H. STAMM.

PRINTING MACHINE.

APPLICATION FILED NOV. 11, 1907.

908,347.

Patented Dec. 29, 1908.

3 SHEETS—SHEET 1.

FIG. 1.

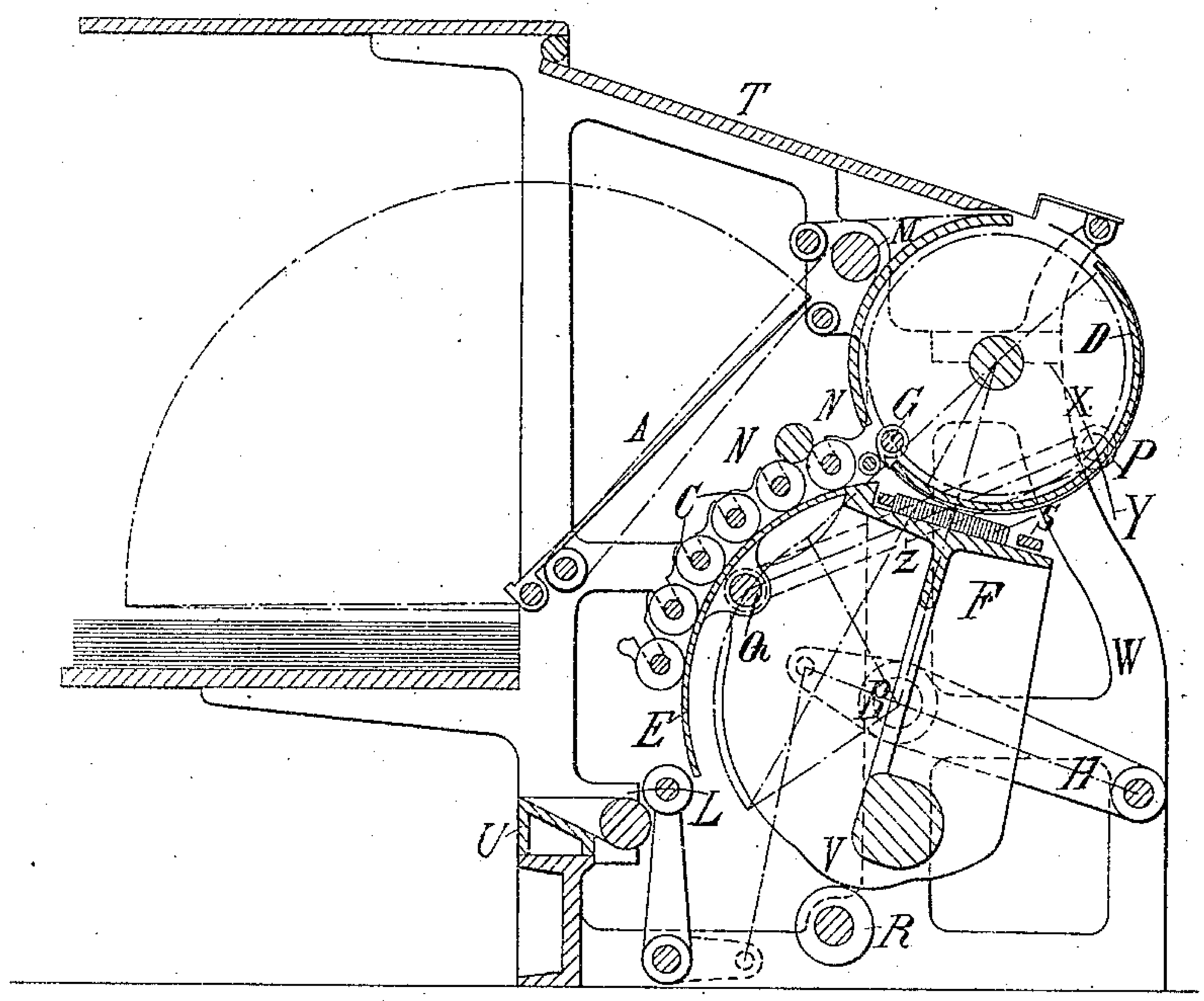
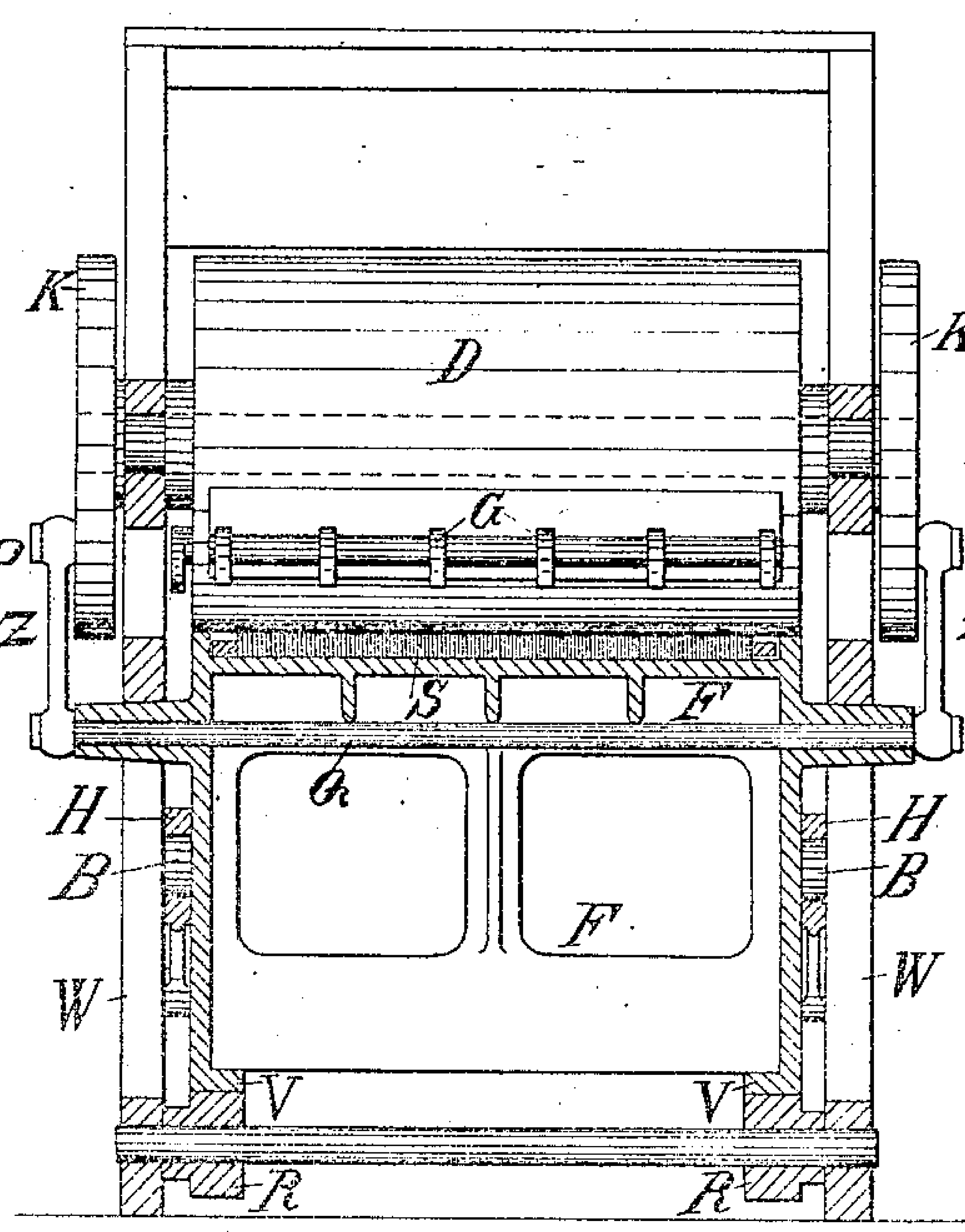


FIG. 2.



Witnesses

Inventor

Henri Stamm

Attorney

H. STAMM.

PRINTING MACHINE.

APPLICATION FILED NOV. 11, 1907.

908,347.

Patented Dec. 29, 1908.

3 SHEETS—SHEET 2.

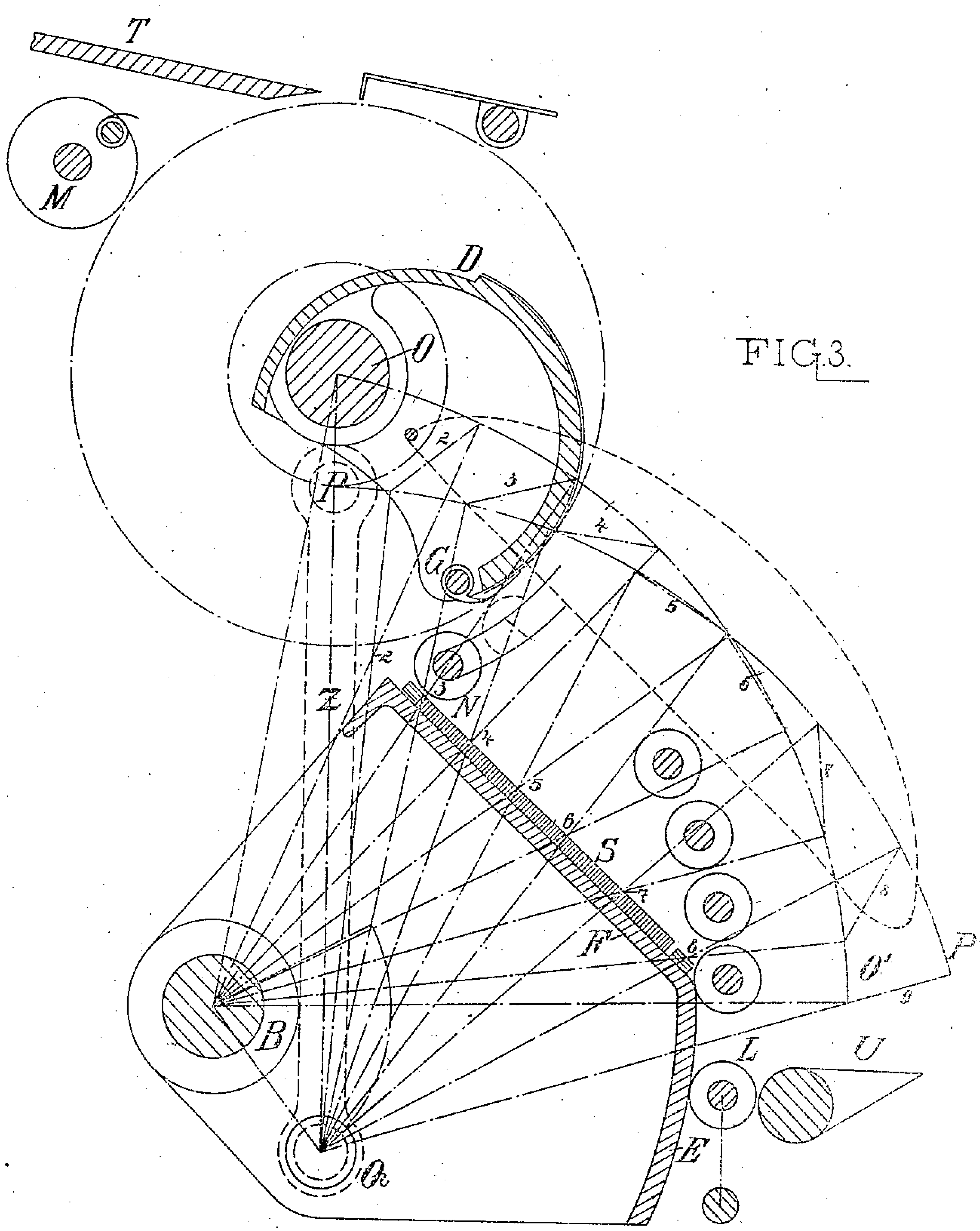


FIG. 3.

Witnesses:

Inventor:

Attorney

H. STAMM.

PRINTING MACHINE.

APPLICATION FILED NOV. 11, 1907.

908,347. Patented Dec. 29, 1908.

3 SHEETS—SHEET 3.

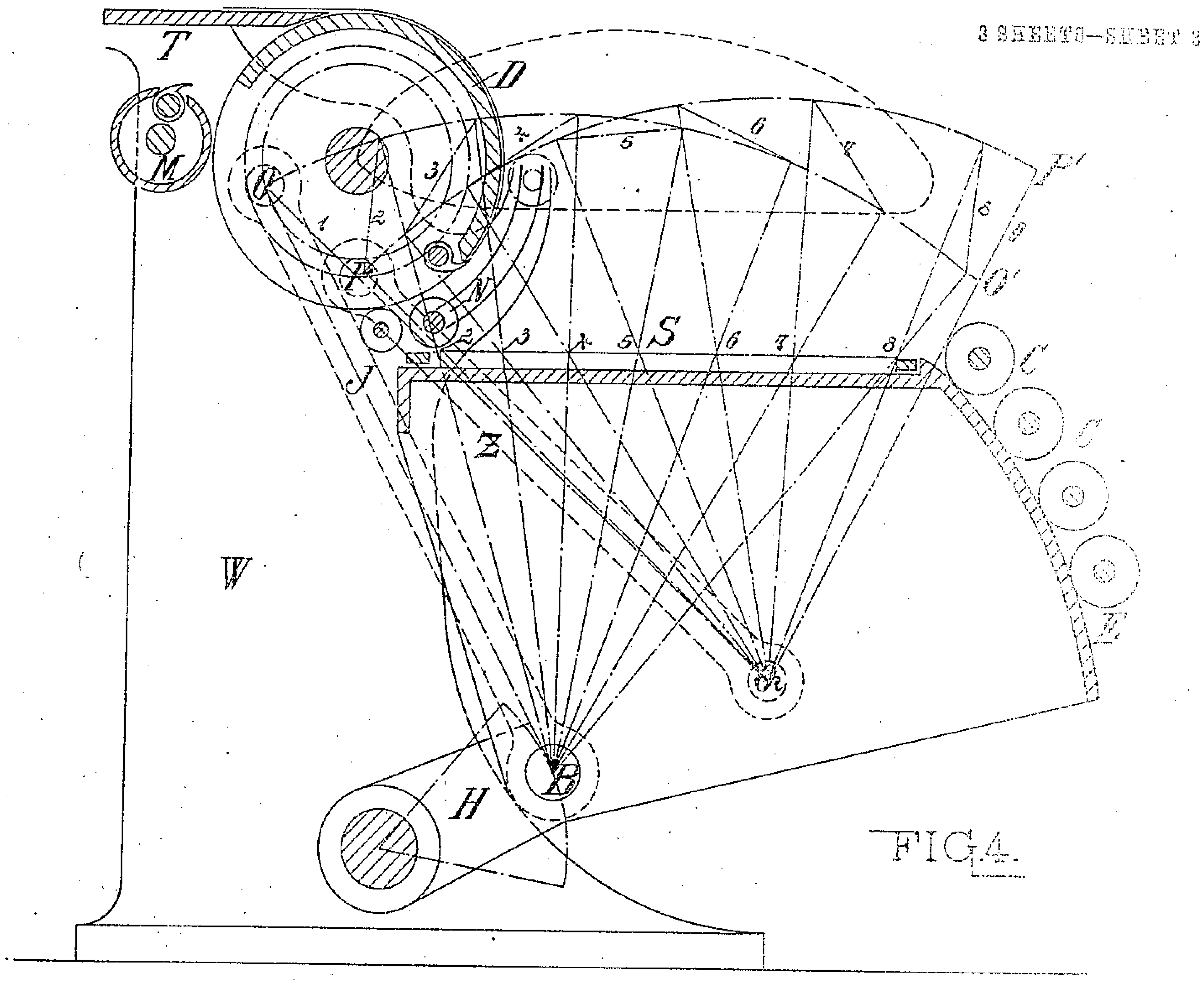
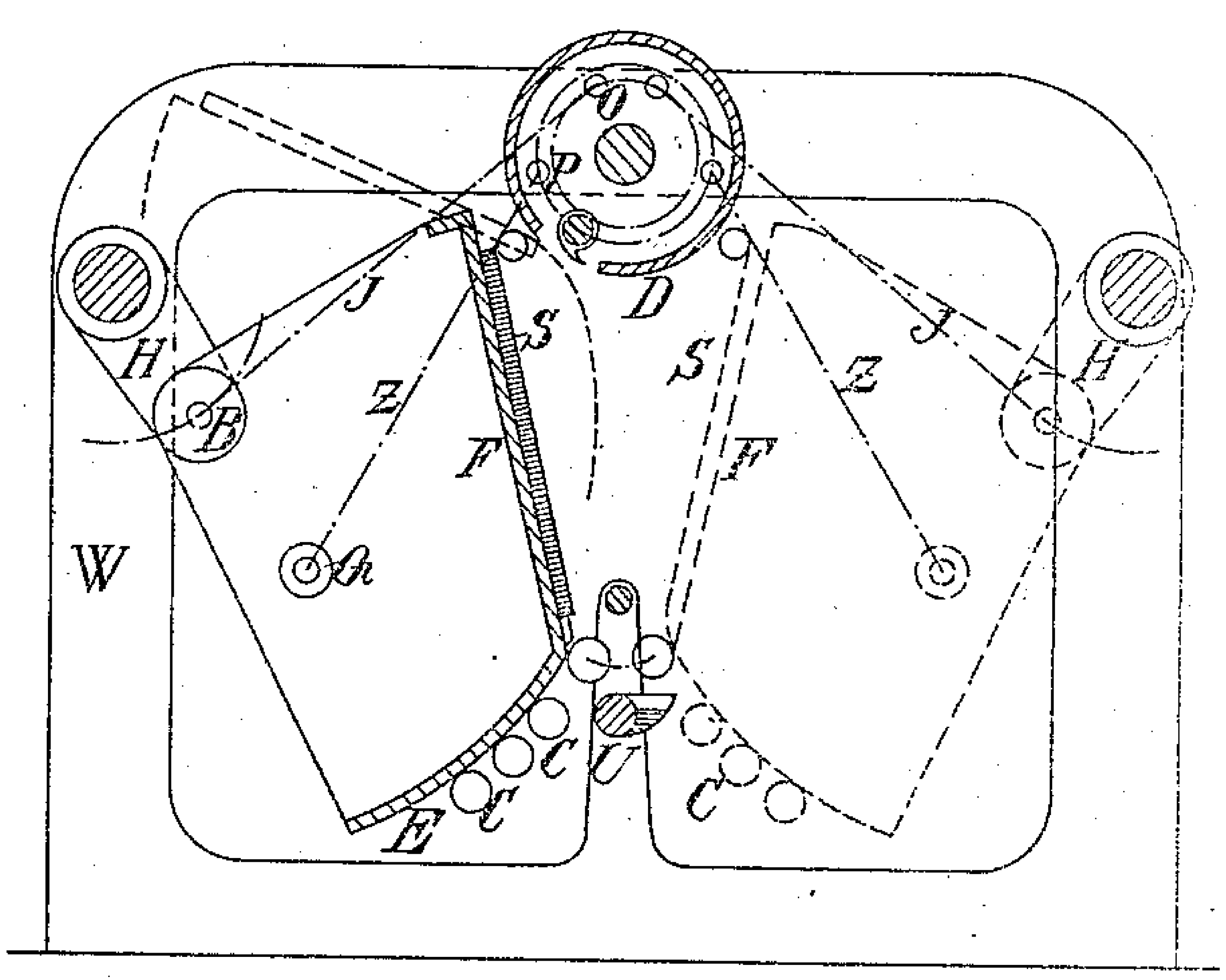


FIG.4.

FIG.5.



Witnesses:
Geo. Heinicke
F. Dümar

Inventor
Henri Stamm
by G. Dittmar
Attorney

UNITED STATES PATENT OFFICE.

HENRI STAMM, OF REUTZSCHMÜHLE, NEAR GREIZ, GERMANY.

PRINTING-MACHINE.

No. 908,347. Specification of Letters Patent. Patented Dec. 29, 1908.

Application filed November 11, 1907. Serial No. 401,756.

To all whom it may concern:

Be it known that I, HENRI STAMM, a citizen of Switzerland, and resident of Reutzschmühle, near Greiz, Germany, have invented certain new and useful Improvements in Printing-Machines, of which the following is a specification.

Printing machines with continuously and uniformly rotating printing cylinders have frequently complicated arrangements for driving the carriage of the forms so as to perform a to and fro movement underneath the cylinder. It has not been attempted to drive the carriage by means of a crank movement as same would not effect a velocity uniform and corresponding to that of the cylinder.

The invention described herein relates to the driving of the carriage by means of a crank movement which receives the impulse from the printing cylinder itself.

I will now describe my invention with reference to the accompanying drawings in which—

Figures 1 and 2 show my invention in cross section and front view respectively. Figs. 3 and 4 show modifications of same in section. Fig. 5 is a vertical section of a modification.

The impression cylinder, D (Fig. 1) works in the same manner as in usual printing machines, the sheets coming from the table or plate T being gripped by the grippers G and after being printed upon, are conducted over guide roller M, the shaft of which may be used as the driving shaft of the machine, to the fly A, which piles them up on a table arranged adjacent to it.

The flat form S lies on the carriage F so as to perform a swinging movement which is effected by means of cranks, or crank disks K, mounted on the shaft of the impression cylinder, and by means of tie-rods Z, directly engaging with shaft Q arranged in the carriage. This movement is effected in such a manner that at the upward travel of the form for its whole length contact of the form with the cylinder takes place, the result being the same as if during this phase an engagement of the form with the cylinder by means of a rack at the side of the former and gear wheel arranged on the latter, would take place, which rack and gear wheel however may be provided in addition to the above arrangement for the purposes of correcting inaccuracies. The flat form is guided in its engagement with the curved cylinder surface by means of suitably shaped curved blocks V which are arranged on the lower ends of the side-walls of the carriage, and which are in contact with rollers R mounted on a horizontal shaft, by means of which said blocks are moved up and down. The center of rotation of the carriage F (pivot B) is guided in its up and down movement by the swinging arms H; but this could also be effected in any other manner, for instance by means of slots in the side walls or the like.

The correct guiding of the form underneath the printing cylinder D is effected by arranging the parts of the crank system in certain determined positions and relations to each other, as stated in the following:

In the construction as shown in Fig. 1 the imaginary plane passing through the pivots of the rods Z on the disks K and on the carriage F is required to pass in any position of the printing cylinder through the point of contact of cylinder and form, as this is indicated in Fig. 1 with regard to the middle position. This is effected in the following manner: Starting from the middle position (Fig. 1) the cylinder D is imagined to roll on the form, while the carriage is imagined to remain in the position shown in this figure. The center of a crank pivot P will then describe an arc. After determining the radius of the latter the length of the tie-rod Z is made equal to same, and the center of rotation of the said tie-rod is chosen as the center of the arc of a circle. It is evident that then the positions of the form S and the cylinder D will be in the same relation to each other as if an engagement of these two parts by means of gears would take place. It is a matter of course that when determining the relation of the positions consideration must be had as to conditions for the proper working of the crank system; provision must also be made for a proper amplitude of the carriage F for the purpose of inking the form.

The inking is effected in a manner well known by means of two rollers N, which receive the ink from the curved cushion E, which receives ink from the ink-case U by means of roller L, rollers C serving to rub and distribute the ink on the surface E. The latter is made integral with the swinging carriage F and is so arranged as to enable it to swing therewith for the purpose of facilitating the distribution of ink on it, the swinging motion being effected by suitable means.

With the construction described above a

comparatively short printing stroke is obtained, so that same is particularly adapted for the case, when a small matter is required to be printed upon a large space, such as a firm's address on packing paper or the like. A much larger printing surface however, even larger than that of ordinary printing machines, in comparison with the total travel of the impression cylinder can be obtained by the modifications of the arrangements shown in Figs. 3, 4, 5.

The modification shown in Fig. 3 differs from the construction described above in the arrangement of the carriage F, which, in this case, similarly as in rotary machines, swings around a fixed center—that is to say the axle of which is arranged in fixed bearings. The impression cylinder D has also a fixed center of rotation O, and as in certain rotary machines, is arranged eccentrically, as indicated in Fig. 3. In order to effect with this construction the contact of the eccentric impression surface with the form S during the whole time of the upward travel of latter, the positions of cylinder and form must be determined in a certain relation which can be found in the following manner. The carriage F is again imagined to remain in its position and the cylinder D to roll over the form S from one end of same to the other. The eccentrically arranged axle or shaft O would then describe a line which for practical purposes may be represented with sufficient approximation by an arc, O, O′. The oscillation of the carriage is effected in the same manner as in the construction of Figs. 1 and 2, by means of tie-rod Z which connects crank pivot P (arranged on or in connection with the impression cylinder) with the pivot Q on the carriage.

The proper passage of the form S is determined in the following manner: The radius P O is taken and is marked on arc O O′ both ways from the point of crossing of same with arc P P′. The same distance P O is then struck from the points thus obtained onto the arc P P′ at 1, 2,—8. Radii are then drawn from points on these arcs to their centers. A line drawn through the points of crossing of these radii, (said points being marked correspondingly 1—8,) determines the face of form S.

The imaginary circumference of the cylinder, which has to be considered with regard to the introduction of the sheets and transportation of same to roller M, is indicated in Fig. 3 by a circle in dotted lines, which touches the farthest point of the eccentrically shaped cylinder. The path which the eccentric pivot travels is shown in Fig. 3 by a segment-like curve, drawn in dotted lines. It is evident that the cylinder moves a considerable distance from the form during the phase of the return travel which makes it possible to employ for the purpose of inking the form a larger number of to and fro moving ink rollers, instead of the roller N, (Fig. 3) moving in slots.

Small deviations from the mathematically calculated construction of the eccentric cylinder can be corrected by means of corresponding shaping of same; or in a similar manner as in Fig. 1 by means of providing the carriage with eccentrics V.

The largest form is obtained by means of the modification shown in Fig. 4, in which same is equal to one half of the circumference of the cylinder, the result being approximately the same as with an ordinary two-revolution printing machine. While however in the latter machine the cylinder has to perform two rotations for each impression, only one rotation is necessary in my machine, so that compared with the number of rotations with the same diameter of cylinder, and same speed, the effect is double that hitherto attained. The effect however can be redoubled by means of the construction shown in Fig. 5, in which two systems of the kind shown in Fig. 4 are arranged round a single cylinder D. In this case the whole of the circumference of the cylinder is used as an impression surface, as is the case in rotary printing machines. It is therefore possible with the system invented by me to print upon endless paper at a continuously uniform traveling speed of same, with a flat form and single cylinder rotating at uniform velocity.

The arrangement of the different parts is similar in the construction of Fig. 4 to that of Fig. 3, from which it differs only in the arrangement of the printing cylinder, which is not arranged eccentrically as in Fig. 3, but concentrically.

The rigid connection of pivots O and B by means of tie-rod Z, Fig. 4 with employment of O as crank pivot is maintained. Thus two crank pivots O and P are obtained which are connected with pivots B and Q by means of tie-rods Z and Z respectively. The addition of a new link H however is necessitated in this construction in order to guide the pivot B in any required direction, said pivot B being free and movable in this construction, it does not matter whether this guiding arrangement (which however was necessary in Fig. 1) is provided on pivot B or on pivot Q. As in the construction of Fig. 1 the guiding of pivot B can also be effected by means of slots in the side walls, instead of lever H.

The arrangements of the driving parts in the construction of Fig. 4 can be carried out in different ways. The cranks O and P for instance may be arranged on different sides of the machine, one on the left hand and the other on the right hand side as shown in Fig. 4, or with both or one only constructed as counter cranks. Further, only one of the

two crank movements could be obtained from the cylinder shaft and the oscillation of lever H could be effected by means of a separate cranked shaft, arranged on another part of the machine, the different parts being arranged in geometrically similar or equal proportions and positions. Crank pivots can also be replaced by eccentrics.

Other modifications may be made without thereby deviating from the principle of my invention.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed I declare that what I claim is:

1. In a printing machine the combination with a constantly rotating cylinder, of a form carriage mounted for to and fro swinging movement, and a crank driving mechanism constructed to obtain its impulse from the impression cylinder, a tie rod connecting the impression cylinder with a pivot on the carriage, means constructed to cause the lower part of the carriage to move in a curved path to guide the swinging form during its engagement with the impression cylinder.

2. In a printing machine the combination with a constantly rotating cylinder, of a form carriage mounted for to and fro swinging movement, and a crank driving mechanism constructed to obtain its impulse from the impression cylinder, a tie rod connecting the impression cylinder with a pivot on the carriage, means constructed to cause the lower part of the carriage to move in a curved path to guide the swinging form during its engagement with the impression cylinder, said impression cylinder being arranged eccentrically.

3. In a printing machine the combination with a constantly rotating cylinder, of a form carriage mounted for to and fro swinging movement, and a crank driving mechanism constructed to obtain its impulse from the impression cylinder, a tie rod connecting the impression cylinder with a pivot on the carriage, means constructed to cause the lower part of the carriage to move in a curved path to guide the swinging form during its engagement with the impression cylinder, said carriage having a flat face.

In testimony whereof I affix my signature.

HENRI STAMM.

In the presence of—

MORITZ BAUER, Seur,

WM. H. H. SPIELMEYER.