Sept. 12, 1933. W. BLUME 1,926,934

MATRIX SETTING AND TYPE LINE CASTING MACHINE

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Fig. 1

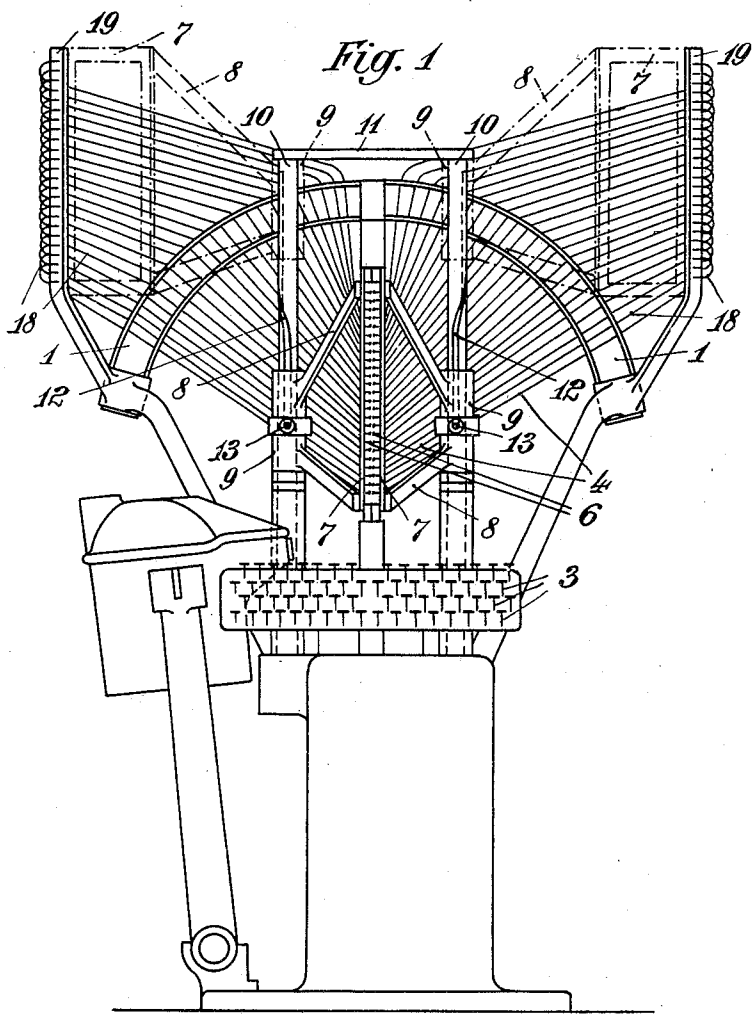

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Fig. 2

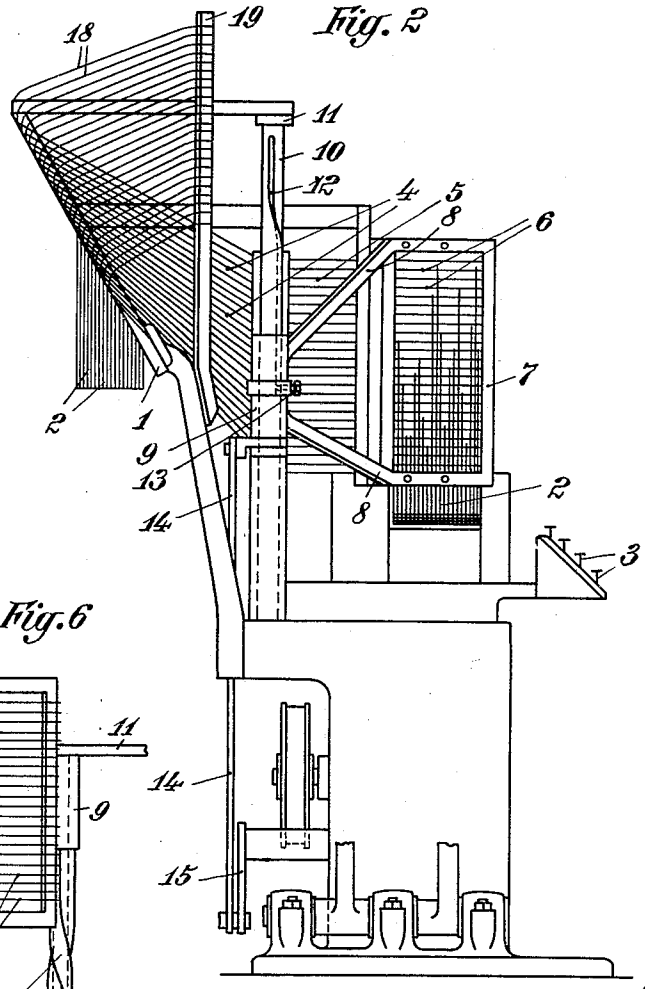

Fig. 6

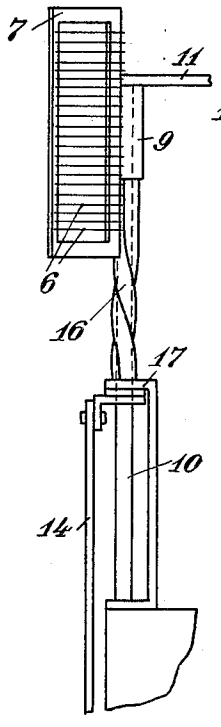

Fig. 5

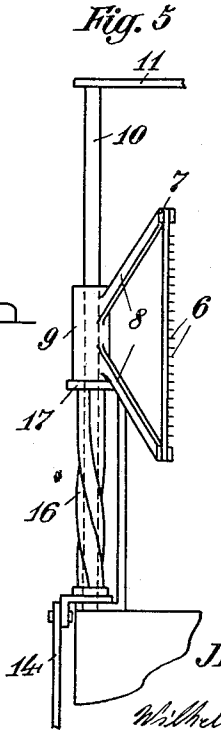

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Fig. 3

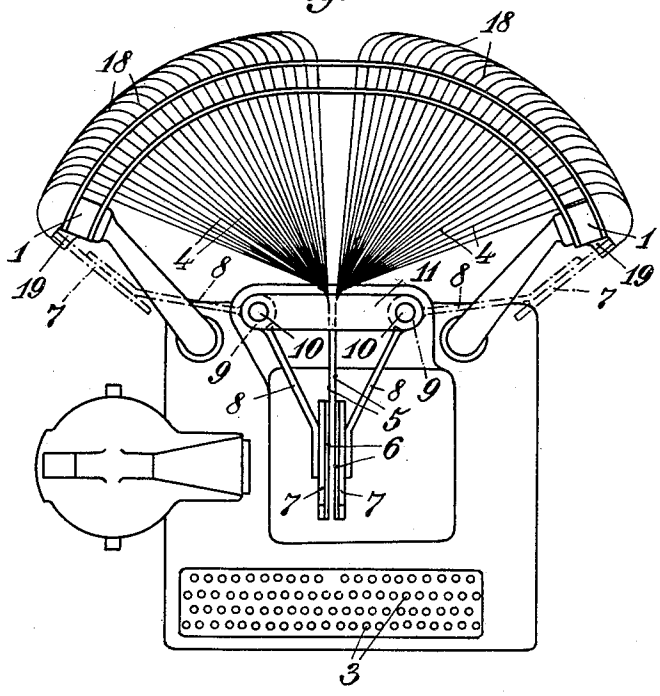
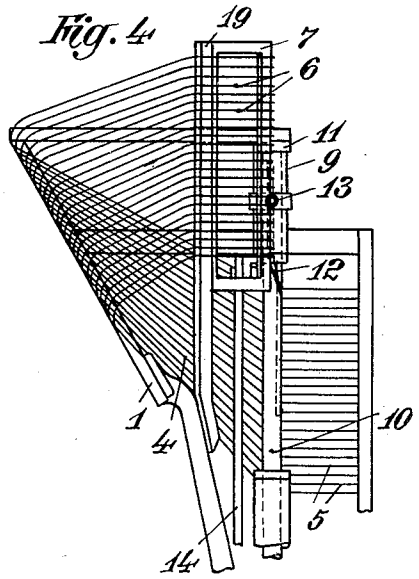


Fig. 4



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UNITED STATES PATENT OFFICE

1,926,934

MATRIX-SETTING AND TYPE-LINE-CASTING-MACHINE

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7 Claims. (Cl. 199—4)

The invention relates to matrix-setting and type-line-casting machines with discontinuous circulation, by means of a conveyor device consisting of two separate, movable frames, of the matrix bars guided on wires. In such machines, the set matrices have to be lifted from the casting station to a distributing station whence, by virtue of their own weight, they slide back into the inoperative stations on wires extending in curves through space. On their way from the casting station to the inoperative stations, the matrix bars have to make a revolution of 360° about their longitudinal axis. The disadvantages of such matrix-setting and type line casting machines provided with a circulation—whether continuous by means of endless guiding wires or discontinuous by means of a conveyor device—consisted substantially in the constructional difficulties in the design of these complicated and very unwieldy machines. It is precisely the dimensions of the existing circulation machines which have continually prompted the search for new means of providing a machine of dimensions not differing substantially from those of setting machines having matrices suspended on wires and operating without circulation of the matrices. Heretofore, in circulation setting machines, the cast matrices have been lifted for example by means of a vertically slidable carriage guided in special rails, to the distributing station situated high above, and in the same plane as, the casting station. From thence they are brought on to their distributing wires and then slide back into the inoperative station on the curved tracks of the said wires. Since, during this return movement, the matrix bars have to make a revolution of 360° about their longitudinal axis, and in addition have to be carried from the common distributing station into the symmetrical halves of the inoperative station extending on two opposite sides and, furthermore, since the said inoperative stations are arranged as usual in two entirely different planes from the plane of the casting or collecting station, it is necessary to provide a long and complicated arrangement of the slide wires through space. The matrix bars travel over such long paths in a sliding movement merely by virtue of their own weight that the highest point of the distributing wires must also be made correspondingly high. These conditions account for the large dimensions of such machines.

Attempts have now been made to simplify the construction in that the cast matrix bars are not lifted in a conveyor carriage common to both halves of the inoperative station, but the said conveyor carriage is made of two frames movable separate from one another in different tracks. In these machines, the cast matrices suspended in the said frames are swung up by means of two levers in the plane of the casting station into two separately disposed distributing stations. During this movement, the frames themselves together with the matrices suspended in them, make a rotation through 180°. Due to the arrangement of the levers, however, the frames have to be carried on separate rails from the casting station to the distributing stations. The construction of these machines, however, has again been found to be too complicated, and above all to result in excessively large dimensions of width and height. It is true that a shortening of the distributing wires had already been obtained since, of course, the matrix bars were swung up towards two sides, thus dispensing with the wire paths previously required for such separation of the matrices to be distributed in accordance with the two halves of the magazine. On the other hand, in these machines, the matrix bars, when they arrived at the distributing stations, or in front of the distributing wires, have already been rotated through 180° relatively to their position in the casting station, and it is therefore no longer necessary to carry the distributing wires in such a curved manner through space as to compel the matrix bars to make a revolution of 360° about their own axis when sliding down. On the contrary, the necessary rotation of the matrix bars on their path from the distributing stations to the inoperative stations is now only 180°. These devices, however, failed to simplify the construction of the machines in the desired manner, and more particularly the dimensions still far exceeded the compass admissible in practice. These disadvantages were caused in the first place by the fact that the conveyor frames were turned through space by means of long levers and were guided on special rails, and in the second place by the fact that the distributing stations situated above the casting station lay in the same plane as the casting stations, while the inoperative stations were of course arranged in entirely different planes from the casting station. It was still necessary, therefore, to guide the matrix bars, after lifting them to the distributing stations, by virtue of their own weight alone on the slide wires over the comparatively long paths into the remotely situated inoperative stations. These long wire paths also necessitated of course a correspondingly great difference in height between the dis-

tributing and inoperative stations. With such a high positioning of the distributing stations, however, the levers for moving the conveyor frames had also to be made correspondingly long, and therefore the entire machine became disproportionate in width and height.

All these disadvantages inherent in existing setting machines provided with a circulaton of the matrix bars suspended from wires carried in curves through space are obviated in the circulation setting machine according to the invention. This new setting machine is scarcely larger in dimensions than the known setting machines having matrices carried on wires without circulation. The dimensions amount in width to about 1100 mm., in depth about 1000 mm. and in height about 1750 mm.

The indicated advantages are obtained by the special original arangement and movement of the separated conveyor frames which have been selected instead of one carriage moved vertically from the casting station to one distributing station. The said frames are also it is true guided to two separate distributing stations, but according to the invention, the frames are not swung up in the plane of the casting station, and also the long levers, heretofore essential, as well as the laterally extending rail guides for the frames are dispensed with in the new machine. On the contrary, the two conveyor frames are mounted each rotatable about a vertical axis in such a manner that, together with the matrix bars, which are suspended in them and are to be distributed, they are rotated simultaneously through about 130° out of the plane of the casting station, and at the same time are also lifted upwardly to the distributing wires, that is to say, therefore, they make a helical movement. The distributing stations are no longer situated, as in the machines constructed heretofore, in the plane of the casting station, but in two planes differing therefrom, each removed in the direction of the corresponding magazine halves. Due to these distributing stations being disposed in space near the inoperative stations, quite short and simply curved wire guides only are required in order to allow the matrices which are to be distributed to slide back from thence into the inoperative stations, while rotating at the same time through 230°. These now short wire paths also necessitate only a very slight difference in height between the highest points of the distributing wires, that is to say, therefore, the distributing stations and the collecting or casting station. Thus, due to the arrangement according to the invention of the distributing stations, in combination with the special form of the distributing operation effected with simultaneous rotation and lifting of the conveyor frames, a machine of minimum dimensions is provided, at the same time obviating the complicated and not very clear construction customary heretofore.

A circulation setting machine provided by way of example with a constructional form of a distributing device according to the invention is represented diagrammatically in the accompanying drawings, wherein:—

Figure 1 shows an elevation of the machine with matrix conveyor frames in the lowermost receiving or casting position.

Figure 2 shows a side elevation of Figure 1, a number of matrix bars being also shown, which have been omitted in the other figures for the sake of clearness.

Figure 3 shows a plan of Figure 1.

Figure 4 shows a part of Figure 2 with lifted matrix conveyor frame in the distributing position.

Figure 5 shows another constructional form of the conveyor frame or the means for moving it, in the lowermost position, and

Figure 6 shows the uppermost position, i. e., the distributing position of the conveyor frame shown in Figure 5.

The matrix bars 2 hanging in the inoperative stations 1 are released by striking the keys 3 and slide along the guide wires 4 on to the wires 5 forming the collecting station. From thence, the set matrix lines are pushed by means of known devices, for example a pusher either by the compositor by hand or by the machine, on to wires 6 situated in the extension of the wires 5 and forming the casting station. As usual, the inoperative, collecting and casting station each consist of two perfectly symmetrical halves, and the same applies, therefore, to the so-called basket of the machine formed by the slide wires. The wires 6 of the casting station, which are either inclined or horizontal, are fixed in two separate, movable frames 7. These frames are mounted for example by means of the arms 8 and the guide sleeves 9 rotatably about the two round bars 10 fixed to the machine frame. The bars 10 are held at their distance apart by a cross member 11. In the constructional example shown in Figures 1 to 4, helically extending grooves 12 are machined in the bars 10. The ends of headed screws or bolts 13 fixed in the guide sleeves 9 carrying the frames 7 project into the said grooves 12. Instead of the headed screws 13, it is also possible to employ studs having their free ends, which enter the grooves 12, provided with track rollers for greater ease of movement. The grooves 12 are so machined in the bars 10 that during one lift of the guide sleeves 9 or the frame 7, the latter make a rotation through about 130°, thus passing out of the lower position shown in Figures 1, 2 and 3 and corresponding to the casting operation, into the upper distributing position, corresponding to the distributing operation, as shown in Figure 4 and as indicated in Figures 1 and 3 by chain lines. The simultaneous upward and turning movement of the conveyor frames 7 is effected simply by lifting up the guide sleeves 9, and this may be done in any desired manner. In the example shown, the guide sleeves 9 are moved by rods 14 which are hingedly connected to the cranks 15 operated by the drive of the machine, or connected, for example, to suitably arranged cams (see Figure 2).

Instead of the device described, it is also possible to provide the guide sleeves 9, for example, with lower extensions 16 of the polygonal, for example square section, which are so wound that their edges form helical lines and which are carried as it were like hollow shafts on the round, vertical bars 10, as represented diagrammatically in Figures 5 and 6. In this case, female members 17, fixed to the machine frame, must be provided, having their correspondingly polygonal, in this case for example square, openings and surrounding the sleeve extensions 16. The drive is effected in the same way as described above. The rods 14 moved by the machine drive lift the helically-shaped lower parts 16 of the guide sleeves 9, and since the female members 17 are stationary, the guide sleeves 9 or the conveyor frames 7, during lifting are turned at the same time.

The effect of the arrangement described is that, during the lifting of the conveyor frames 7 carrying the matrices to be distributed, which lifting occurs after the casting operation for the purpose of distributing the cast matrices, the said conveyor frames are positively turned at the same time through about 130° in the direction of the inoperative stations. The matrices to be distributed are then pushed off the conveyor frames on to the distributing wires 18 in any desired manner—for example by means of a pusher—from whence they slide into the inoperative stations. Hence, due to the described means according to the invention, the matrices to be distributed are lifted and turned to the distributing stations 19, which are no longer situated, as heretofore, in the same plane as the casting station, but, on the contrary, have been removed to near the respective inoperative stations, so that only short and simply curved wire guides are required in order to allow the matrices which are to be distributed to slide back from thence into the inoperative position, with simultaneous rotation through about 230°, only a slight difference in height between the distributing and inoperative stations now being required on account of the short wire paths.

Having thus fully described the invention what is claimed as new and desired to be secured by Letters Patent is:—

1. A matrix-setting and type-line casting machine of the discontinuous circulation type including a frame, distributing, inoperative and collecting stations respectively arranged in superposed relation thereabove, matrix supporting and guiding wires connecting the stations having their free receiving and discharge ends located respectively at the distributing and collecting stations, matrix receiving and conveying frames constituting a casting station mounted for vertical and sliding and rocking movement on the main frame and normally located adjacent the collecting station for receiving matrices therefrom, and means for operating the conveying frames to move the same from their normal positions near the collecting station to the distributing station so that the matrices can be transferred to the distributing stations.

2. In a matrix-setting and type-line casting machine of the kind having matrix bars carried in circulation on wires, in which the cast matrix bars with the guide wires arranged in separate frames and forming the casting station are moved up and are adjusted relatively to the distributing wires situated in the vicinity of and leading to the inoperative stations, means for rotatably and slidably mounting the conveyor frames carrying the matrix bars to be distributed including arms extending from the frames, guide sleeves connecting the arms of each frame together, vertical guide bars secured to the machine frame for rotatably receiving the sleeves, means on the sleeves for slidably connecting the same to the bars so that the frames during their lifting, effected for the purpose of distributing the matrix bars hanging in them, are turned positively at the same time and perform a helical movement through, about 130° out of the plane of the casting station towards the distributing stations.

3. A matrix-setting and type-line casting machine as claimed in claim 2, wherein the vertical guide bars are circular in cross section and are provided with helically extending grooves, and wherein the slidable connecting means for the guide sleeves include elements fixed to the sleeves and engaged in the grooves so that during lifting of the guide sleeves or the frames a positive turning thereof towards the distributing stations takes place at the same time.

4. A matrix-setting and type-line casting machine according to claim 2, wherein automatically machine operated rods are provided for lifting the guide sleeves carrying the conveyor frames and are hingedly connected to each guide sleeve.

5. A matrix-setting and type-line casting machine as claimed in claim 1, wherein means are provided for slidably and rockably mounting the conveying frames on the main frame and include vertical supporting rods provided with helical grooves, sleeves connected with the frame rockably mounted about the rods, and elements carried by the sleeve and engaging the grooves in the rods so that when the frames are lifted the latter will perform a helical movement.

6. A matrix-setting and type-line casting machine as claimed in claim 1, wherein machine operated rods are connected with the frames to effect operation of the latter.

7. In a matrix-setting and type-line casting machine of the kind having matrix bars carried in circulation on wires, in which the cast matrix bars with the guide wires arranged in separate frames and forming the casting station are moved up and are adjusted relatively to the distributing wires situated in the vicinity of and leading to the inoperative stations, means for rotatably and slidably mounting the conveyor frames carrying the matrix bars to be distributed including arms extending from the frames, guide sleeves connecting the arms of each frame together, vertical guide bars secured to the machine frame for slidably and rotatably receiving the guide sleeves, helically wound extensions projecting from the lower edges of the guide sleeves, and channel members fixed to the machine frame and having apertures of a shape coresponding to the external cross section of the sleeve so that during the lifting of the guide sleeves a positive turning of the conveyor frames carried by the guide sleeves takes place at the same time towards the distributing stations.

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