

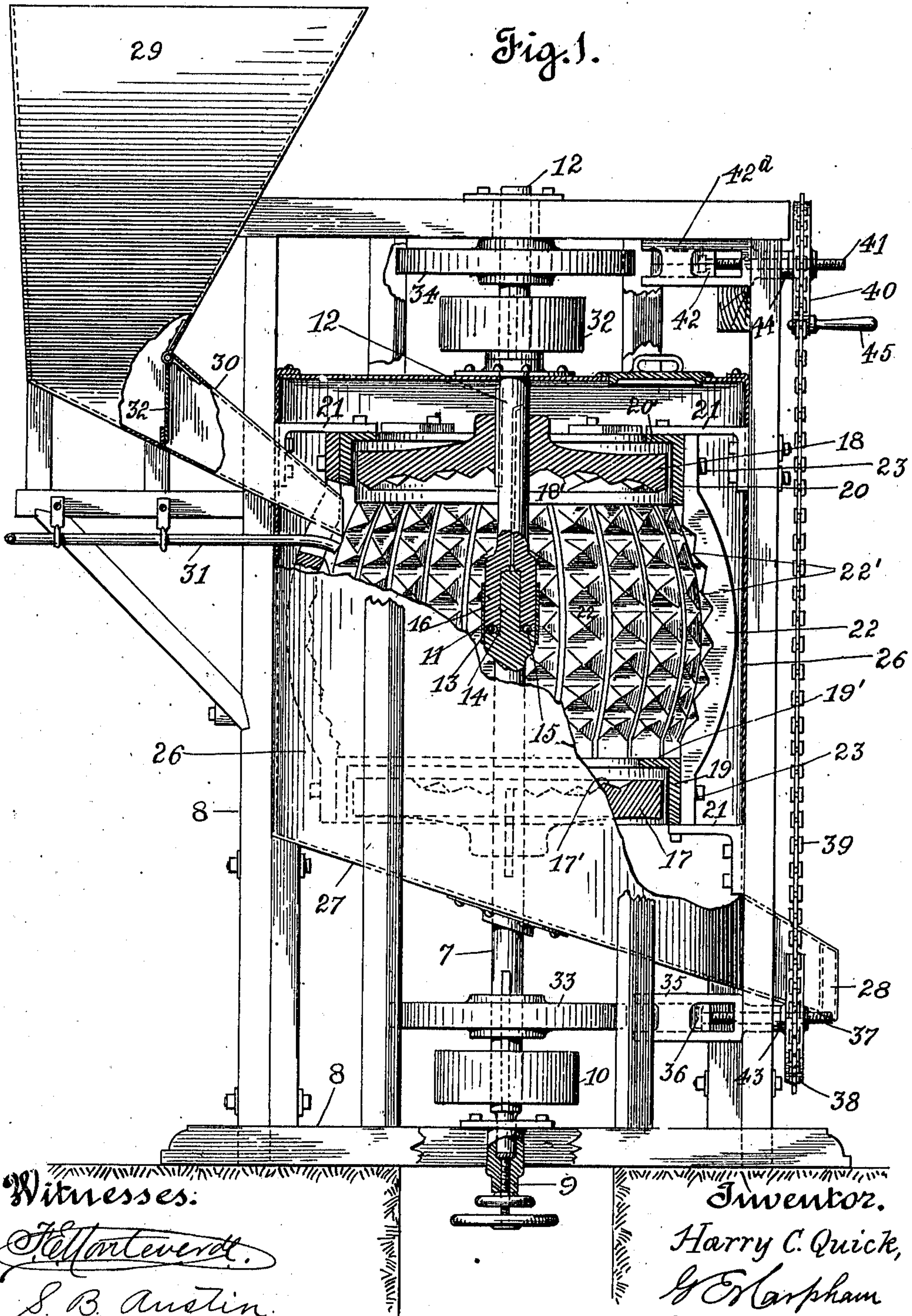
H. C. QUICK.
ORE CRUSHING MACHINE.

APPLICATION FILED SEPT. 13, 1907. RENEWED FEB. 26, 1910.

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Patented Apr. 4, 1911.

2 SHEETS—SHEET 1.



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Fig. 2.

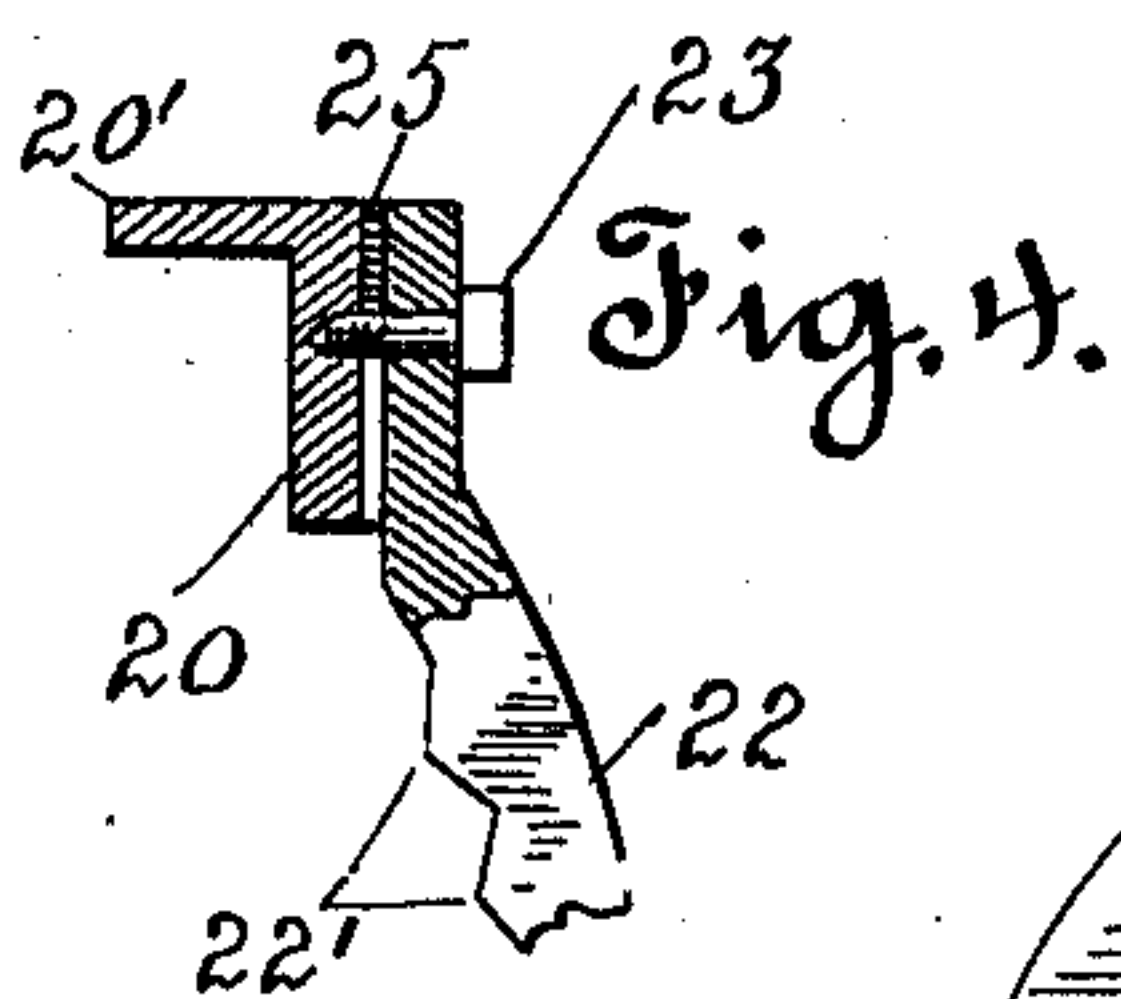
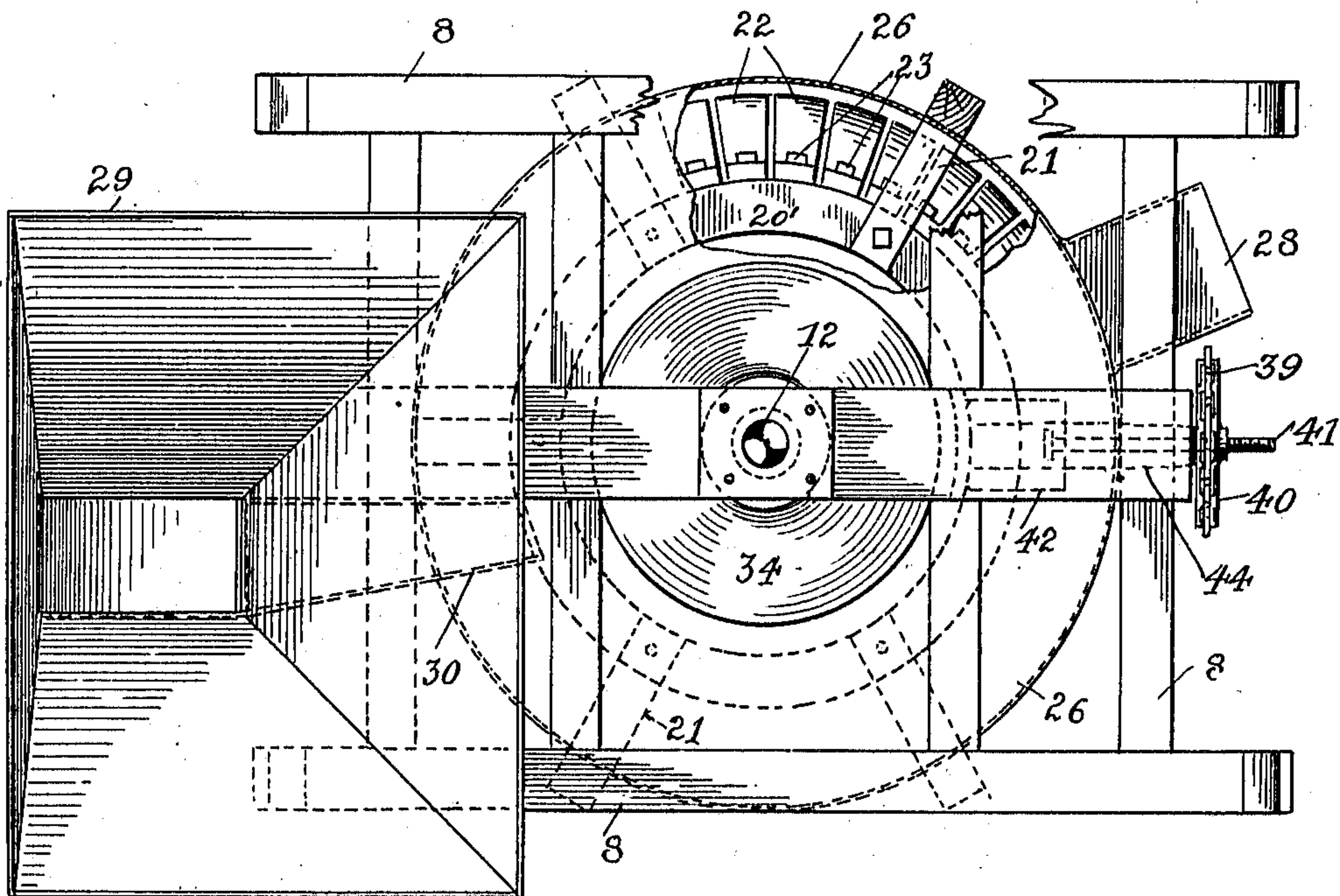
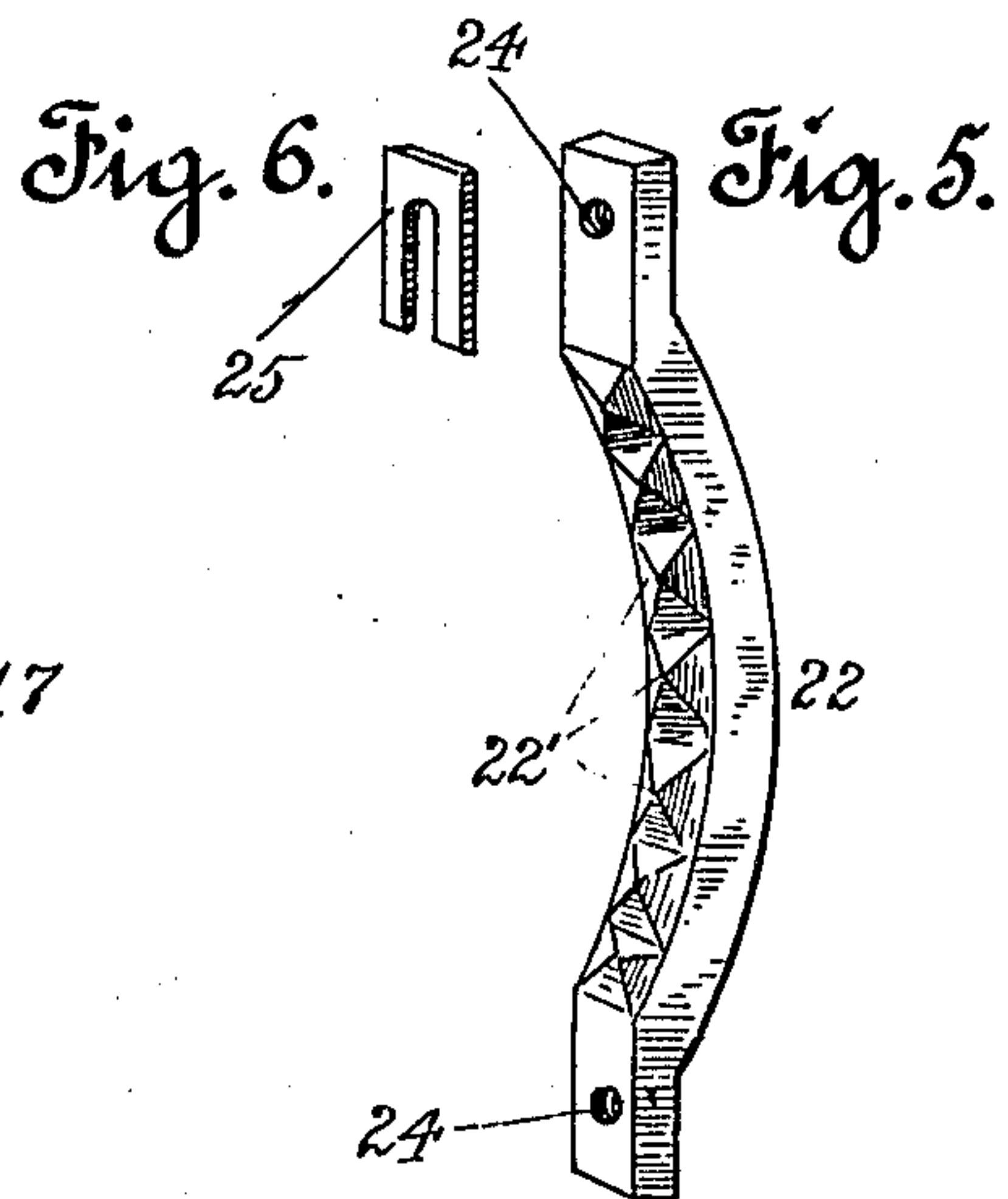
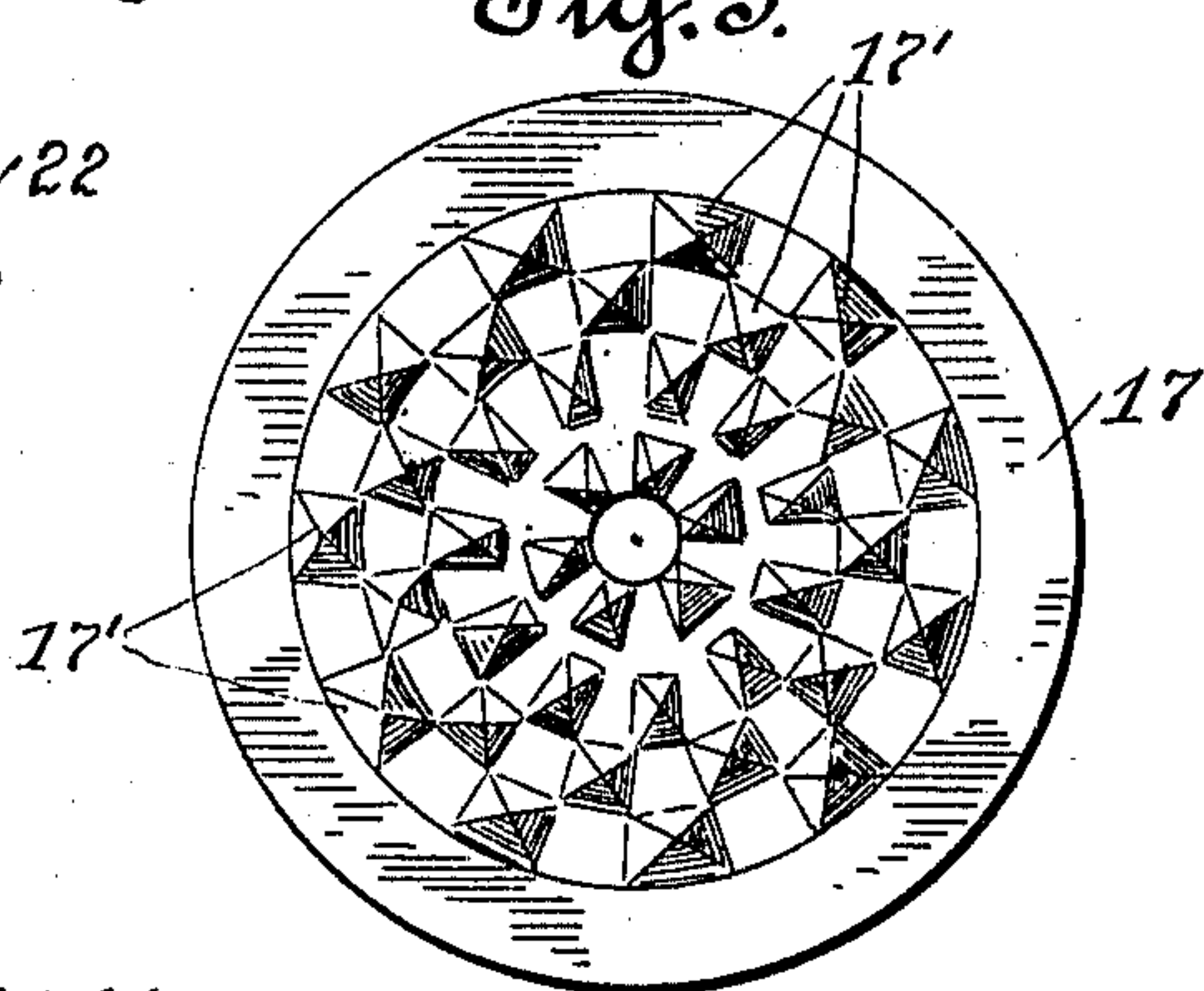


Fig. 3.



Witnesses.

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UNITED STATES PATENT OFFICE.

HARRY C. QUICK, OF LOS ANGELES, CALIFORNIA, ASSIGNOR TO BUSTER QUICK MILL COMPANY, A CORPORATION OF CALIFORNIA.

ORE-CRUSHING MACHINE.

988,505.

Specification of Letters Patent.

Patented Apr. 4, 1911.

Application filed September 13, 1907, Serial No. 392,611. Renewed February 26, 1910. Serial No. 546,259.

To all whom it may concern:

Be it known that I, HARRY C. QUICK, a citizen of the United States, residing at Los Angeles, county of Los Angeles, and State of California, have invented new and useful Improvements in Ore-Crushing Machines, of which the following is a specification.

My invention relates to an ore crushing machine in which the ore is crushed by being hurled from a rotating wheel upon which it is fed and striking against the sides of the crushing chamber or the top or bottom thereof or against other pieces of ore in the crushing chamber, and the object thereof is to produce an efficient machine of great capacity. I accomplish this object by the machine described herein and illustrated in the accompanying drawings in which;

Figure 1 is a side elevation partly in section of my improved machine. Fig. 2 is a plan of the same. Fig. 3 is a plan of one of the hurling wheels. Figs. 4 to 6 are details relating to the side members of the ore crushing chamber.

In the drawings the lower driving shaft 7 is mounted in suitable bearings in the frame 8 of the machine, and is adjustable longitudinally by screw 9. A pulley 10 provides means to apply power to drive the shaft. The upper end of shaft 7 is reduced in size and is received in a socket 11 in the lower end of the upper driving shaft 12 which is enlarged to provide additional strength and to provide suitable surface for the groove 13 which forms the upper member of a ball race, the lower member being formed by groove 14 in the end of the lower driving shaft adjacent to the reduced end of said shaft, said shaft being preferably enlarged as shown in Fig. 1 just below the reduced portion. Balls 15 are provided for said race. A sleeve 16 is secured upon the lower end of the upper driving shaft and projects downwardly around the upper end of the lower driving shaft to prevent dirt from entering the joint between the two shafts.

Securely keyed to the lower driving shaft is a bottom hurling wheel 17, and to the upper driving shaft is keyed the top hurling wheel 18. Surrounding these hurling wheels are annular rings 19 and 20 which are provided with ledges 19' and 20' which

project over the hurling wheels. These annular rings are secured to brackets 21, which brackets are secured to the frame of the machine. There are a sufficient number of these brackets to give a suitable support to said rings to hold them rigid. Vertical ribs 22 are secured to the annular rings 19 and 20. These ribs form the sides of the crushing chamber and the inner face thereof is provided with knobs or projections 22'. The upper face of the lower hurling wheel and the lower face of the upper hurling wheel are provided with like knobs or projections 17' and 18'. There are as many vertical ribs as are necessary to form the sides of the ore crushing chamber and they are secured to the annular rings by bolts 23 which pass through holes 24 in the ends of the ribs. The ribs are separated to form the finest mesh that it is desired to crush the ore to in the mill. When it is desired to have the ore crushed in the mill to a coarser mesh, bolts 23 are unscrewed a sufficient distance to permit of the insertion of shims 25 between the annular rings and the ends of the ribs as shown in Fig. 4, which causes the further separation of the ribs.

Secured to the frame and surrounding the ore crushing chamber is an imperforate casing 26 which is provided with a sloping bottom 27 at the lower end of which is a spout 28 through which the ore is discharged. This casing forms what may be termed the ore collecting chamber.

A feed hopper 29 is provided to hold ore to be crushed. This feed hopper is provided with a spout 30 which leads the ore into the crushing chamber, an opening being made between two of the ribs for that purpose. When the machine is used for wet crushing, a hose 31 conveys water into the ore crushing chamber. When the machine is used for dry crushing, compressed air may be furnished through the hose into the crushing chamber. A gate 32 suitably controlled, regulates the admission of ore from the hopper to the spout.

The upper driving shaft is provided with a pulley 32 to which power may be applied to drive the shaft.

In the operation of my machine the power is applied to rotate the lower shaft in one direction and the upper shaft in the reverse direction, and ore is fed into the crushing

chamber. As the ore falls upon the lower hurling wheel it is thrown upwardly and a portion of it will strike the upper hurling wheel and a portion will strike the vertical ribs and fall back upon the lower wheel. The ore that strikes the upper hurling wheel has its motion changed by the upper hurling wheel and is hurled back in the direction from whence it came. This change of motion operates upon the ore to pulverize it in the same manner that a person would separate the parts of an apple by grasping one part of the apple in one hand and the other part in the other hand and twisting the parts in the reverse direction. The ore in passing from one hurling wheel to the other will encounter ore flying in the reverse direction which it will strike with a like twisting motion, which I have found in practice to be very effective in reducing the ore to small particles. As soon as the ore is crushed to the desired mesh it may pass out between the vertical ribs or it may work its way around the hurling wheels.

On shaft 7 is keyed a brake wheel 33 and on shaft 12 is keyed a brake wheel 34. Adjacent to brake wheel 33 is a brake frame 35 which guides shoe 36 in its movement toward or from brake wheel 33. This brake shoe is swivelly mounted on the end of a screw threaded shaft 37 which passes in threaded contact through the hub of sprocket wheel 38. Sprocket wheel 38 is connected by sprocket chain 39 with sprocket wheel 40 which is mounted upon screw threaded shaft 41. Shaft 41 is swivelly connected to brake shoe 42 which is guided by the brake shoe frame 42^a toward and from the brake wheel 34. The outer end of shaft 37 is supported by bearing 43; and the outer end of shaft 41 is supported by bearing 44. These bearings prevent the sprocket wheels from moving on their shafts but do not prevent them from rotating. A handle 45 is secured to one of these sprocket wheels, preferably 40, so that the sprocket wheels may be rotated together and cause the brake shoes to engage with or be disengaged from their respective brake wheels at the same time, whereby the motion

of both shafts may be simultaneously controlled.

If desired the driving shafts could terminate at the opposing faces of the hurling wheels. In such case suitable bearings would be provided adjacent to the hurling wheels.

If desired the top of the ore crushing chamber could be stationary but the machine would not then be as efficient.

Having described my invention what I claim is:

1. In an ore crushing mill, an ore crushing chamber having vertical sides composed of separated ribs; horizontally revolving hurling wheels at the top and bottom of said ribs; and means to revolve said wheels in reverse directions.

2. In an ore crushing mill, an ore crushing chamber, rotating hurling wheels at the top and bottom thereof; means to revolve said wheels in reverse directions; and vertical ribs forming the sides of said ore chamber, means to adjust the distance between the ribs.

3. In an ore crushing machine an ore crushing chamber formed of vertical separated ribs; means to increase the distance between said ribs; a top and a revoluble bottom for said chamber; and means to revolve said bottom.

4. In an ore crushing machine a lower driving shaft, a hurling wheel secured thereon, an upper driving shaft; a hurling wheel secured to said upper shaft, said upper hurling wheel being at a distance above the lower wheel; vertical separated ribs inclosing the space between said wheels and with the wheels forming an ore crushing chamber; means to adjust the distance between said ribs; means to feed ore into said crushing chamber; and an ore collecting chamber surrounding said wheels and ribs.

In witness that I claim the foregoing I have hereunto subscribed my name this 30th day of April, 1907.

HARRY C. QUICK.

Witnesses:

G. E. HARPHAM,
S. B. AUSTIN.