No. 749,197. PATENTED JAN. 12, 1904.

F. J. HOYT.

HYDRAULIC GOLD MINING.

APPLICATION FILED JUNE 18, 1902.

NO MODEL. 2 SHEETS—SHEET 1.

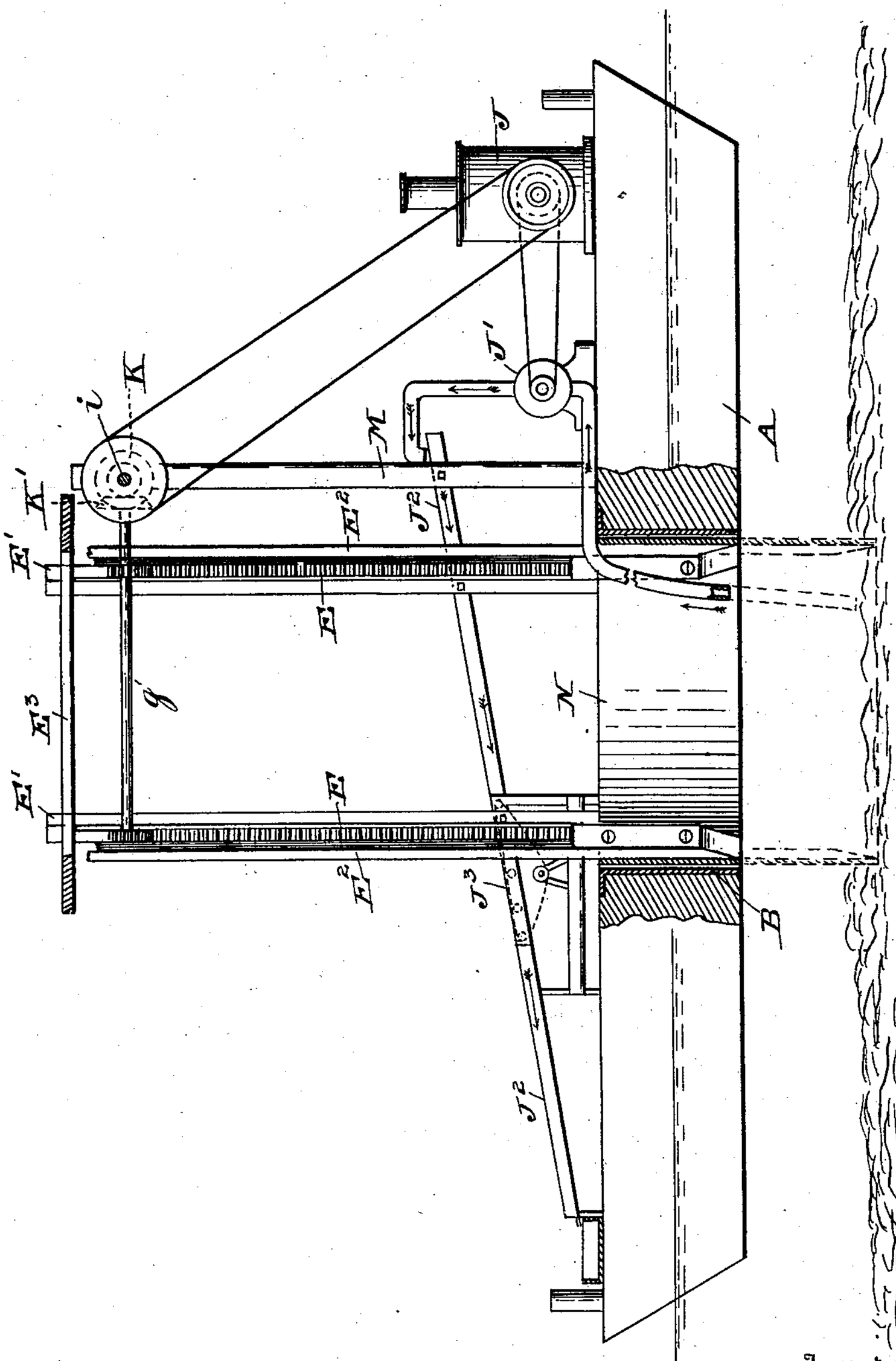

Fig. 1.

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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 2.

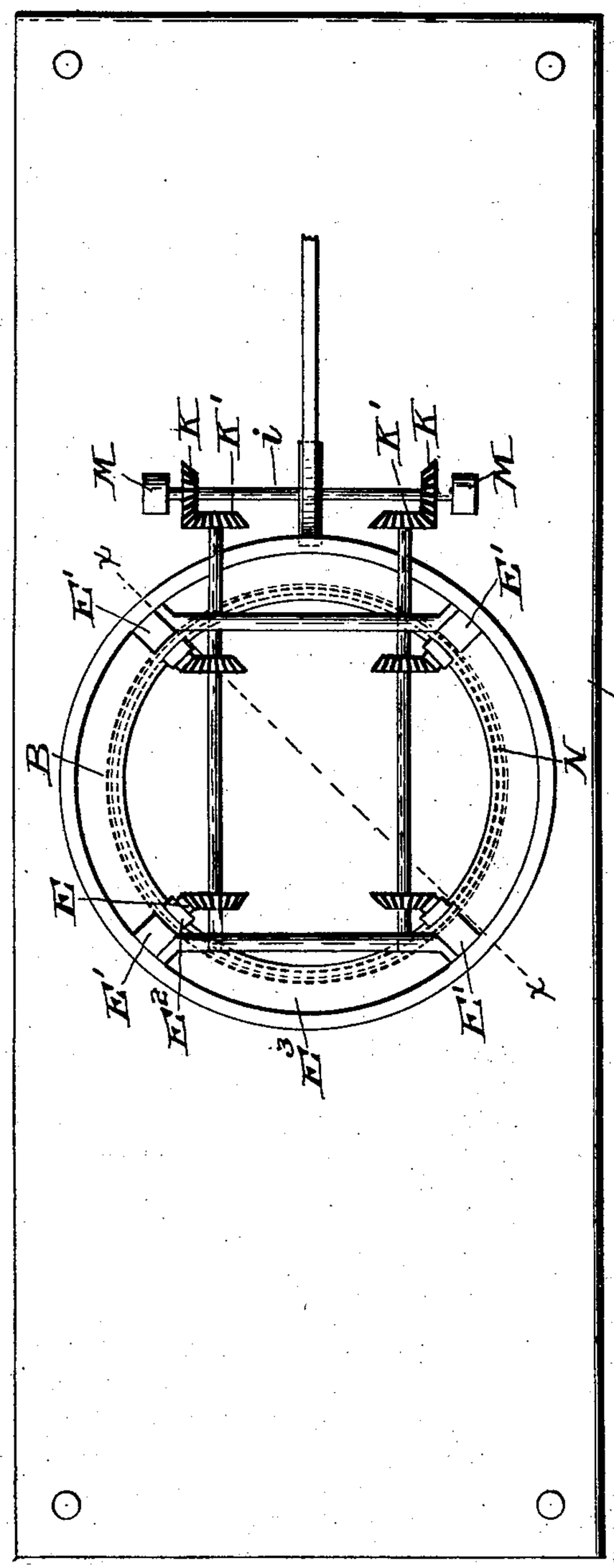


Fig. 4.

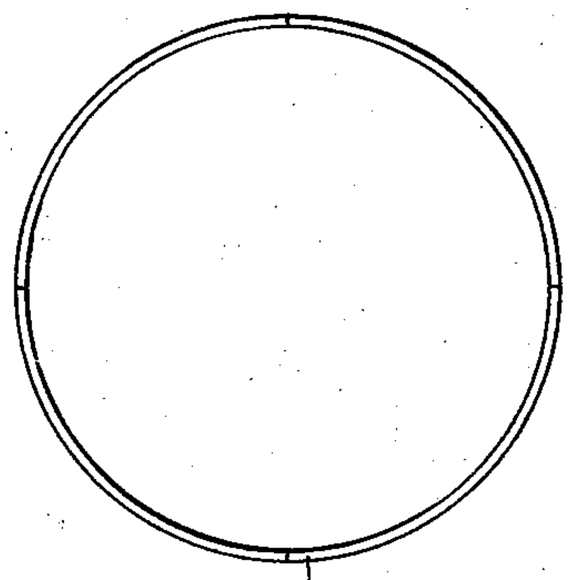
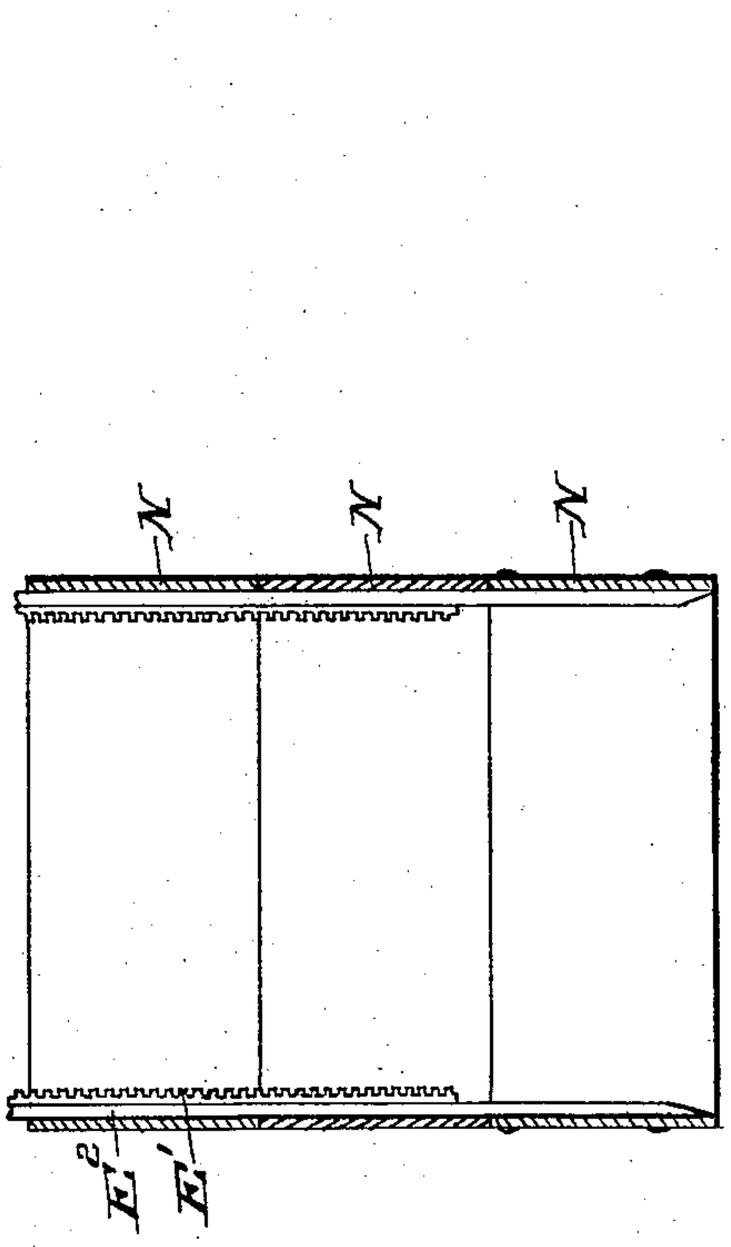


Fig. 3.



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No. 749,197. Patented January 12, 1904.

UNITED STATES PATENT OFFICE.

FREDERICK J. HOYT, OF CHICAGO, ILLINOIS.

HYDRAULIC GOLD-MINING.

SPECIFICATION forming part of Letters Patent No. 749,197, dated January 12, 1904.

Application filed June 18, 1902. Serial No. 112,223. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK J. HOYT, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in Hydraulic Gold-Mining, of which the following is a specification, reference being had therein to the accompanying drawings.

This invention relates to an improvement in appliances for operating in rivers and shallow waters for saving the gold known to be deposited therein, the present system being the use of dredges, working buckets on an endless chain or belt, and dragging the material—generally sand and gravel—from the bottom of the rivers and discharging it down a sluiceway provided with riffles or over a quicksilver-machine for saving the gold brought up in buckets or using a suction-pump and sucking up the sand and gravel with the gold and saving the gold by the same method adopted by the bucket system. It is a well-known fact that by any of these systems but a small percentage of the gold in the river-bottoms is saved, notwithstanding many thousands of yards are handled per day, and, in fact, only the ability to handle large quantities, with the small percentage saved, makes it a paying proposition to work them. The reasons for this are various, principally that the disturbance of large quantities of the deposit in the bed of the river adjoining the points of intersection of the buckets or the suctions of the sand-pump loosens the material and the gold either runs down the channel or seeks the bed-rock, and as in most cases the bed-rock is very uneven the gold enters the crevices and large quantities—in fact, the bulk of values cannot be reached and saved by any of the above processes; also, large quantities of gold lodge behind boulders in the bottom of the river and cannot be saved by either dredges or pumps.

The object of my invention is to save all or the largest percentage of the gold in the bed of the river, believing that it is better to get all the values by handling a smaller amount of the material and working it practically clean of the values therein in successive operations. This I accomplish in the manner and by the means hereinafter described, and illustrated in the accompanying drawings, in which—

Figure 1 is a side elevation partly in section; Fig. 2, a plan view of the hoisting and lowering gear; Fig. 3, a sectional view on line X X of Fig. 2 of the caisson and racks, and Fig. 4 a plan view of the caisson.

Referring to the drawings, I build an ordinary flat-bottomed boat A—say a hundred feet long and thirty feet wide—having at the four corners the ordinary posts used on dredges for anchoring the same rigid against any current there may be in the river. Through the boat at its center is a circular opening B—say twenty feet in diameter—lined with boiler-iron. On the outside of this circular opening is built a substantial skeleton frame securely anchored to the deck of the boat, the upright timbers E′ being set on the four quarters of the circle. About fifteen feet above the deck of the boat these four timbers are tied securely together by a stout circular frame E^3. On one end of the boat are placed the engine and boiler J, pump J′, &c., and on the other end the sluice J^2 and amalgamator J^3, of any preferable design for saving the gold.

A caisson or cylinder N, of metal, is provided—say boiler-iron—of a diameter that will just slide in the circular opening in the boat, which cylinder is about three feet high on its inside. On its four quarters is placed an upright steel or iron beam E^2—say six inches wide by two inches thick—securely bolted to the inside of the cylinder. The lower ends of each are ground to a thin edge, these steel beams being from twenty to thirty feet long, and when the cylinder to which they are attached is placed in position in the circular opening in the boat the cylinder stands with its lower edge on a level with the bottom of the boat. The steel beams E^2 project upward and through ways or guides placed on the inner surface of the circular wood or iron rim E^3, that ties the four posts E′ of the framework together. On the four steel beams E^2, that

stand two on each side of the boat and have an inner flat surface six inches wide at a point one foot below the upper rim E^3, or fourteen feet above the deck of the boat, is fastened securely to each beam a rack E, of heavy cogs—say four inches wide and four inches thick—the cogs being placed on the side of the plate, running from that point to the top of the beam. Near or at a proper distance from the stern of the boat and running athwart the same on proper supports M, with boxes or pillows thereon, is a heavy five or six inch shaft *i* at about on a height with the circular rim E^3 and is connected by a belt or sprocket-chain with the engine J on the stern of the boat. On the shaft *i* at the proper points are placed large miter-gears K, which mesh with miter-gears K′ on two shafts *g*, one on each side of the center of the boat running fore and aft and inside of the four steel beams E^2, having the racks E thereon. On the shafts *g* are also placed gear-wheels *h* to mesh in the racks E on the uprights on the sides of the boat. By these means a uniform action is obtained on all the four sides at once, which action raises and lowers the caisson or cylinder N, to which these steel beams E^2 are securely fastened. I now take as many pieces of boiler-iron or sheet-steel, one or two feet in width, cut in four quarters and bent as will together form a section of cylinder to be placed on top and added to the cylinder three feet wide. These cylinders are cut into four quarters to facilitate the handling of the same and when placed in position on top of the cylinder N in the boat are securely bolted to the upright beams on each quarter, the cylinder N being first lowered, so that its upper surface may be on a line with the deck of the boat. After the first four quarters are bolted in position the cylinder N can be again lowered until the top is again on a level with the deck of the boat, when another section can be added, and so on, until a cylinder is formed of any depth desired or until the ends of the uprights are reached. Thus a cylinder is provided that can be raised and lowered at will and forced by the power behind it down and through any body of sand and gravel to bed-rock.

Its operation is as follows: The place selected, the boat is placed in position and anchored. Then the engine is started, the cylinder lowered, the sections needed added, and the cylinder forced down through the water and sand and gravel to bed-rock, when a sand-pump with suction-pipe is dropped into the cylinder, and all the water, sand, and gravel pumped out and sent through the sluice and over the amalgamator and the gold saved. The agitation from sucking out can create no loss, as it is confined within the walls of the cylinder, which cylinder can be sucked out perfectly clean and the bed-rock examined and all gold in crevices taken out and saved. When this has been done, the cylinder may be raised a foot or more and quantities of material will rush in that have been resting against its outer wall and can all be taken out with a sand-pump. When it ceases to flow in, the cylinder may be raised above the level of the sand and gravel, the boat swung around, the cylinder lowered again, and the operation repeated. When in lowering the cylinder, if a boulder is struck the cylinder may be stopped and the sand-pump set to work. If the boulder is too large to be pulled inside, the cylinder may be raised and swung around to inclose it, the sand, gravel, and water removed with the pump, and all gold lodged under the boulder removed and saved. When the work at any point is finished and the boat is taken any distance, the sections of the cylinder may be removed and laid one side until wanted again. By these means a cylinder may be formed having its upper surface coming only to the top of the deck of the boat after bed-rock is found, which facilitates the handling of the suction-pump for emptying the cylinders of the water, sand and gravel, and gold.

While possibly with this invention very large bodies of sand and gravel cannot be handled in a day, yet by this process all or a very large percentage of all the gold in the river-bed will and can be saved.

Having thus described my invention and its operation, what I claim is—

1. In a hydraulic mining apparatus a float or scow provided with an opening through its deck and bottom to the water, a sectional caisson adapted to fit within and extend through said opening in such manner that in its working position its top is always on a level with the deck, a common mechanism for lowering said caisson to the river-bed and for forcing it therein to any desired depth in one continuous operation and for raising said caisson from the river-bed, and power means for driving said mechanism, substantially as described.

2. In a hydraulic mining apparatus, a float or scow provided with an opening through its deck and bottom to the water, a caisson adapted to fit within said opening, a rack-and-gear mechanism for raising and lowering said caisson from and to the river-bed and for forcing said caisson into the river-bed to any desired depth, and power means for driving said mechanism, substantially as described.

3. In a hydraulic mining apparatus, a float or scow provided with an opening through its deck and bottom to the water, a caisson adapted to fit within said opening, mechanism for raising and lowering said caisson from and to the river-bed and for forcing said caisson into the river-bed to any desired depth consisting of a plurality of vertical racks, a plurality of gear-wheels with which said racks mesh, working shafts on which said gear-wheels are mounted, a driving-shaft, means for connecting said working shafts with said driving-

shaft and power means for driving said mechanism connected to said driving-shaft, substantially as described.

4. In a hydraulic mining apparatus, a float or scow provided with an opening through its deck and bottom to the water, a sectional caisson adapted to fit within said opening, mechanism for raising and lowering said caisson from and to the river-bed and for forcing said caisson into the river-bed to any desired depth consisting of, a plurality of vertical racks attached to said caisson, a plurality of gear-wheels with which said racks mesh, a pair of shafts on which said gear-wheels are mounted, a miter-gear on one end of each of said shafts, a second pair of miter-gears meshing with said first pair, a driving-shaft on which said second pair of miter-gears is mounted, and power means for driving said mechanism connected with said driving-shaft, substantially as described.

5. In a hydraulic mining apparatus, a float or scow provided with a circular opening through its deck and bottom to the water, a sectional, cylindrical caisson adapted to fit closely within said opening, mechanism for raising and lowering said caisson from and to the river-bed and for forcing said caisson into the river-bed to any desired depth, consisting of a frame surrounding said caisson, four vertical racks attached to the inside of said caisson at its four quarters, slots in said frame to guide said racks in their vertical movement, four gear-wheels with which said racks mesh, two horizontal, parallel shafts on which said gears are mounted in pairs, said shafts carried by bearings in the top of said frame, a miter-gear on one end of each of said shafts, a second pair of miter-gears meshing with said first pair, a horizontal driving-shaft on which said second pair of miter-gears is mounted, a second frame in the top of which said driving-shaft is mounted, and power means for driving said mechanism connected with said driving-shaft, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

FREDERICK J. HOYT.

Witnesses:

A. M. HOYT,

WILL H. MOORE.