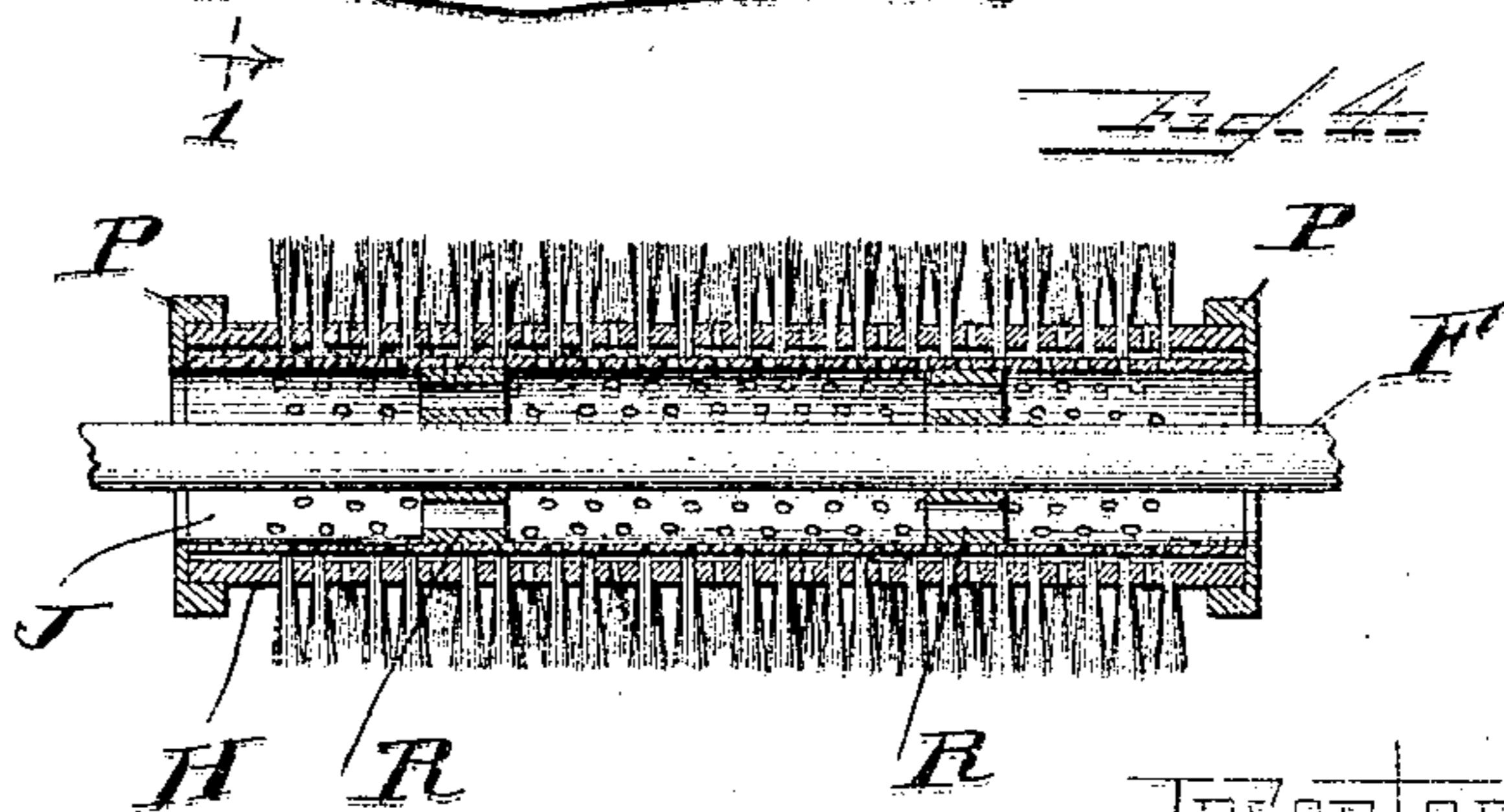
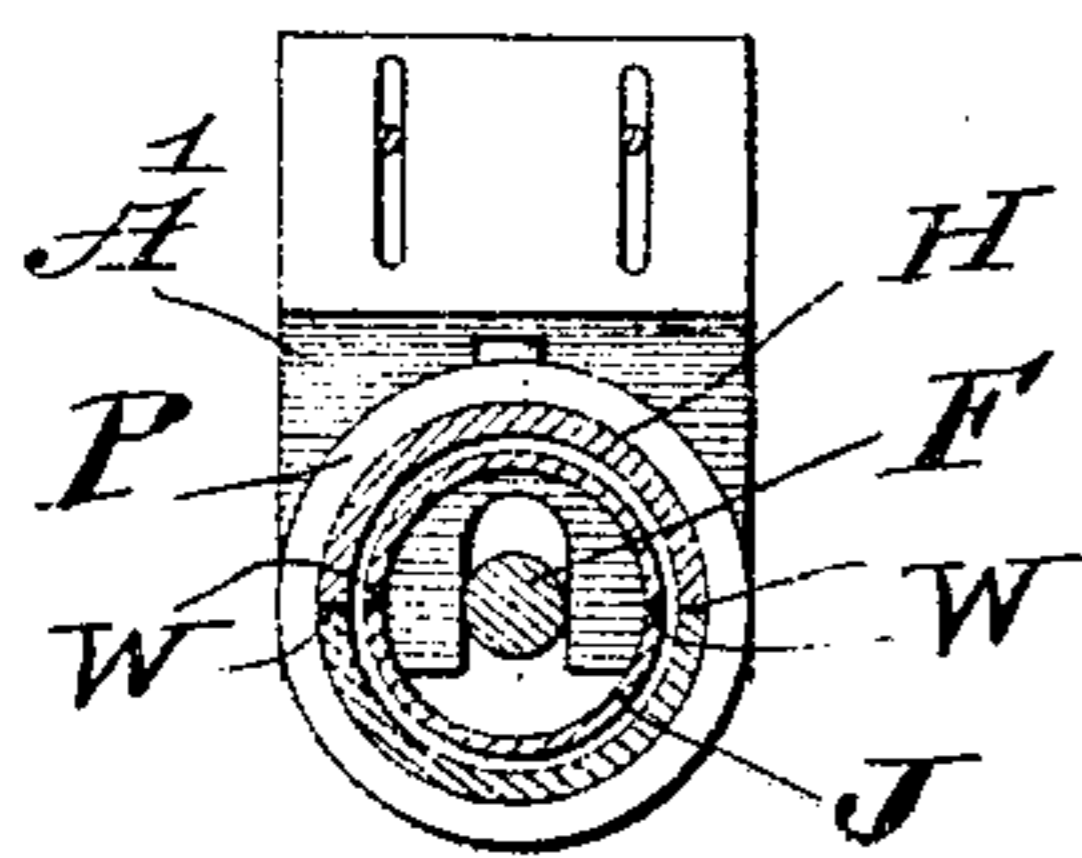
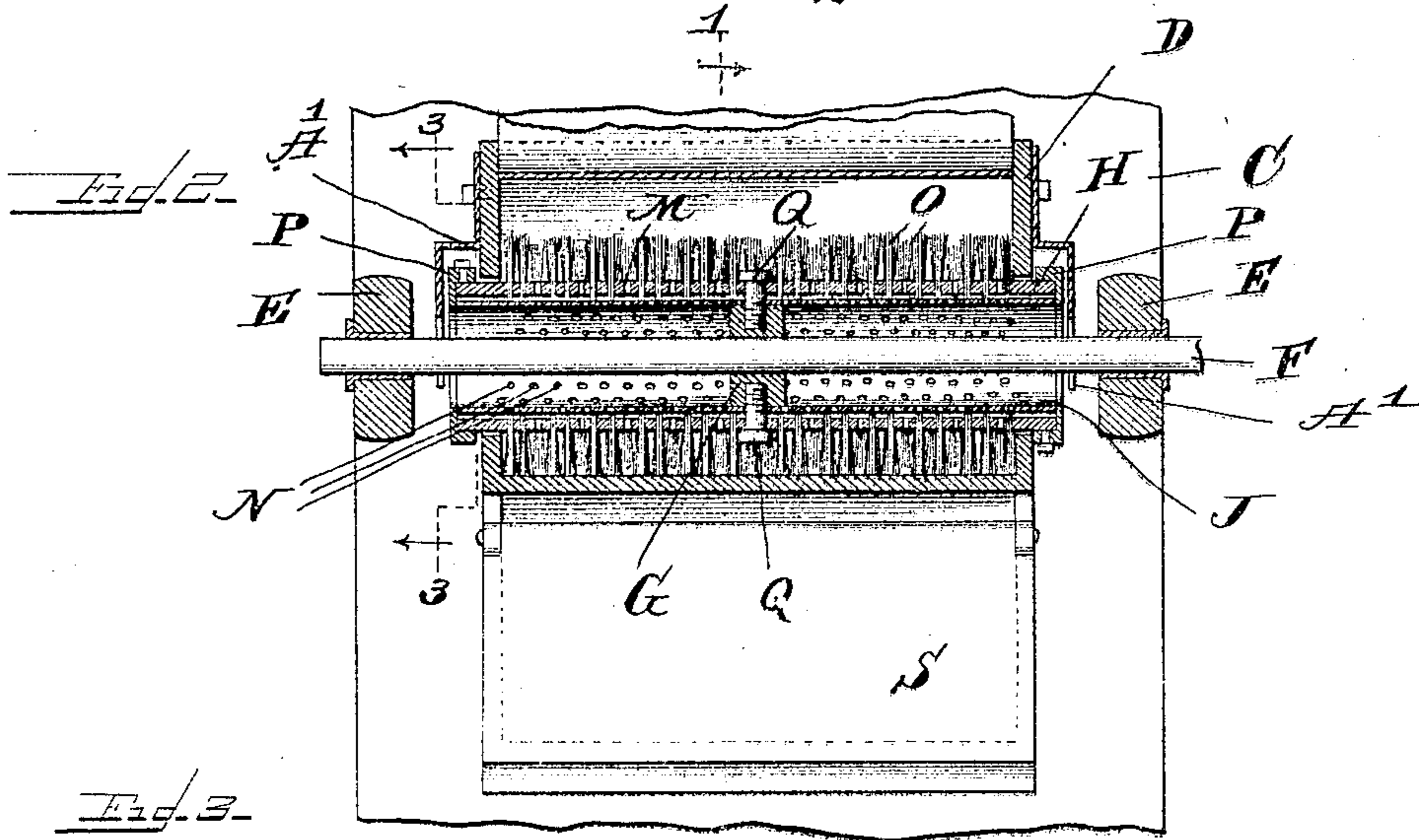
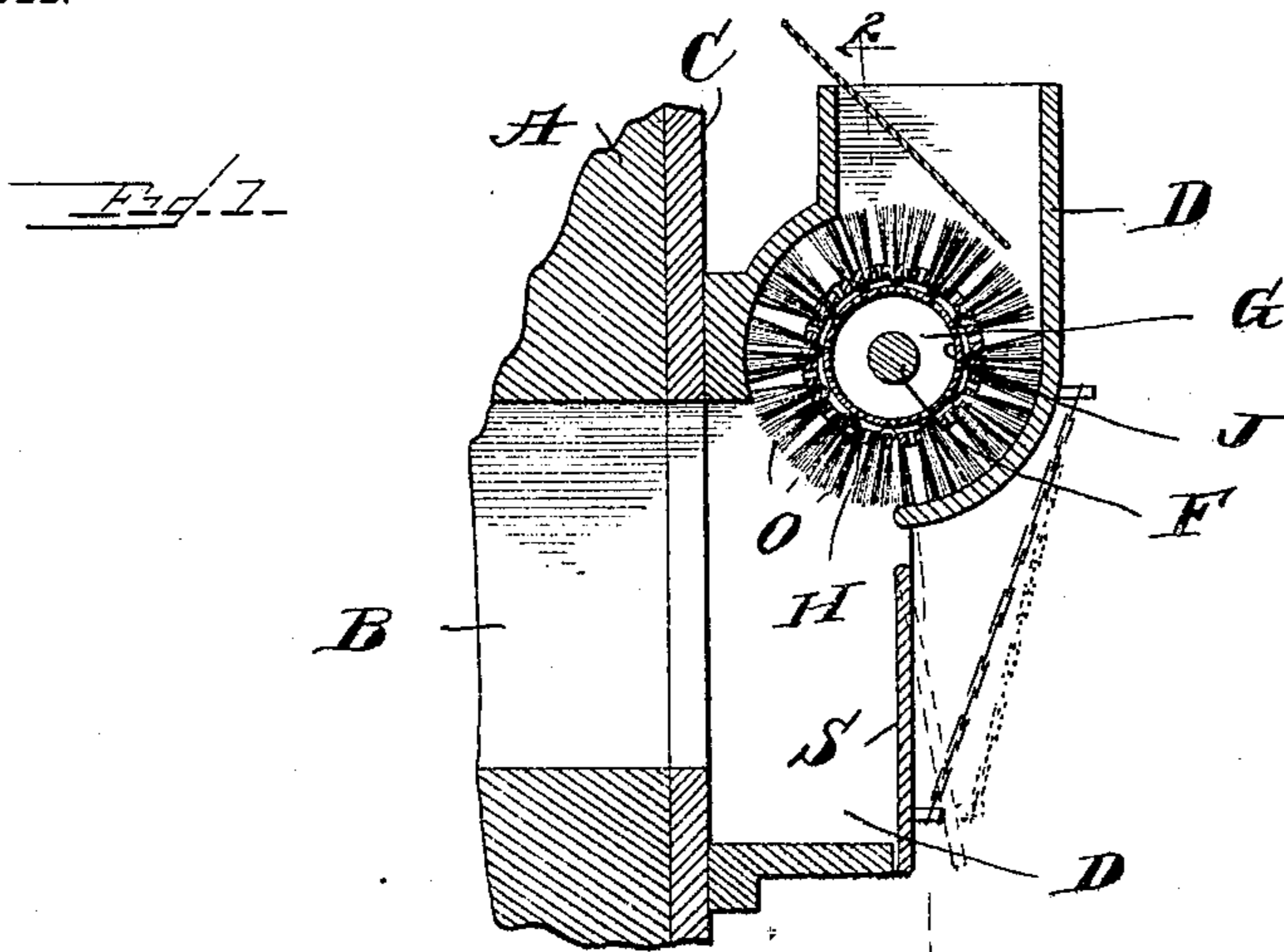


No. 764,693.

PATENTED JULY 12, 1904.

G. L. SWIFT.
FUEL FEEDING APPARATUS.
APPLICATION FILED SEPT. 8, 1903.

NO MODEL.



WITNESSES

W. A. Paubrockmatt
E. C. Semple

INVENTOR

George L. Swift
By Brown & Darby

ATTYS.

UNITED STATES PATENT OFFICE.

GEORGE L. SWIFT, OF CHICAGO, ILLINOIS.

FUEL-FEEDING APPARATUS.

SPECIFICATION forming part of Letters Patent No. 764,693, dated July 12, 1904.

Application filed September 8, 1903. Serial No. 172,199. (No model.)

To all whom it may concern:

Be it known that I, GEORGE L. SWIFT, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Fuel-Feeding Apparatus, of which the following is a specification.

This invention relates to fuel-feeding apparatus.

The object of the invention is to provide a construction of fuel-feeding apparatus which is simple and efficient and wherein provision is made for the efficient and proper admission of air and its mixture with the fuel to promote the complete combustion thereof.

A further object of the invention is to provide a construction wherein the feeding device is prevented from being clogged up with the fuel.

A further object of the invention is to provide a construction wherein the feeding device is prevented from becoming unduly or over heated in the operation thereof.

Other objects of the invention will appear more fully hereinafter.

The invention consists, substantially, in the construction, combination, location, and relative arrangement of parts, all as will be more fully hereinafter set forth, as shown in the accompanying drawings, and finally pointed out in the appended claims.

Referring to the accompanying drawings, and to the various views and reference-signs appearing thereon, Figure 1 is a view in vertical transverse section on the line 1 1, Fig. 2, looking in the direction of the arrows, of a fuel-feeding apparatus embodying in its construction the principles of my invention. Fig. 2 is a view in vertical longitudinal section of the same on the line 2 2, Fig. 1, looking in the direction of the arrows. Fig. 3 is a detail view in section on the line 3 3 of Fig. 2 looking in the direction of the arrows. Fig. 4 is a view of a modified form of rotating feed device embodying the principles of my invention.

The same reference-letter is used to designate the same part through the several views.

In Patent No. 558,875, issued April 21, 1896, and reissued April 3, 1900, reissue No. 11,816, to Georg Hilliger, is set forth, described, and

claimed a construction of apparatus for feeding coal-dust employing a rotating brush operating in connection with shaking devices in a hopper for feeding fine fuel, such as coal-dust, to a furnace-chamber. The present invention relates to an apparatus of this same general character, while not being confined to the character or size of the fuel to be fed, and is designed to overcome certain defects and objections found in actual practice to exist in apparatus of this general character.

In the practical operation of an apparatus of the character disclosed in the said Hilliger patent it has been found that the fine fuel accumulates between the bristles of the rotating brush, thereby clogging the same, and this accumulated fuel frequently ignites or cokes under the heat generated in the furnace-chamber, thereby heating the apparatus and the parts of the brush, frequently burning off the bristles. Moreover, the fuel accumulates at the ends of the brush and between such ends and the hopper-walls, thereby clogging the apparatus at these points and heating the same, as well as the journal-bearings for the shaft upon which the brush is carried, and hence arresting the rotation of the brush, thereby placing the apparatus out of commission and interfering with its continuous service. Again, in apparatus of the nature set forth in said patent the fuel is delivered into the furnace-chamber in a stream or sheet and but very slightly mixed with air, the apparatus relying upon the natural draft of the stack to draw sufficient air through the openings or dampers underneath the feeding apparatus to mix with the fuel and to surround each particle thereof and to supply the necessary amount of oxygen to support and maintain combustion. In order to attain this result, however, it was necessary to speed up the brush, so as to deliver the fuel with sufficient velocity into the furnace-chamber to hold the same in suspension until the mixing process of the air therewith could be effected sufficiently before the same becomes ignited. This results in a rapid current of fuel through the combustion-chamber, causing a constant erosion of the same and a cooling of the ignition-surface, so that ignition is delayed until the fuel attains con-

siderable distance into the furnace-chamber, and thereafter it is not permitted a sufficient travel to be entirely consumed, and consequently unconsumed particles of the fuel are
 5 carried beyond the furnace-chamber and become deposited in the flues and tubes, thereby not only impairing the efficiency of the apparatus in fuel consumption, but also clogging or interfering with the proper operation of
 10 the boiler to be heated from the furnace. It is among the special objects of my present invention to avoid these objections, and I accomplish the object by the construction shown and now to be described, wherein reference-
 15 sign A designates a setting in which is formed the furnace-chamber B.

C designates the front plate of the furnace, upon which is suitably mounted a hopper D, to which the fuel is supplied. In journal-
 20 boxes E is journaled a shaft F, upon which is mounted a rotary brush of peculiar construction, presently to be more fully described. The shaft F is arranged to extend through the hopper, and the ends of said shaft project
 25 beyond the side walls of the hopper and are received beyond such walls in the journal bearings or boxes E.

In one form of my invention, as shown in Fig. 2, the shaft F carries a central hub G, upon which are supported cylindrical shells
 30 H and J, the one telescoped within the other. These shells are suitably perforated, as indicated at M N. The brushes, blades, or the like (indicated at O) are secured in the outer
 35 shell or cylinder H in any suitable or convenient manner to project radially therefrom. In the particular form shown, to which, however, my invention is not to be limited or restricted, the brushes, blades, or the like O are
 40 bent into substantially U shape, with the ends arranged to project through adjacent openings or perforations through the shell or cylinder H, as clearly shown in Fig. 1, the inner shell
 45 or casing J constituting a support or backing for the bends of the brushes, blades, or the like. The ends of the cylinders or shells H J project slightly beyond the side walls of hopper D, but do not extend as far as the journal
 50 bearings or boxes E of the shaft F, thereby affording space between the journal boxes or bearings E and the ends of said shells or casing. The ends of the shells or casings may be held together in any suitable or convenient
 55 manner—as, for instance, by means of the cap-rings P. The shells or casings H J may be securely and efficiently supported or bolted upon the hub G in any convenient manner—as, for instance, by means of the screws Q or in any other suitable or convenient manner.
 60 It will be understood that the brushes, blades, or the like are not inserted in all of the perforations M of the outer shell or casing. If desired, instead of employing a central hub G upon shaft F, upon which the cylinder shells
 65 or casings are mounted, two or more spiders

R may be mounted upon said shaft to rotate therewith and upon which the shells or casings are mounted in the manner above described, said spiders having means for supporting the shells or casings and also being
 70 open therethrough to afford air-passage, as clearly shown in Fig. 4. Rotation may be imparted to shaft F and through said shaft to the brush cylinders or shells from any suitable or convenient source.

In the practical operation of an apparatus such as above described air is drawn into the interior of the brush shells or cylinders, by reason of the rotation thereof, through the openings at the ends thereof, and such air is
 80 forced through the perforations or openings through the shells or casings, and hence between and among the bristles, blades, or the like, thereby not only keeping the same free
 85 from accumulations of fuel-dust and the like, but also maintaining the brush and its associated parts cooled, thereby insuring continuous service of the apparatus and avoiding the heating of the same or the clogging thereof. Moreover, the rotation of the brush induces currents
 90 of air through the brush device, as above explained, thereby thoroughly mixing the fuel and air at the initial point of delivery of the fuel into the furnace-chamber, so that each particle of fuel becomes sufficiently surrounded
 95 with oxygen or the necessary supply of air to support and maintain combustion before leaving the apparatus to enter the furnace-chamber. In this aerated state, so to speak, the fuel is more easily floated or delivered into
 100 the combustion-chamber by the brushes, and consequently a more complete and rapid combustion is secured and less chance is afforded of erosion of the igniting-surface of the fuel. There is less chilling of such surface, and hence
 105 less liability of any particles of the fuel failing to ignite or to be consumed or of being carried beyond the furnace-chamber to be deposited in the flues or uptakes. Hence a greater economy of fuel is secured and a more complete utility of the particles of heat generated in the production of steam.

I have referred to the use of brushes, blades, or the like to accomplish the work of delivering the fuel into the combustion-chamber.
 115 I do not desire, however, to be limited or restricted in this respect, as any form of hollow brush cylinder or tube or roll with bristles, blades, paddles, teeth, or the like fixed to the periphery thereof and operating to dis-
 120 integrate the fuel and to mix and throw the same by centrifugal force into the combustion-chamber is included within the spirit and scope of my invention. It is obvious that the perforations or openings through the cylinder-
 125 shells H J may be of any desired number or size or shape to accomplish the desired object of forming air-passages therethrough or to furnish a sufficient quantity of air to effect a thorough mingling in the proper proportions of the
 130

air with the fuel before and during the delivery of the fuel into the combustion-chamber to effect and insure the complete combustion thereof. If desired any convenient means may be employed to aid the cylinder during the rotations thereof in inducing a draft of air through the openings at the ends of such cylinders or casings. If desired and in order to afford means for cleaning out the slag or other deposit from the combustion-chamber or to supply additional air thereto, if found necessary, a hinged or pivoted damper S (see Fig. 1) may be employed.

If desired and in order to regulate the extent of opening of the hollow brush at its ends to the outer air, adjustable plates A' may be employed to vary such openings as the necessities of the case require.

In order to facilitate the construction and assembling of the cylinders H J, said cylinders may be made in halves or sections, as indicated at W, Fig. 3.

The fuel may be supplied to the hopper in any suitable or convenient manner or condition adapting it to be fed into the combustion-chamber by the operation of the feed device; but I do not desire to confine the use of my invention to any special form of fuel, as the same is designed to operate with coal, coal-dust, peat, or the like.

Having now set forth the object and nature of my invention and a construction embodying the principles thereof and having described such construction, its purpose, function, and mode of operation, what I claim as new and useful and of my own invention, and desire to secure by Letters Patent of the United States, is—

1. In a fuel-feeding apparatus, a combustion-chamber, a hopper, a rotary shaft arranged to extend through said hopper, an open-ended cylindrical shell or casing mounted upon to rotate with said shaft, the open ends of said shell or casing extending beyond the side walls of the hopper, brushes, blades or the like carried by said shell or casing, said

shell or casing being perforated, and an interior perforated shell or casing forming a backing for said brushes, bristles or the like, as and for the purpose set forth. 50

2. In a fuel-feeding apparatus, a combustion-chamber, a hopper, a rotary shaft extending through said hopper, a hollow cylindrical shell or casing mounted upon to rotate with said shaft, the ends of said shell or casing extending through the side walls of the hopper, said shell or casing being perforated, feeding devices such as bristles, blades or the like carried by said shell or casing, an interior hollow perforated shell or casing forming a backing for said bristles, blades or the like and also mounted to rotate with said shaft, and rings for securing the ends of said cylinders together, all combined and arranged as and for the purpose set forth. 65

3. A fuel-feeding apparatus comprising a hopper, a rotary brush arranged therein to deliver fuel therefrom to the combustion-chamber, means for supplying air through such brush to the fuel for delivery along with the fuel into the furnace-chamber, and means for adjustably regulating said supply of air, as and for the purpose set forth. 70

4. In an apparatus for feeding coal-dust or the like, a combustion-chamber and a hopper, a shaft arranged to extend through said hopper, a supporting-spider carried by said shaft, an open-ended cylindrical shell or casing supported upon said spider, the ends of said shell or casing communicating with the outer air, said shell or casing being perforated, feeding brushes or bristles supported by said shell or casing and extending through a portion of said perforations, and means for rotating said shaft, as and for the purpose set forth. 85

In witness whereof I have hereunto set my hand, this 4th day of September, 1903, in the presence of the subscribing witnesses.

GEORGE L. SWIFT.

Witnesses:

C. H. SEEM,

S. E. DARBY.