

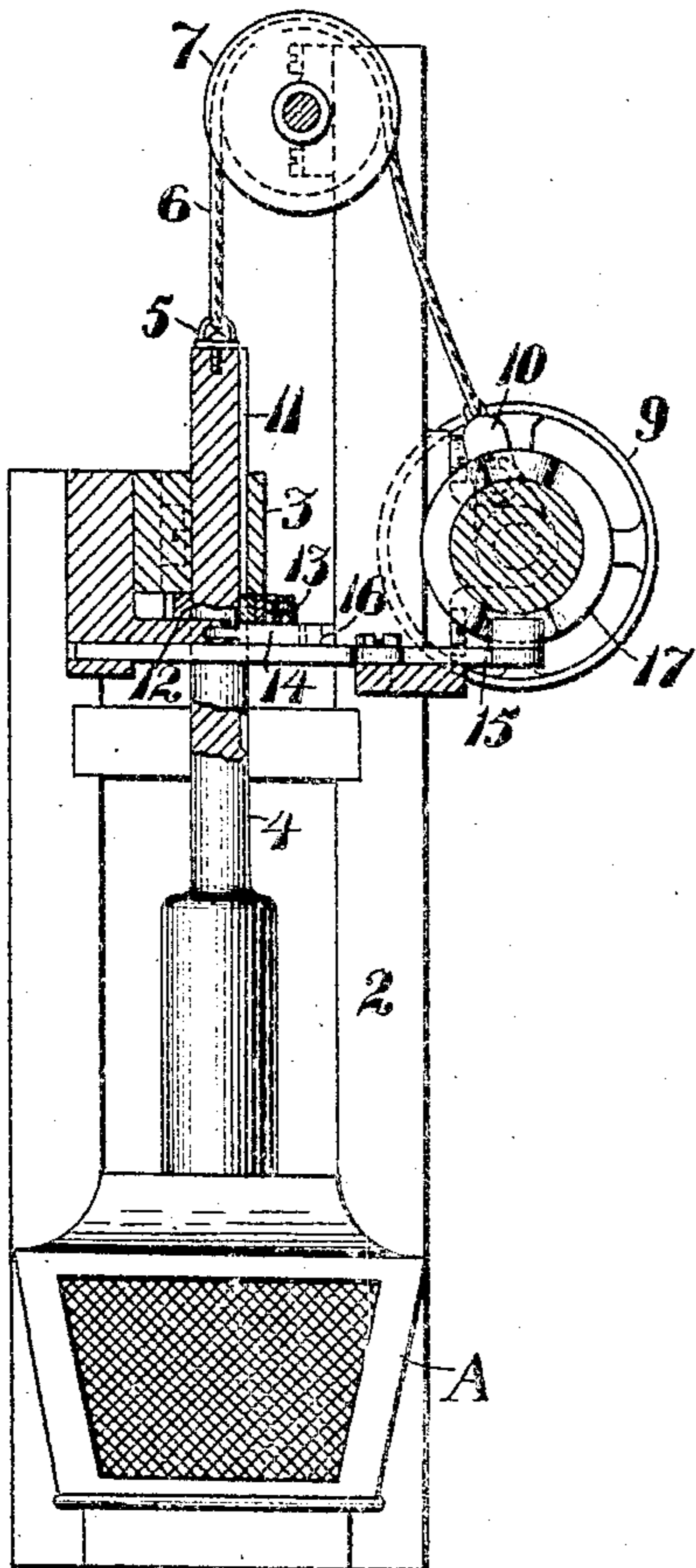
No. 786,590.

PATENTED APR. 4, 1905.

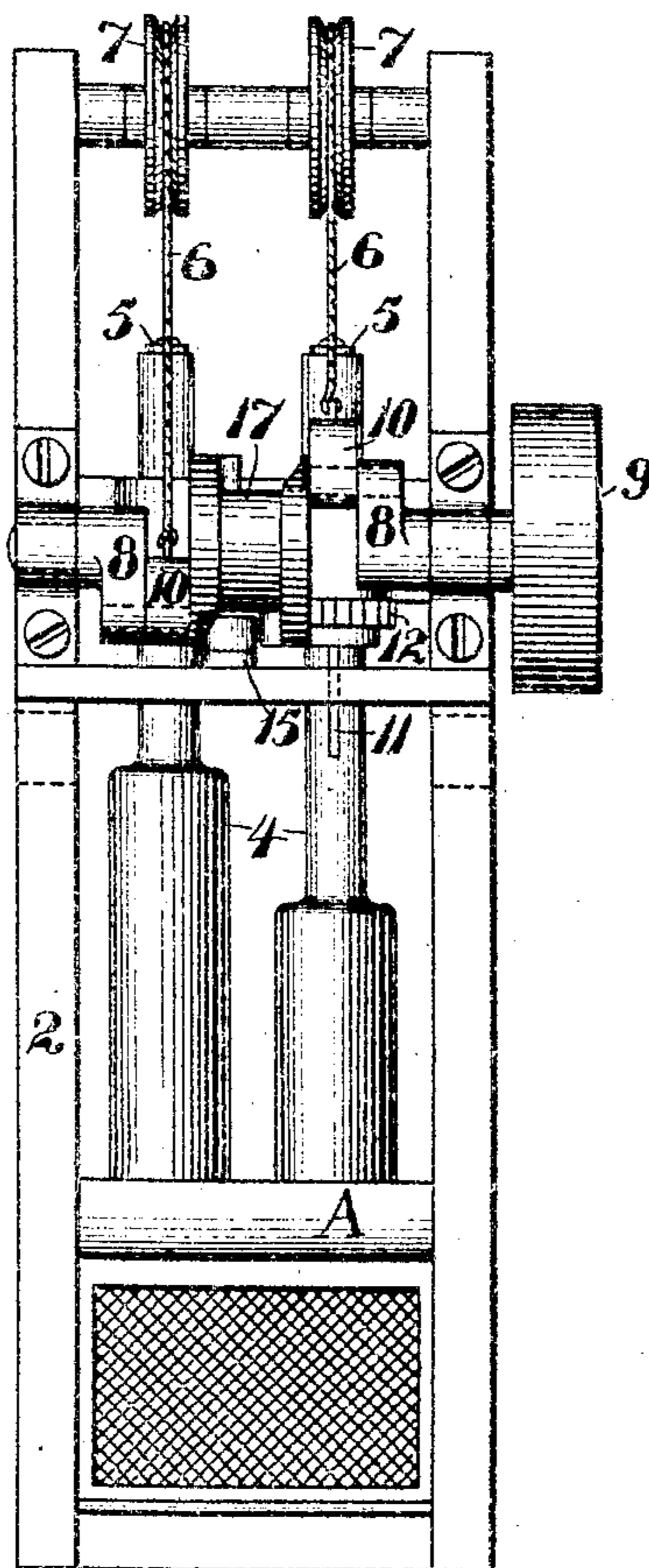
A. McCOMBIE.  
STAMP MILL.

APPLICATION FILED NOV. 8, 1904.

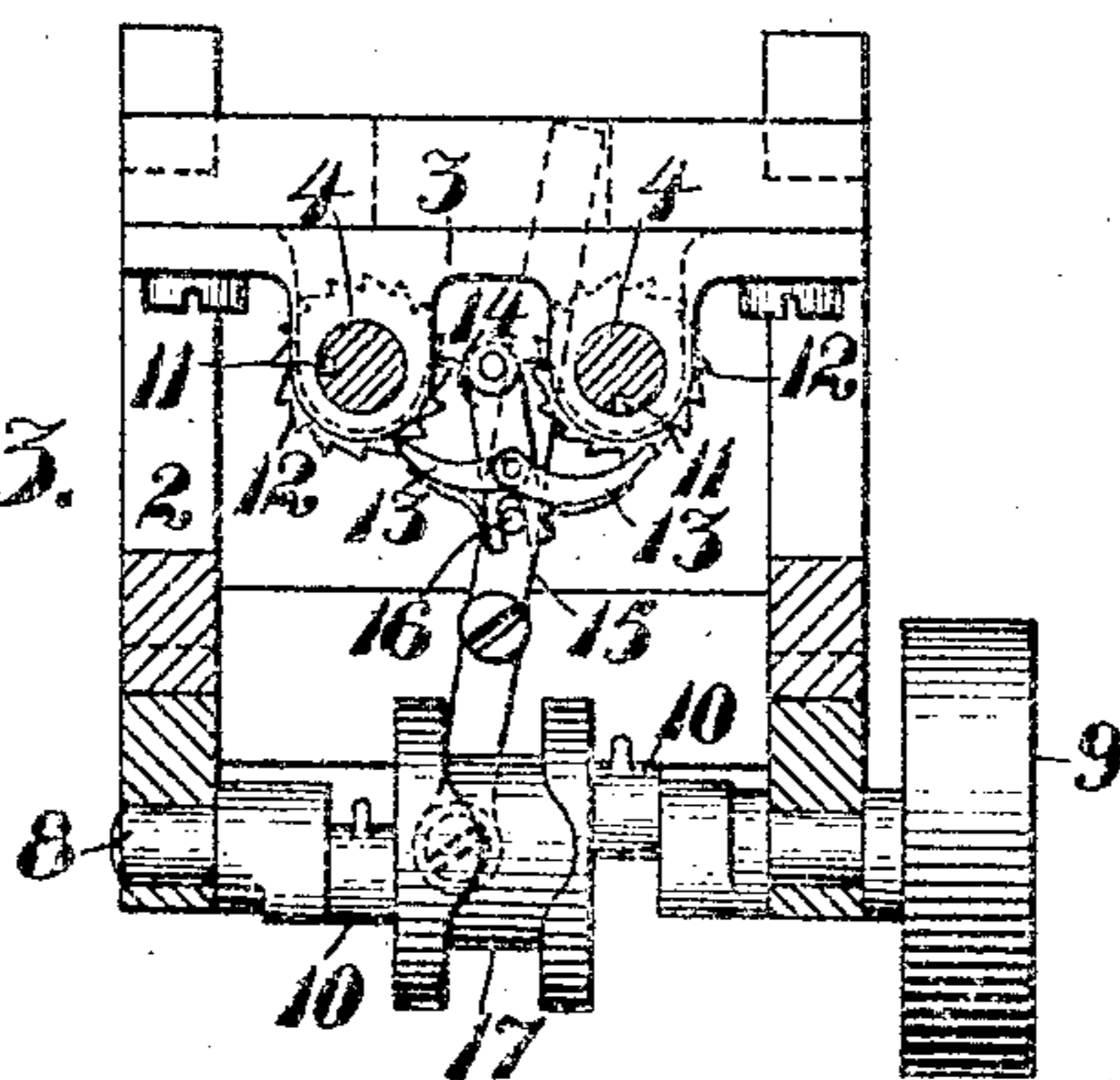
*Fig. 1.*



*Fig. 2.*



*Fig. 3.*



Witnesses:-

*F. C. Fiedner*  
*J. H. Moore*

Inventor,

*Alexander McCombie*  
*By Geo. H. Strong. atty*

# UNITED STATES PATENT OFFICE.

ALEXANDER McCOMBIE, OF GRASS VALLEY, CALIFORNIA, ASSIGNOR OF  
ONE-HALF TO JAMES McCOMBIE, OF CHICAGO, ILLINOIS.

## STAMP-MILL.

SPECIFICATION forming part of Letters Patent No. 786,590, dated April 4, 1905.

Application filed November 8, 1904. Serial No. 231,887.

*To all whom it may concern:*

Be it known that I, ALEXANDER McCOMBIE, a citizen of the United States, residing at Grass Valley, in the county of Nevada and State of California, have invented new and useful Improvements in Stamp-Mills, of which the following is a specification.

My invention relates to improvements in crushing-mills of that class in which a rising and falling stamp is operated so as to drop upon the rock or material, which may be fed to and contained in a mortar having the usual dies between which and the stamp the rock will be crushed.

The invention consists in a means for rapidly reciprocating the stamps, a means for rotating them, and in details of construction which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a side elevation of my improved stamp-mill in partial section. Fig. 2 is a rear elevation of same. Fig. 3 is a plan view showing mechanism for turning the stamps synchronously with their reciprocation.

In the ordinary construction of stamp-mills it is customary to raise the stamps by means of cams fixed upon a horizontal revoluble shaft, these cams engaging tappets upon the stamp-stem, and when the point of the cam passes from beneath the tappet the stamp is allowed to drop. The friction of the sliding cams upon the tappets and other frictional resistance greatly increases the power necessary to drive a line of stamps, and the speed at which the stamps may be made to drop is also quite limited. In my invention I design to reduce the frictional resistance and to increase the rapidity with which the stamps may be reciprocated.

As shown in the drawings, A represents a mortar having screens for the discharge of the crushed material when it is reduced to a sufficient fineness, this mortar being of any usual or suitable construction.

2 represents a framework or support for the mechanism at the upper part of the apparatus, and 3 represents guides through which the stem 4 of the stamp is slidable. The stamp

may be of any suitable or desired size and weight and may have the usual or any desired form of shoes adapted to crush the ore between themselves and the dies within the mortar. These being common and well known are not here shown. The upper end of each stamp-stem has a swiveled link 5, turnably fixed in its end, and to this link is connected a rope 6, which passes over a vertically-adjustable pulley 7, which either has its shaft suitably journaled in the upper part of the frame 2 or the pulleys may each have hubs of sufficient length turnable upon a stationary shaft.

8 is a crank-shaft journaled upon the frame, as shown, and may have a pulley, as at 9, or other equivalent means for transmitting power to rotate the shaft. I have here shown the apparatus as comprising two stamps, and the crank-shaft has opposed cranks, one for each stamp. A loosely-turnable box 10 is fitted upon each of the cranks, and the ends of the ropes 6 are connected with these boxes, so that when the crank-shaft is revolved the ropes will be alternately pulled by the action of the cranks, and thus the stamps will be raised by the pull upon the ropes and allowed to descend by the return upward movement of the cranks. The revolution of the crank-shaft may be made as rapid as possible within the limitations of gravitation to cause the stamps to drop properly between the pulls upon the ropes by which they are raised, and thus the power is applied directly to the stamps and with only the small amount of frictional resistance due to the shaft and crank journals. If the speed of the crank-shaft is not sufficient to slacken the ropes, it will be seen that the weight of the descending stamp will assist to raise the one which is being lifted, and it will be preferable to keep the speed within such a limit that the ropes will be kept substantially taut. By this construction there is less noise, less friction, and comparatively little power is required to operate it.

In order to rotate the stamps step by step during the operation, which is always desirable, I have shown each stamp-stem having a key or feather, as at 11, slidable through a ratchet-wheel 12, which ratchet-wheel is turn-

ably supported contiguous to the box in which the stamp-stem slides.

13 represents spring-pressed pawls, here shown as having a common pivot upon a lever 14, which is pivoted intermediate between the stamp-stems, as plainly shown in Fig. 3.

15 is a suitably-fulcrumed lever having a pin 16 or equivalent device engaging the end of the lever 14. The lever 15 has at its outer end a roller or equivalent antifrictional device adapted to engage a cam 17, which cam is fixed upon the crank-shaft and is revoluble with it. The action of this cam upon the lever 15 will cause said lever to move from side to side, and through this lever the lever 14 is also reciprocated, carrying with it the pawls 13. Thus each of the pawls will alternately engage with the ratchet 12 of one of the stamp-stems and will act to turn the stamp a short distance at each reciprocation, thus presenting the faces of the stamp-shoe, so as to equalize the wear thereon. The turning of the stamp-stem takes place at the end of each downstroke. The turning of the stamps at this time also acts to grind the ore between the shoes and dies.

Having thus described my invention, what I claim, and desire to secure by Letters Patent, is--

30 1. In a stamp-mill, vertically-guided stamps and stems, a crank-shaft, ropes connecting with the cranks, direction-pulleys over which the ropes pass, turnable connections between the ropes and the stamp-stems, and means including a pivoted lever and connection operated from the crank-shaft for intermittently turning the stamps during their reciprocation.

2. In a stamp-mill, vertically-guided stamps

and stems, a journaled revoluble crank-shaft, ropes having one end connected with the cranks, pulleys over which the ropes pass, turnable connections between the other ends of the ropes and the stamp-stems, ratchet-wheels through which the stamp-stems are movable, with feathers engaging the ratchets and stems, and reciprocating pawls whereby the ratchets are intermittently turned.

3. In a stamp-mill, vertically-guided stamps and stems, a revoluble crank-shaft, flexible connections between the crank and the stamp-stem, a pawl-and-ratchet connection by which the stamp and stem may be turned, a fulcrumed lever upon which the pawl is carried, and a turnable cam engaging the end of the lever.

4. In a stamp-mill, vertically-guided reciprocating stamps, a crank-shaft, flexible ropes connecting with the cranks and turnable connections upon the stamp-stems, ratchets through which the stems are slidable and feathers turnably connecting the stems and ratchets, spring-pressed pawls engaging the ratchet-teeth, a fulcrumed lever upon which said pawls are pivoted, a second fulcrumed lever, means engaging the two levers, a cam carried by the crank-shaft with which cam the lever engages, and by the movement of which the pawls alternately engage and move the ratchets.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ALEXANDER McCOMBIE.

Witnesses:

CHAS. P. BOWEN,  
M. O'CONNELL.