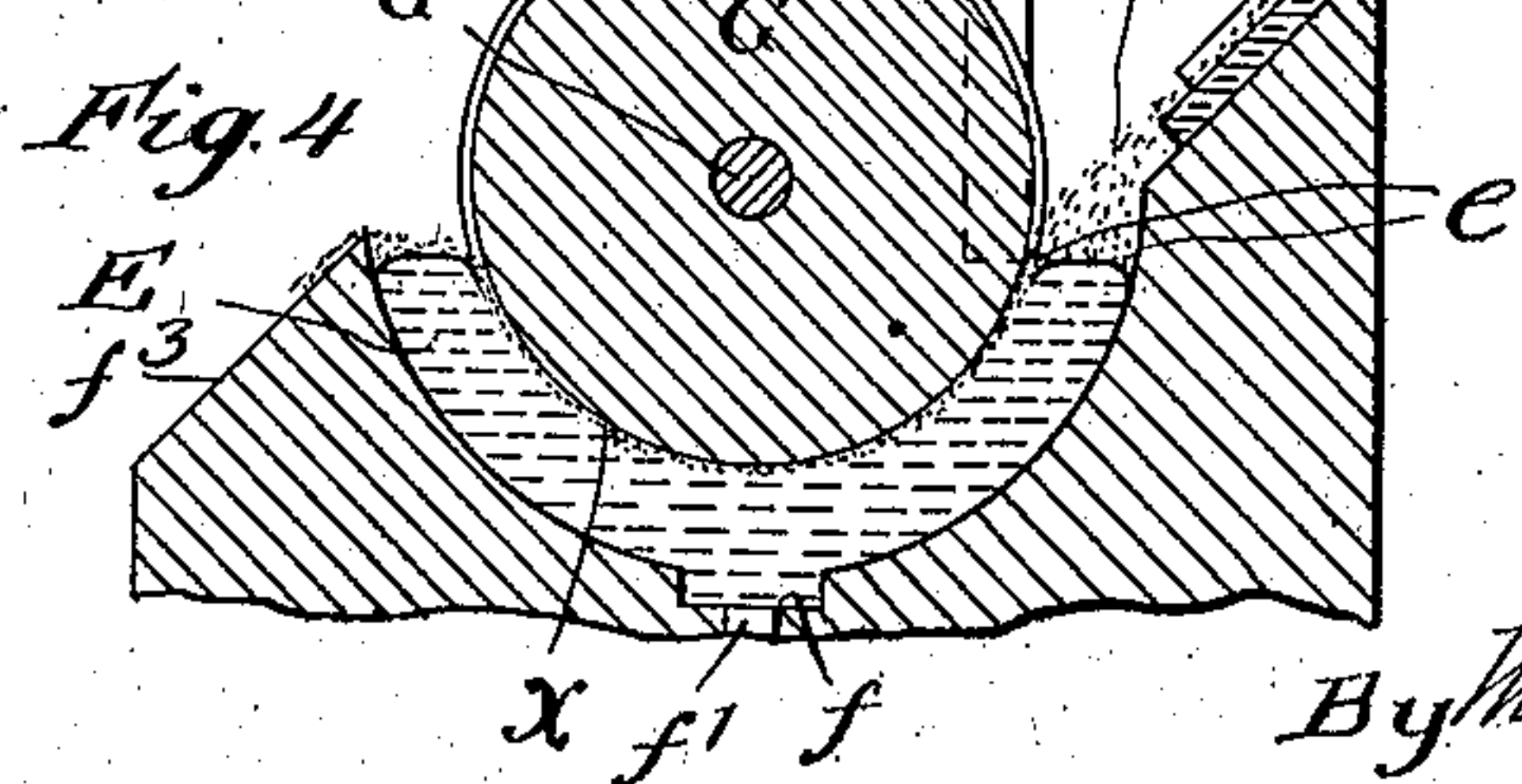
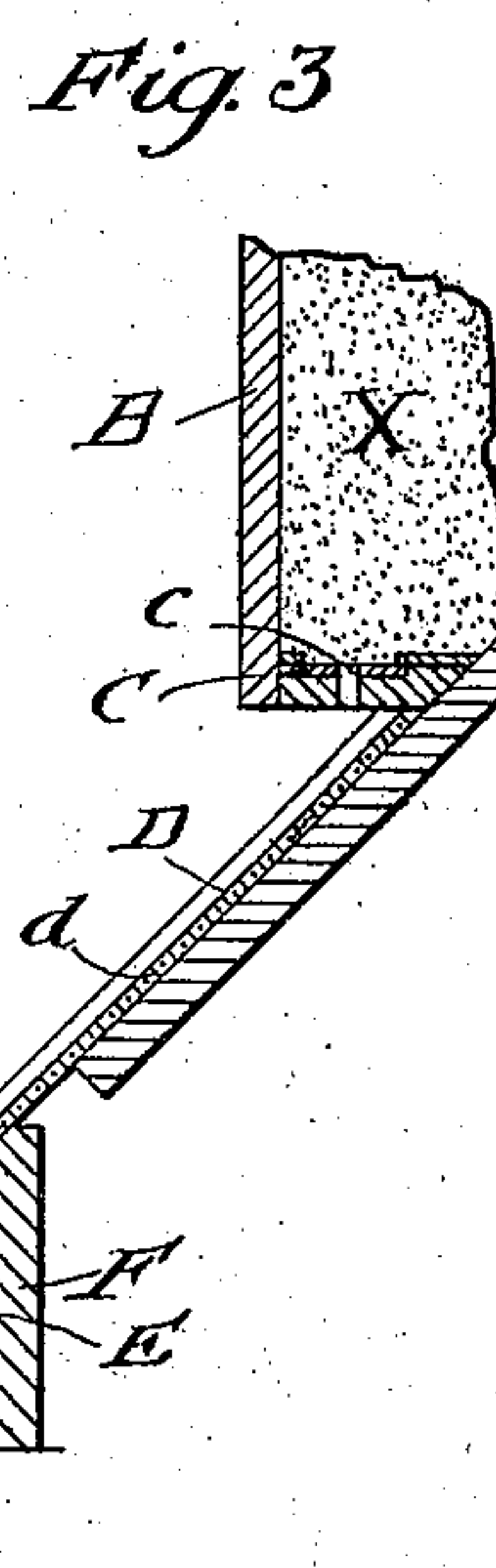
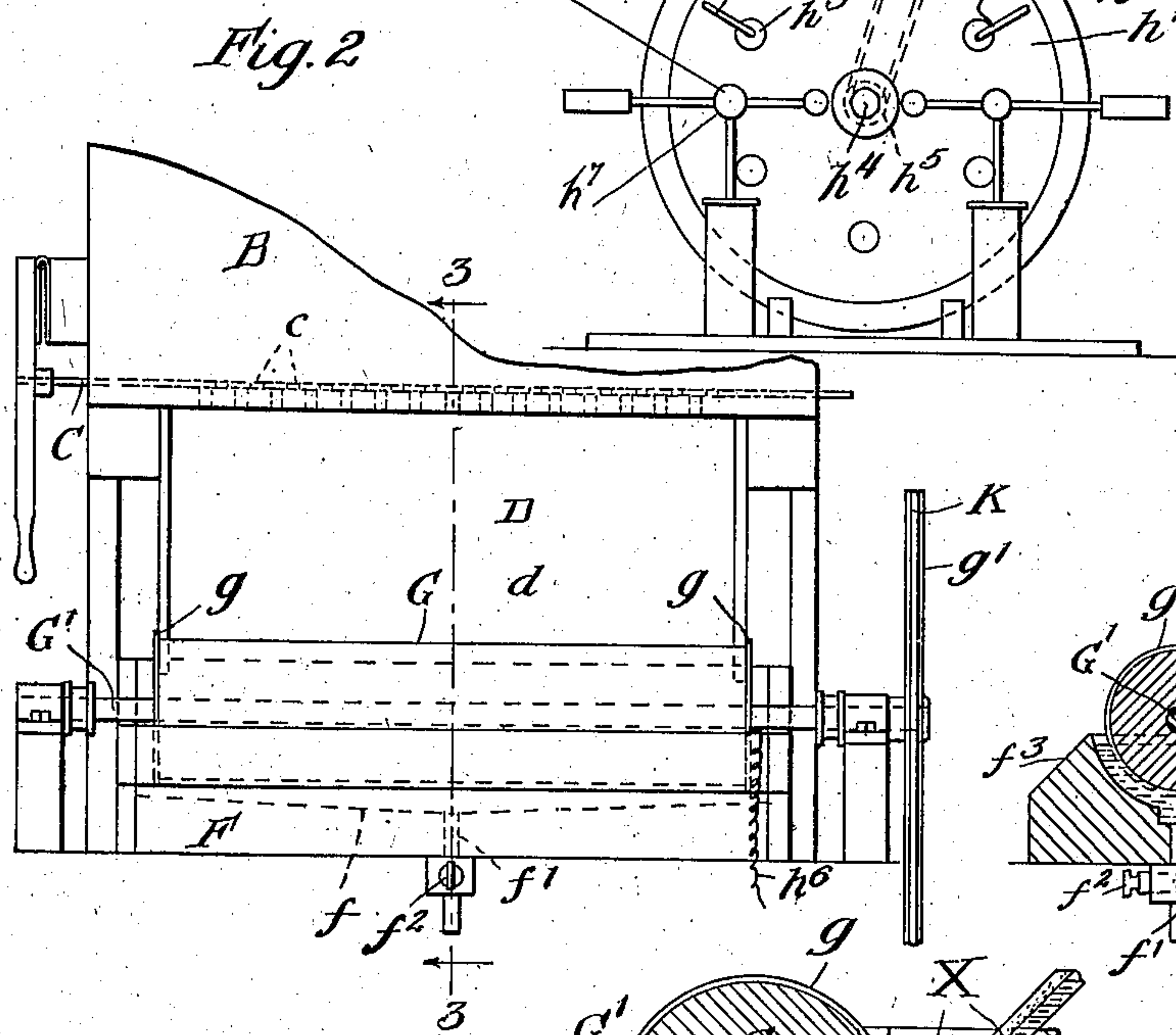
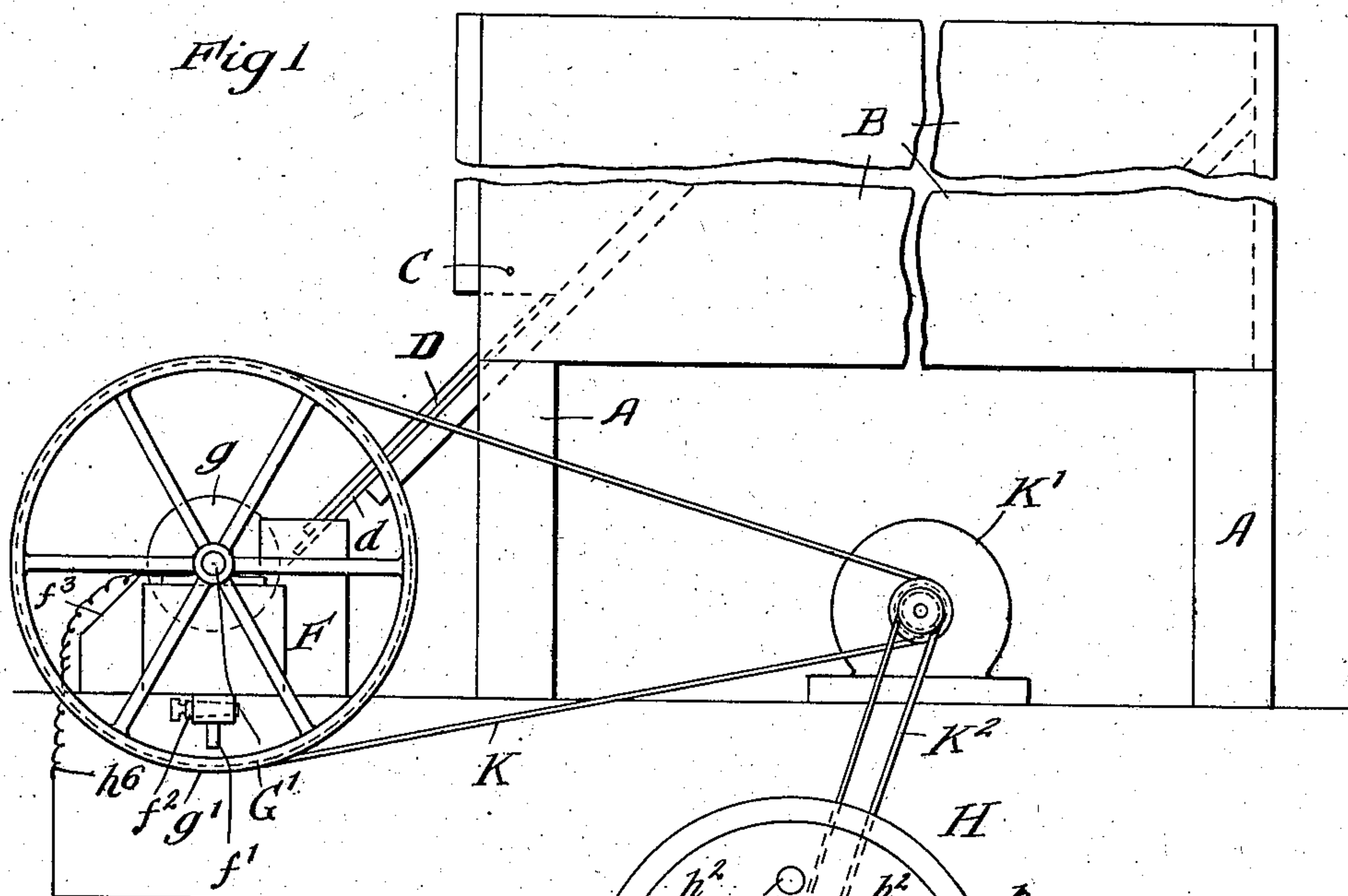


No. 814,814.

PATENTED MAR. 13, 1906.

H. A. THOMAS.  
AMALGAMATING PROCESS.  
APPLICATION FILED AUG. 22, 1904.



Witnesses:

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# UNITED STATES PATENT OFFICE.

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## AMALGAMATING PROCESS.

No. 814,814.

Specification of Letters Patent. Patented March 13, 1906.

Application filed August 22, 1904. Serial No. 221,635.

*To all whom it may concern:*

Be it known that I, HERBERT A. THOMAS, a citizen of the United States, residing in Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Amalgamating Processes, of which the following is a specification.

My invention relates to improvements in the art or process of dry amalgamation for separation of precious metals from ores.

The object of my invention is to provide a simple and efficient process of separating precious metals from pulverized ores whereby the pulverized ore may be brought directly in contact with the liquid mercury rapidly and cheaply and with uniformity and certainty and the mercury itself kept in a fresh and bright state suitable for perfect and complete amalgamation and whereby the mercury may be prevented from adhering to or being carried away with the tailings or non-metal-bearing particles of the pulverized ore passing through the liquid mercury.

My invention consists in the means I have discovered and devised for practically accomplishing this important object or result—that is to say, my invention or discovery is based in part upon the practical utilization of the property of liquid mercury to form a depression or crease at the wall or sides of a vessel containing it or at the surface of any object or body that is not wet by it which may be inserted or immersed into the body of liquid mercury and in part upon the practical utilization of the apparent property of a body of liquid mercury when charged with static electricity to prevent particles of liquid metallic mercury from being carried away with particles of pulverized ore passing through or in contact with the liquid mercury, so that when particles of pulverized ore are carried through and out of the mass of liquid mercury the electrostatically-charged mercury, by reason of this property, will separate itself perfectly and entirely from the particles of sand or ore passing out of the mercury, and thus leave such pulverized-ore tailings entirely free from mercury, while the precious metal contained in the ore is completely amalgamated and recovered as the particles of ore pass down into, through, and

up out of the body of liquid mercury. My process or invention practically utilizing these two properties or principles may be practiced by any suitable apparatus, implements, or appliances—as, for example, a vessel suitably insulated containing a body of liquid mercury, a static electric machine or other device for charging the mercury and keeping it charged with static electricity, and a moving device moved by hand or otherwise and adapted to be immersed or partially immersed in the mercury and convey the pulverized ore in a thin layer or sheet of uniform thickness on its surface down, into, through, and out of the mass or body of liquid mercury, the pulverized ore automatically feeding and forming itself into a thin layer or sheet on the surface of such device as it moves down, through, into, and out of the liquid mercury by reason of the crease or depression naturally forming at the surface of the mercury and moving device and the layer or sheet of pulverized ore being pressed and held on the surface of the moving device by the hydrostatic pressure of the liquid mercury itself against it, while the mercury at the same time permeates through the layer or sheet of pulverized ore and comes in direct contact with all the particles of the ore and the mercury completely and perfectly separating itself from the particles of ore or tailings as the thin sheet or layer of the same passes up out of the mercury by reason of this property of electrostatically-charged mercury to prevent particles of mercury from being carried away with particles of ore passing through or in contact with it. My invention thus practically utilizes these two natural laws or properties of electrostatically-charged liquid mercury, and thus affords a practical and successful process of dry amalgamation by means of which the precious metals contained in ore may be very perfectly, rapidly, and cheaply amalgamated and recovered and without loss or waste of mercury.

While my process may be practiced or carried out by any suitable apparatus or implements of the simplest character, I have in the accompanying drawings, forming a part of this specification, shown a form of apparatus which I have specially devised and prefer



to use in practicing my process and which I herein show to enable my invention to be more readily understood and to be easily practiced by those skilled in the art in the manner best known to me.

In said drawings, Figure 1 is a side elevation, and Fig. 2 a partial front view, of the apparatus which I prefer to use in practicing my invention or process. Fig. 3 is a detail vertical section on line 3 3 of Fig. 2, and Fig. 4 is an enlarged partial vertical section.

In the drawings, A represents the frame; B, a hopper for containing the pulverized ore; C, a feed slide or valve in the ore-box or hopper having a series of holes *c*, so that by opening and closing the slide the feed of the ore may be regulated as desired or shut off when required.

D is a feed-chute, having, preferably, a glass plate *d* for the pulverized ore to flow down.

F is an insulated liquid-mercury-containing vessel, the same being preferably of wood, and thus substantially self-insulating. The interior of this mercury vessel or receptacle is preferably substantially semicylindrical and somewhat larger in diameter than the moving device or surface G, which is preferably a cylindrical roller, by which and on the surface of which the ore automatically forms in a thin layer or sheet and is carried or conveyed down into, through, and out of the liquid mercury E in the vessel F. The ore-conveying device or roller G is preferably of wood and about eight inches in diameter and of any length desired, according to the capacity required in the machine. Ordinarily I make the roller G from three to six feet in length. The roller G is furnished at each end with hard-rubber disks *g*, which slightly exceed in diameter the diameter of the roller G for the purpose of more effectually insulating the shaft G' of the roller from the mercury and providing ore-retaining flanges at the ends of the roller G.

H is a static electric machine having the customary stationary glass disk *h*, rotating glass disk *h'*, brushes *h<sup>2</sup>* and metal-collecting points *h<sup>3</sup>*, shaft *h<sup>4</sup>*, and driving-pulley *h<sup>5</sup>*. A conductor-wire *h<sup>6</sup>* leads from one of the poles *h<sup>7</sup>* of the static electric machine to the mass of liquid mercury E in the mercury-containing vessel F.

The roller or moving device G has a driving-pulley *g'* on its shaft G', and the same is continuously rotated by a belt K from the electric or other motor K'. A belt K<sup>2</sup> from the motor also drives the static electric machine H.

The mercury-containing vessel F has a longitudinal groove or channel *f* at its bottom and discharge-tube *f'* and glass cock *f<sup>2</sup>* for

drawing off the mercury from the vessel F when desired.

As the ore feeds down the chute D it fills the longitudinal groove, crease, or depression *e*, which the liquid mercury E by its natural law forms at its upper surface at the meeting surface or periphery of the roller G, and as the roller G revolves the pulverized ore X thus forms a thin sheet or layer *x* on the surface of the roller G of uniform thickness, which sheet or layer of ore *x* is conveyed down into, through, and up out of the mass of liquid mercury E by the roller G as the roller revolves in the mercury, the thin layer or sheet *x* of ore being pressed and held against the surface of the roller by the hydrostatic pressure of the liquid mercury itself. As the thin and continuous sheet or layer of pulverized ore thus passes or is conveyed down into, through and up out of the liquid mercury the mercury has opportunity to come in contact with every metal-bearing particle of ore, and thus to perfectly amalgamate and recover the precious metal therefrom, and as the thin continuous sheet or layer of pulverized ore passes up out of the liquid and electrostatically-charged mercury the particles of mercury automatically separate and free themselves perfectly from the sand or tailings by reason of the property of electrostatically-charged liquid mercury, which prevents its particles being carried away with particles of pulverized ore passing through or in contact with it, and as the thin continuous sheet or layer of pulverized ore passes up out of the mercury and free from mercury particles such layer of ore or tailings falls off the surface of the roller G and is discharged over the inclined lip *f<sup>2</sup>* of the mercury-containing vessel F and is thus discharged from the machine.

I disclaim as not of my invention the method and apparatus set forth in the A. B. Kittson patent, No. 497,659, of May 16, 1893.

I claim—

1. The dry amalgamating process herein described consisting in insulating a body of liquid mercury, charging it electrostatically, and feeding through it a thin sheet of pulverized ore, whereby the precious metals are amalgamated or removed from the ore and the mercury completely freed and separated from the tailings, substantially as specified.

2. The dry amalgamating process herein described consisting in feeding the pulverized ore in a thin, continuous sheet or layer through a body of insulated and electrostatically-charged liquid mercury, substantially as specified.

3. The dry amalgamating process herein described consisting in electrostatically charging an insulated body of liquid mercury and

feeding the pulverized ore in a thin, continuous sheet or layer through the electrostatically-charged liquid mercury and maintaining said mercury in an electrostatically-charged condition, substantially as specified.

5 4. The dry amalgamating process herein described consisting in electrostatically charging a body of insulated liquid mercury, feeding and conveying the pulverized ore in a thin

sheet or layer through said body of electrostatically-charged liquid mercury and maintaining said mercury in an electrostatically-charged condition as the pulverized ore is conveyed through it, substantially as specified.

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Witnesses:

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