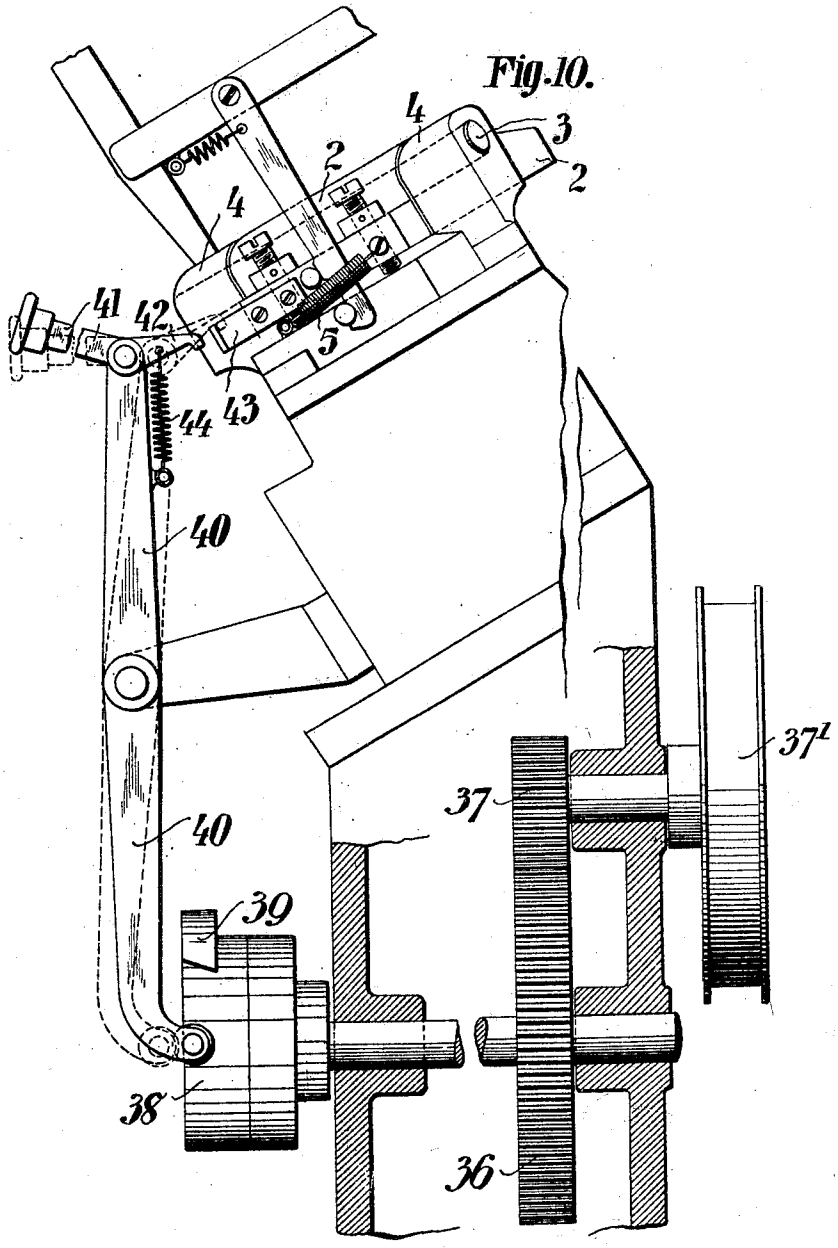
6 SHEETS—SHEET 6.

Fig. 10.



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UNITED STATES PATENT OFFICE.

JULIUS DORNETH, OF BERLIN, GERMANY, ASSIGNOR TO TYPOGRAPH G. M. B. H., OF BERLIN, GERMANY.

TYPOGRAPH MATRIX-SETTING AND LINE-CASTING MACHINE.

1,030,878. Specification of Letters Patent. Patented July 2, 1912.

Application filed February 6, 1911. Serial No. 606,812.

To all whom it may concern:

Be it known that I, JULIUS DORNETH, a subject of the German Emperor, and residing at Berlin, Germany, have invented certain new and useful Improvements in Typograph Matrix-Setting and Line-Casting Machines, of which the following is a specification.

This invention relates generally to improvements in typograph matrix-setting and type-casting machines, and particularly to the member by which the matrices are adjusted.

When forming a line the recessed matrices rest on a strip or guide and are adjusted by being pressed from below against the strip or guide. If ordinary matter is being set up the guide is withdrawn and is only pushed forward when the machine is thrown into gear; if mixed matter is being set, however, the strip or guide is always pushed forward.

One illustrative embodiment and two modifications of the invention are represented by way of example in the accompanying drawing, wherein:—

Figure 1 is a side elevation of the machine, Fig. 2 is a detail view showing the strip or guide entering into a groove in the matrix, Fig. 3 shows the adjusting plate in plan, Fig. 4 is a front elevation when this plate is retracted and Fig. 5 is a like view showing the plate pushed forward; Fig. 6 is a side view taken from the right; Fig. 7 a similar view from the left of the mold holder, and Fig. 8 is a front view of the same; Fig. 9 is a front view of a modification; and Figs. 10 and 11 are a front view and plan of a second modification.

Referring to the drawings and firstly to Fig. 1, A designates the matrix basket rotatable about the axle *a*, and B the fixed frame. By striking one of the keys *b* the corresponding matrix *d* suspended above in the matrix basket is released by means of the wires *c*. The matrix slides along its guide wire *e* down to the collector where the line is assembled and is then cast. The basket is turned upward about the axle *a* by means of the grip *f* so that all the matrices slide back again.

A plate 2 having a strip or guide 1 is arranged in the fixed frame B of the machine. In the rear edges of the matrices *d* are recesses *g* into which this guide enters. The matrices are adjusted by their being pressed from below against the guide 1, such a mechanism being illustrated in British Patent No. 16,860 of 1907. The plate 2 is longitudinally displaceable on an axle 3 which is located slantwise relatively to the line and which is mounted in collars 4 serving as stops for the plate. If the plate abuts against the forward collar, as shown in dotted lines in Fig. 3, the guide is pushed forward. As shown in Fig. 4, a spring 5 constantly tends to bring the plate into this position. The guide is shown in its rear position against the rear stop in full lines in Fig. 3. In this position it is held by a locking device.

As usual the machine is started by depressing the bar 12; if however, said bar is rotated a slide 14 is pushed forward by means of cam 13, and pushes the device (shown in British Patent No. 16,860 of 1907 and not shown herein) for elevating the matrices and for stopping the same in front of the collector into the path of the matrices. This slide has in front a shoulder or lug 8 and at the rear a plate 9 is attached to it. This plate is in front of an arm 10 on the plate 2 and thus normally prevents the latter plate being pushed forward. A spring 11 constantly presses the slide 14 backward, so that it tends to occupy its locking position. Now when the rod 12 is depressed and also when it is rotated, its cam 13 presses against the shoulder 8 and moves the slide 14 out of the position shown in Fig. 4 into that according to Fig. 5. Consequently the plate 9 releases the arm 10 of the plate 2 and the latter is pushed forward under the action of the spring 5. When ordinary matter is being set up the guide 1 is drawn backward. When the line is subsequently to be cast, by throwing the machine into gear by depressing the rod 12 as hereinafter described, the slide 14 is pushed forward so that the guide can move forward. Simultaneously, the device for elevating the matrices for setting capital letters is displaced; it is, however, inoperative because the line is already set.

The slide 14 can return only when the plate 2 having the arm 10 is pushed back against the action of the spring 5 by a device described hereinafter operating after the termination of the casting.

When setting capital letters and mixed matter it is, of course, necessary for the guide to remain pushed forward, in order that the elevated matrices may not occupy their lowest position. The slide is then pushed forward by rotating the operating-rod 12.

When setting capital letters the matrices are delivered to the guide 1 in such manner that the lowermost recess g is in line to be engaged by the guide 1. It is manifest that the guide must be projected forward in order to sustain the matrices in their elevated position. It is also manifest that in setting mixed matter this guide must be projected in order to support the capital letters. In setting ordinary matter the guide is withdrawn or retracted and is only brought forward when the entire line is set and is ready to be adjusted vertically.

The plate 2 is pushed backward by means of a two-armed lever 18, revoluble about the pivot 17 (Fig. 6), whose one arm is connected by a link 19 with the plate 2, while a second two-armed lever is fulcrumed at 21 on the other arm; the one arm 22 of this second lever projects downwardly and is formed as a stop, while its other arm 23 is connected by a link with a hand-lever, not shown in the drawing. A spring 29 holds the arm 23 in its vertical position. In consequence of the special arrangement of the fulcrum 21 of this arm, this arm can rotate only counter-clockwise.

The mold holder is rotated through the main driving mechanism of the machine. This main driving mechanism is set in operation by forcing the rod 12 downwardly. The lower end of this rod bears against an oblique surface i' of the clutch sleeve i which is rotatably mounted upon the shaft 26 of the line casting jaw h. This clutch sleeve is free to rotate on said shaft but is secured to it in such manner that the two parts will move laterally or axially together. By forcing the starting rod 12 downwardly along the inclined surface i' the clutch sleeve and the shaft 26 will be moved axially outwardly, as indicated by the arrow in Fig. 7. The clutch sleeve is formed on its inner end with clutch teeth which engage similar teeth k of a clutch ring l fixedly mounted in the frame of the machine, and the purpose of moving the said clutch sleeve and shaft 26 axially is to disconnect these clutch teeth so that the sleeve may rotate freely on said shaft and also so that the line clamping jaw h may be brought into engagement with the line of matrices. The clutch sleeve i is also provided with the rack teeth i^2 which engage the teeth of the rack m formed on the clutch-releasing rod 7. A tension spring n is connected to this clutch-releasing rod and tends to draw said rod downwardly to cause it to engage the clutch-releasing lever 35, this lever being shown in Fig. 9. It is manifest that when the clutch sleeve i is moved sufficiently to release its clutch teeth from the teeth of the clutch ring l the clutch-releasing rod 7 will be moved downwardly by means of the spring n and the starting clutch will be thrown into operation.

The machine is started when the sleeve i and the rod 7 are released. The mold holder a' is then turned upwardly through 90° to bring the mold holder to the line of matrices and to hold it there during the casting operation, after which it is returned to its normal position, as shown in Fig. 8. As the shaft 24 of the mold holder returns to its normal position a lug o on the cam disk p, secured on the mold holder shaft, engages the lower end of a pivoted latch q yieldingly held in a recess in the releasing bar 7 and raises said bar. The latch q is pressed outwardly by means of a spring, so that the lug may pass said latch when the mold holder shaft is rotating to bring the mold holder into casting position. As the releasing bar 7 is raised it returns the clutch sleeve i to its normal position, by reason of the rack teeth m and i^2 and brings the clutch teeth of said sleeve into alinement with the similar teeth on the fixed clutch ring l. The further rotation of the cam disk p brings the cam r into engagement with the outer end of the clutch sleeve i and forces said sleeve inwardly to bring the two sets of clutch teeth into engagement, thereby locking the clutch-releasing bar in its upper position and stopping the machine. The machine will, therefore, remain at rest until the bar 12 is again depressed to free the clutch sleeve.

Rigidly secured to the shaft 26 and near the outer end of the clutch sleeve i is a sleeve or collar 27 formed with a radially extending cam 28. It is, of course, manifest that this sleeve and cam will have a lateral or axial movement with the sleeve i and the shaft 26. Interposed between the clutch sleeve i and the collar or sleeve 27 is a coil spring t, one end of said spring being rigidly secured to the collar and the other being similarly secured to the end of the clutch sleeve, said spring being so disposed that it will be capable of giving to the fixed collar and the shaft 26 a partial rotation, as will be hereinafter described.

On the cam disk p is formed a radially extending cam arm 25 which, in the normal or at-rest position of the machine, engages the cam 28 and holds the line clamping jaw in its inoperative position. When the shaft 26 is moved axially through the depression of

the starting rod 12, cam 28 is moved outwardly and disengaged from the cam arm 25. As soon as it is freed from said cam arm the coil spring gives to the shaft a partial rotation, thereby bringing the line-clamping jaw *h* upwardly into the clamping position. This movement takes place before the shaft 26 and the clutch sleeve have completed their outward axial movement under the influence of the rod 12 so that the line clamping jaw is turned up into its operative position before the line clamping operation is completed.

When the mold holder is returning to its normal or at-rest position, and when the cam *r* has forced the clutch sleeve inwardly to bring the clutch teeth into engagement, the cam 28 is brought into position to be again engaged by the cam arm 25 as said cam is moving upwardly to its holding position. As said arm engages the cam 28 it rotates the shaft 26 and thereby returns the line clamping jaw to its normal released position. The cam arm 25 serves as a means for holding the said jaw in its released position. This action of the cam arm 25 in rotating the sleeve or collar 27 operates against the tension of the coil spring *t* so that when the cam 28 is released from the cam 25 said coil spring will operate to throw the line holding jaw into its upper or clamping position.

During the rotation of the sleeve 27 a projection 28 of the same abuts from below against the bottom face of the arm 22 of the two-armed lever 22, 23, lifts it, as the same cannot rock, and rocks the two-armed lever 20, 18, so that it pushes the plate 2 backward. The locking slide 14 is then moved backward by the spring 11 so that it is placed in front of the arm 10 and locks the plate in its rear position.

After a line has been cast, the arm 22 can be rotated in such manner that it is not located in the path of the arm 28, by the grip connected with the lever 23 by rods not shown in the drawing. Consequently, the axle 26 is pushed toward the front without the plate 2 being pushed back, and the same line can then be cast again.

Any suitable means may be employed for manually moving the lever 23 and to thereby swing the arm 22 thereof out of the path of the arm 28. In Fig. 6 a rod is shown as connected to said lever 23 at the upper end thereof, said rod being shown in cross section, and, of course, any suitable means may be connected to this rod for swinging said lever.

The arm 20 of the two-armed lever 18—20 has the downwardly extending portion 31 (Fig. 6), which extension carries at its end a set-screw 30. This screw serves as an adjustable stop to prevent the shaft 26 and the clutch sleeve *i* from completing their lateral or axial movement under the influence of the starting rod 12 until the adjusting bar 1—2 has made its full outward movement. When the cam 28 has been moved outwardly with the shaft 26 sufficiently to release it from the cam arm 25 it will be rotated with said shaft under the influence of the coil spring *t* so that it will be in the line of the set screw 30. When the plate 2 is at the limit of its forward movement the lever 18—20 is moved sufficiently through its connection 19 with said plate to throw the set screw 30 out of line with the cam 28 so that said cam may continue its lateral movement until the clutch sleeve is freed from the clutch ring. If, however, dirt, drops of leads or the like interfere with and prevent the full forward movement of the adjusting plate 1—2 the lever 18—20 will not be moved sufficiently on its pivot to lower the set screw 30 below the cam 28 and said set screw will then interfere with and prevent the full forward movement of the clutch sleeve *i* and the shaft 26. It is manifest, therefore, that if the clutch sleeve cannot be freed from the clutch ring, the releasing bar 7 cannot operate to start the machine. The operator must then free the adjusting plate 1—2 before the operation of the machine can be continued.

Fig. 9 shows another improvement of the typograph matrix-setting and line-casting machine, by which the machine is prevented from being thrown into gear when dirt, drops of lead or the like are located between the displaceable parts. A rod 33 provided with a lug 32 is carried by the rack 7 meshing with the rack 27^a on sleeve *i*. In the rear position of the projecting guide 1 the lug 32 rests on the projecting arm 10 of the plate 2 and is liberated from the same, when the guide 1 is in its extreme forward position. It is manifest that the rack can move downward only when the guide 1 is pushed completely forward so that the lug 32 can pass by the arm 10. If the guide 1 is not pushed sufficiently far forward, when the machine is thrown into gear the rack remains in its upper or locking position and the machine cannot be operated. The machine is thrown into gear in a known manner by the rack 7 moving downward somewhat and its end 34 pressing on a two-armed lever 35 which releases the driving clutch.

In the form according to Figs. 10 and 11, the plate 2 is pushed forward by the disk 38, driven through the medium of gears 36, 37 by the main driving pulley 37', by which other parts of the mechanism are actuated in known manner. The disk 38 carries a projection or cam 39 arranged in such manner that shortly before the termination of the cycle of operations, it rocks a two-armed lever 40 and a two-armed lever

41 connected therewith, whereupon the end 42 of the latter presses against an angle iron 43 connected with the plate 2 and pushes the latter backward. The plate is held in this position by the same locking mechanism 9, 10, 11 as in the illustrative embodiment according to Figs. 1 to 6.

If a line is to be cast repeatedly, as is well-known the guide 1 may not be drawn back before the termination of the cycle of operations. To this end, the lever 41 is so placed by hand that its end 42 is located behind the angle iron 43, as shown in dotted lines in Fig. 10, and consequently cannot act on the plate 2.

I claim:—

1. A matrix setting and line casting machine comprising a plate for adjusting matrices, means for drawing said plate forwardly into position to engage the rear edges of the matrices, means for forcing said plate rearwardly from said matrices, and means for locking it in its rearward position.

2. A matrix setting and line casting machine comprising a guide for adjusting a line of set matrices, means for moving said guide forwardly to engage the rear edges of the matrices, means for moving said plate rearwardly away from said matrices, means for locking it in its rearward position, means for automatically returning it to its rearward position from its forward position, and means for rendering said automatic means inoperative, whereby the guide will be held in its forward position during a plurality of line casting operations.

3. A matrix setting and line casting machine comprising a guide for adjusting a line of set matrices, means for normally forcing said guide forward toward the set line of matrices to engage the rear edges thereof to straighten the line, means for locking said guide in its rearward position, means for simultaneously releasing said guide and starting the casting operation and means for automatically returning said guide to its rearward locked position after each casting operation.

4. A matrix setting and line casting machine comprising a guide for adjusting a line of set matrices, means for normally forcing said guide forward toward the set line of matrices to engage the rear edges of the matrices to straighten the line, means for locking said guide in its rearward position, means for simultaneously releasing said guide and starting the casting operation, means for automatically returning said guide to its rearward locked position after each casting operation, and means for rendering said guide returning means inoperative, whereby a plurality of castings may be made from the same line of matrices.

5. A matrix setting and line casting machine comprising a guide for adjusting a line of set matrices, means for normally forcing said guide forward toward the set line of matrices to engage the rear edges of said matrices and to straighten the line, means for locking said guide in its rearward position, means for simultaneously releasing said guide and starting the casting operation, means for automatically returning said guide to its rearward locked position after each casting operation, and manually operated means for rendering said guide returning means inoperative, whereby a plurality of castings may be made from the same line of matrices.

6. A matrix setting and line casting machine comprising a guide for adjusting a line of set matrices, means for moving said guide forward to said matrices to engage the edges of said line of matrices to straighten the line, and means controlled by the position of said guide for starting the casting operation.

7. A matrix setting and line casting machine comprising a guide for adjusting a line of set matrices, means for moving said guide forward to said matrices to engage the rear edges of said matrices to straighten the line, and means to prevent the casting operation until the guide has made its full forward adjusting movement.

8. A matrix setting and line casting machine comprising a guide for adjusting a line of set matrices, means normally tending to move said guide forward to the matrices to engage the rear edges of the said matrices to straighten the line, means to lock said guide in its rearward position, means for automatically returning said guide to its rearward position after the casting operation, and means for releasing said guide without starting the casting operation, and means for starting the casting operation when said guide is released.

9. A matrix setting and line casting machine comprising a guide for adjusting a line of set matrices, means for moving said guide forwardly to the matrices to engage the rear edges of the matrices to straighten the line and hold it during the casting operation, means for starting the casting operation and means connecting said starting means to said guide, whereby the position of said guide will control the starting means.

10. A matrix setting and line casting machine comprising a guide for adjusting a line of set matrices, means for moving said guide forwardly to the matrices to engage the rear edges thereof to straighten the line and hold it during the casting operation, means for starting the casting operation, means controlled by the position of the guide to prevent the casting operation until the

guide has moved to its adjusting position, and means engaging the guide and locking it in its rearward or withdrawn position, said means being controlled by the starting means.

11. A matrix setting and line casting machine comprising a plate movable toward and from the line of set matrices and adapted to adjust said line of matrices to the same vertical plane, means normally tending to move said plate toward said line of set matrices and for holding it in engagement therewith during the casting operation, means for automatically moving said plate away from the set line of matrices after the casting operation and means for automatically locking said plate in its withdrawn position.

12. A matrix setting and line casting machine comprising a plate for adjusting a line of set matrix bars to the same vertical plane, means for bringing said plate into engagement with the edges of all of the matrix bars in the set line, means for moving said plate away from the line of set matrix bars and means for automatically locking it in its withdrawn position.

13. In a matrix setting and line casting machine, the combination of a line of set matrix bars having notches or recesses in their rear edges, of a plate for adjusting said line of set matrix bars to the same vertical plane, means for moving said plate into engagement with the recesses in the rear edges of said matrix bars, means for moving said plate away from said matrix bars and means for locking said plate in its withdrawn position.

14. In a matrix setting and line casting machine, the combination of a line of set matrix bars, a plate adapted to be brought into engagement with the rear edges of said bars after they are set, means to bring said plate into engagement with said bars, means for moving it rearwardly from said bars and means for locking it in its withdrawn position.

15. A matrix setting and line casting machine comprising a horizontally movable plate adapted to engage the rear edges of a line of set matrix bars to straighten the line, means normally tending to move said plate to the line of matrix bars, means for locking said plate in its rearward position away from said bars, means for releasing said lock, and means for automatically returning the plate to its rearward position and means for automatically operating said lock to lock said plate in its rearward or withdrawn position.

16. A matrix setting and line casting machine comprising a movable plate adapted to engage a line of set matrix bars to straighten the line, means to lock said plate in its rearward or withdrawn position with respect to the set line of matrices, a mold holder, means to bring said mold holder to the line of set matrices, means to simultaneously release the adjusting plate and start the mold holder moving means.

17. A matrix setting and line casting machine comprising a movable plate adapted to engage a line of set matrix bars to straighten the line, means to lock said plate in its rearward or withdrawn position with respect to the set line of matrices, a mold holder, means to bring said mold holder to the line of set matrices, means to simultaneously release the adjusting plate and start the mold holder moving means, and means to prevent the operation of the mold holder moving means until the adjusting plate has completed its movement to the line of set matrix bars.

18. A matrix setting and line casting machine comprising a movable plate adapted to be brought into engagement with a line of set matrix bars to straighten said line, means normally tending to move said plate to said matrix bars, a latch for locking said plate in its rearward or withdrawn position, a mold holder operating means, means for releasing the movable plate and for setting in operation the mold holder moving means, and means controlled by the movable plate to prevent the operation of the mold holder moving means until the said plate has made its complete forward movement into engagement with the line of set matrix bars.

19. A matrix setting and line casting machine comprising a guide plate, means to move said guide plate into engagement with the rear edges of a line of set matrix bars and to hold said plate in engagement therewith during the casting operation, a mold holder, means for moving said mold holder into and out of casting position, a clutch to control the operation of the mold holder moving means, a clutch operating bar, means to hold said operating bar in its inoperative position, means to release said bar to operate the clutch and means controlled from the guide plate to prevent the release of the clutch operating bar until said plate reaches the limit of its forward movement to the line of matrix bars.

20. A matrix setting and line casting machine comprising a horizontally movable guide plate, means to move said plate into engagement with the rear edges of a line of set matrix bars, a mold holder, means for moving said mold holder into casting position, means to lock the movable plate in its rearward or withdrawn position, means to release said locking means, means released by the guide plate to set the mold holder moving means in operation, means operated by the mold holder moving means to return

the guide plate to its rearward position after the casting operation, and means to render the guide plate returning means inoperative.

21. A matrix setting and line casting machine comprising a horizontally movable guide plate, means to move said plate into engagement with the rear edges of a line of set matrix bars, a mold holder, means for moving said mold holder into casting position, means to lock the movable plate in its rearward or withdrawn position, means to release said locking means, means released by the guide plate to set the mold holder moving means in operation, means operated by the mold holder moving means to return the guide plate to its rearward position after the casting operation, and manually operated means to render the guide plate returning means inoperative.

22. A matrix setting and line casting machine comprising a guide for adjusting a line of set matrices, means for moving said guide to said matrices to engage one of the edges of said line to straighten the line, and means controlled by the position of said guide for starting the casting operation.

23. A matrix setting and line casting machine comprising a guide for adjusting a line of set matrices, means for moving said guide to said matrices to straighten the line, a mold holder, a mold holder moving means, and means controlled by the position of the guide for starting the mold holder moving means.

24. A matrix setting and line casting machine comprising a guide for adjusting a line of set matrices, means for moving said guide to said line of set matrices to straighten the line, a mold holder, a mold holder moving means, and means adapted to be released by the guide when it has completed its movement up to the line of matrix bars to straighten said line, said means being adapted to start the mold holder moving means.

25. A matrix setting and line casting machine comprising a mold holder, means for holding a line of set matrix bars, means for moving the mold holder to the said line of matrix bars, and guiding means independent of the mold holder for engaging the line of set matrix bars to straighten the line, and means controlled by the position of the guiding means to release the mold holder moving means.

In witness whereof I have hereunto signed my name this 25th day of January 1911, in the presence of two subscribing witnesses.

JULIUS DORNETH.

Witnesses:
WOLDEMAR HAUPT,
HENRY HASPER.