

No. 670,784.

Patented Mar. 26, 1901.

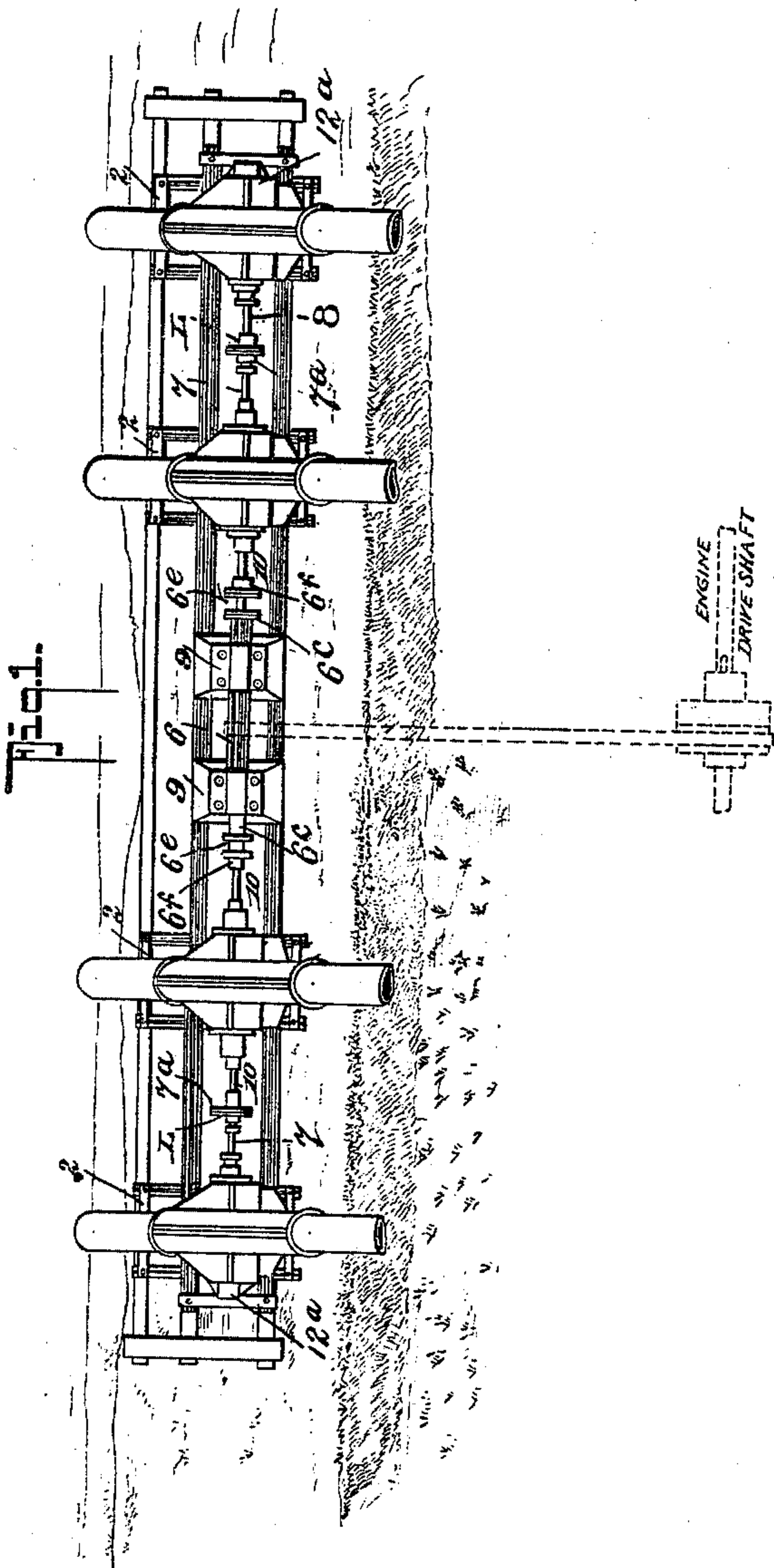
E. M. IVENS.

PUMP BATTERY SYSTEM FOR RICE IRRIGATION.

(Application filed Apr. 16, 1898.)

(No Model.)

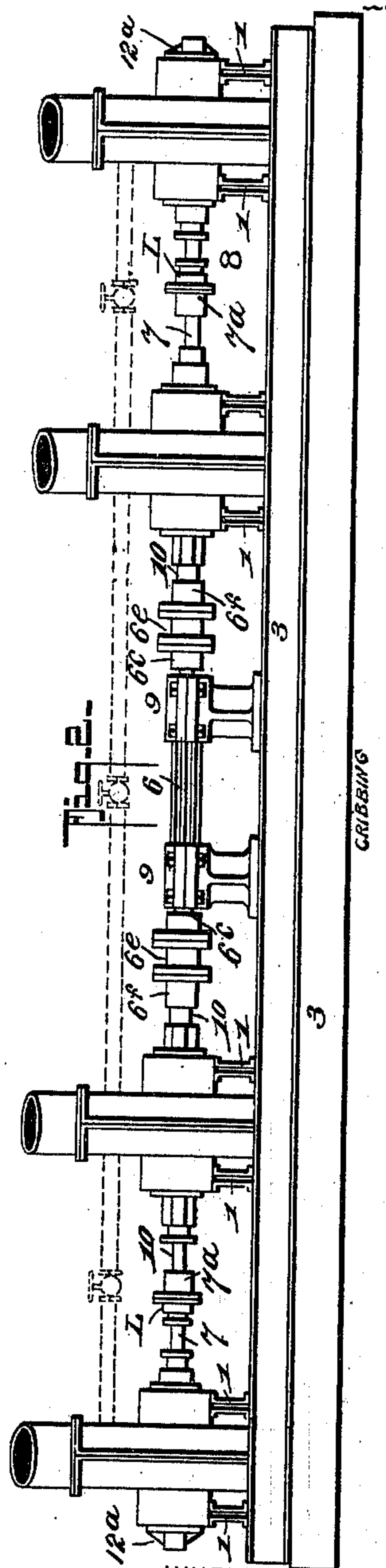
2 Sheets—Sheet 1.



WITNESSES:

H. G. Dieterich

E. McCormac



INVENTOR

Edmund M. Ivens

BY

Fred G. Dieterich & Co.
ATTORNEYS

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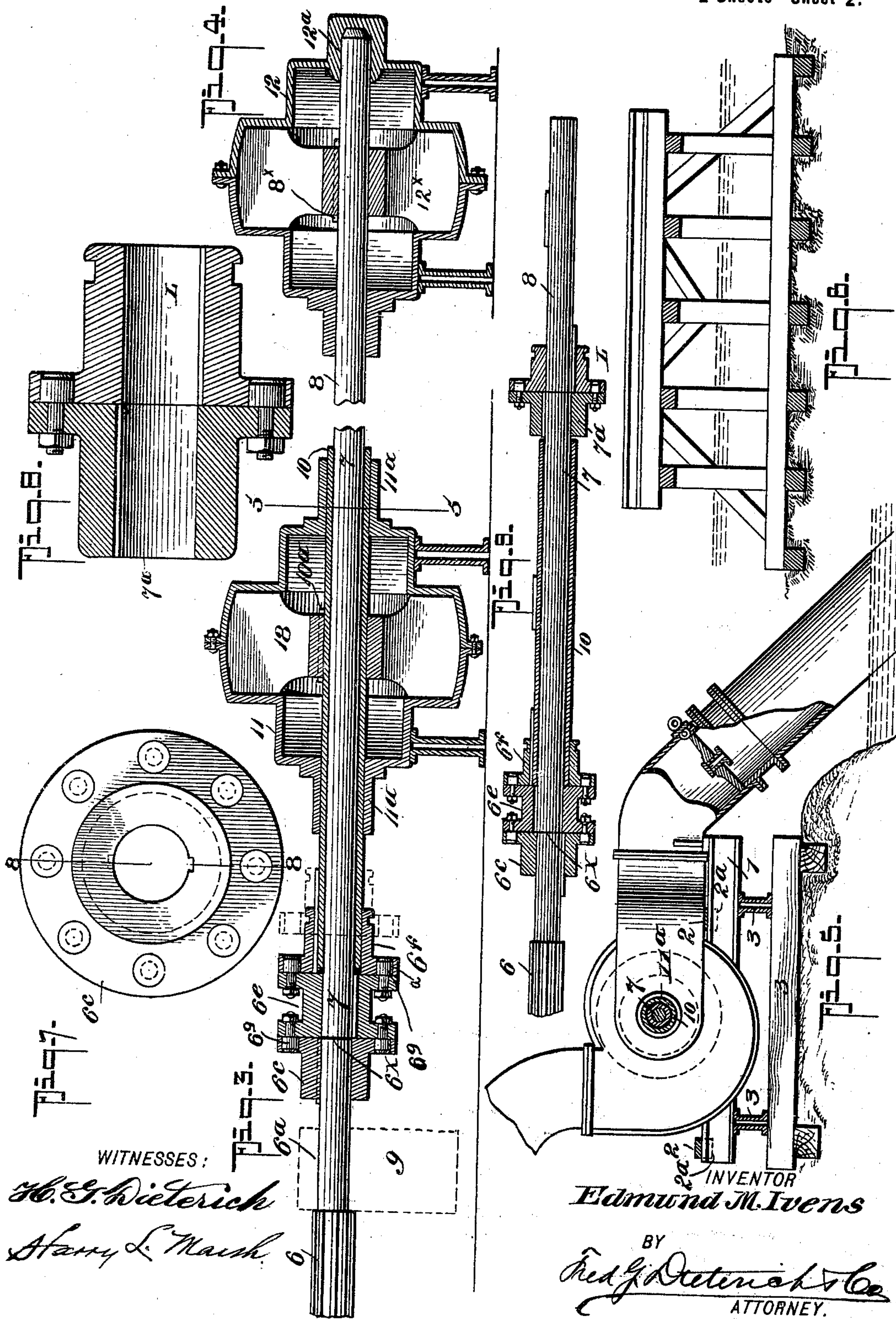
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UNITED STATES PATENT OFFICE.

EDMUND M. IVENS, OF NEW ORLEANS, LOUISIANA.

PUMP-BATTERY SYSTEM FOR RICE IRRIGATION.

SPECIFICATION forming part of Letters Patent No. 670,784, dated March 26, 1901.

Application filed April 16, 1898. Serial No. 677,829. (No model.)

To all whom it may concern:

Be it known that I, EDMUND M. IVENS, residing at New Orleans, in the parish of Orleans and State of Louisiana, have invented
5 a new and Improved Pump-Battery System for Rice Irrigation, of which the following is a specification.

This invention relates to certain improvements in the present system of pumps and
10 operating mechanism therefor for rice irrigation in which a plurality of pumps are independently mounted near the edge of the bayou or stream at different points. Usually these pumps are arranged in batteries of
15 six (more or less) of, say, one-hundred-horse power, and each pump has a separate boiler and engine and requires separate operators, (engineer and fireman,) the same being independently operated to lift the water from the
20 bayou or stream and distribute it over the rice-field. This arrangement of pump-batteries I have from practical experience found open to numerous objections and as not producing all of the results and advantages de-
25 sired.

The purpose, therefore, of my invention is to provide a connected battery system of pumps which in its structure will be of a far more substantial character than when the
30 pumps are disconnected and operated singly or independently, which will be of a greatly-increased efficiency over the independently-operated pump system, in which the cost of the plant, as well as the cost of operation,
35 will be greatly less than the single-pump-battery system, and in which the entire battery of pumps will require the services of but one engineer and fireman instead of an engineer and fireman for each pump, as in the
40 single-pump system, and in which one engine of very high horse-power is used for driving all of the pumps of the system.

Another and essential feature of this invention is to provide a construction of pump-
45 battery in which any one or all of the pumps can be stopped or started at the will of the operator without affecting the drive mechanism and the live or running pumps speeded to a greater capacity on account of decreased
50 load during the stoppage of one or more of the pumps for repairs or other causes.

Another object of this invention is to pro-

vide a novel and stable construction of pump-battery system having a single operating or drive shaft common to all of the pumps, a
55 single high-speed power-engine for driving the shaft, and novel connections between the several pumps and the shaft, whereby they can be set to an operative or inoperative condition at will. 60

Again, my invention seeks to provide a novel arrangement of driving-shaft, crib, or foundation for the pump-battery and drive means so combined and interdependently arranged as to produce a strong mechanism for
65 the purposes specified, of a greatly-increased efficiency and reduced cost, which can be readily and easily manipulated, and which is capable of operating and producing results not attainable under the single or independ- 70
ently-operated system of pump-battery.

The invention in its more subordinate features embodies certain novel details of construction and peculiar combination of parts, all of which will hereinafter be first described 75
and then claimed, reference being had to the accompanying drawings, in which—

Figure 1 is a diagrammatic plan view illustrating the general arrangement of my battery system. Fig. 2 is a side elevation of the
80 battery of four pumps arranged in accordance with my invention. Fig. 3 is a longitudinal section of a portion of the drive and jack shaft and one of the center or inside pumps and the clutch mechanism connecting it with the jack
85 or drive shaft. Fig. 4 is a similar view of a portion of one end of the jack-shaft and one of the end pumps and its shaft-connecting means. Fig. 5 is a transverse section taken on the line
90 5 5 of Fig. 3 and illustrating more clearly the construction of crib or support for the battery system, and Fig. 6 is a view illustrating the manner of constructing a crib for supporting the battery in the stream. Fig. 7 is a detail
95 section of the slip-coupling for one of the end pumps. Fig. 8 is a transverse section thereof on the line 8 8 of Fig. 7, and Fig. 9 is a detail longitudinal view of the right wing of the drive-shaft and the clutch devices for
100 connecting or disconnecting the several sections thereof.

The subjoined description, together with the drawings, discloses the general principle and construction of the battery system em-

bodying my invention. I desire it understood, however, that I do not limit myself to the exact construction of parts shown and described, as various modifications in the arrangement of the several parts, particularly as to the correlation of the clutch devices for connecting the several pumps to the operating-shaft, may be made without departing from the broad idea of my invention or the scope of the appended claims.

The entire battery of pumps is mounted upon a steel frame composed of longitudinally-extending channel-irons 1, joined by castings 2, which extend transversely over the irons 1 and have pendent lugs 2^a, that fit into the hollow of the irons 1, as indicated in dotted lines in Fig. 5, and the said irons 1 rest upon sills 3, the whole forming a solid foundation adapted to rest upon cribbing (see Fig. 6) when the pump-battery is to set at the edge of a bayou or stream, such arrangement of parts forming a more permanent, solid, and uniform support for the pump-battery than is possible to obtain by supporting the pump upon individual separate foundations, especially on soft or marshy land.

My improved battery system of pumps generally embodies a single drive-shaft and two or more pumps thereon capable of being operated in unison from such shaft or independently of each other from the said shaft. In the preferred arrangement two end pumps and two or the multiple of two intermediate pumps are provided, such even number of pumps being preferred to the more uniformly distribute the strain on the drive-shaft at each side of its center or point of connection with the drive means operated from a single engine of high capacity. The drive-shaft consists of a central jack or rope drive portion 6, the ends of which terminate at 6^x, (see Figs. 3 and 9,) and the said ends form journals 6^a for turning in the bearings 9. (Shown in dotted lines in Fig. 3 and in full lines in Figs. 1 and 2.) Upon each end the jack-shaft 6 has a slidable coupling member 6^c, adapted to cooperate with the double coupling member 6^e, one of said members 6^e being keyed upon the inner end of each shaft-section 7, which sections 7 form, as it were, continuations of the drive or jack shaft, as shown. Upon each shaft-section 7 is mounted a sleeve 10, journaled in the bearing portions 11^a of the casing 11 of the inner pump, and each of the said sleeves 10 has a feather 10^a, with which the disk 18 of the said inner pump engages, as clearly shown in detail in Fig. 3. The inner end of each sleeve 10 is also provided with a feather or spline to receive the endwise-slidable slip-couplings 6^f, which cooperate with the double-clutch members 6^e. To provide for quickly causing the clutch members 6^e and 6^f to interlock, the double clutch 6^e is equipped with an annular series of outwardly-projecting studs 6^g at each end to engage with the apertures *a* in the annular rims of the clutch members 6^e and 6^f, as shown. Additional shaft-sections 8 8 are

also provided, one for each shaft-section 7, the outer extremities of which are journaled in the end bearings 12^a of the outer pump-casings 12. Said sections 8 also have feathers 8^x for keying the disk members 12^x to the outer pumps thereon. The inner ends of the shafts 8 are joined with the outer ends of the shafts 7 by coupling members 7^a, held to turn with the shaft-sections 7 and the slidable members L upon the coincident ends of the shaft-sections 8, the said members 7^a and L also having lugs and apertures, like the members 6^e, 6^c, and 6^f, before referred to.

By joining the several shaft-sections in the manner described a very advantageous result is obtained, by reason that the several pumps upon each side of the driver or jack shaft section balance each other when single suction-pumps are used, and the water enters on opposite or extreme sides into an equal number of pumps arranged at each side of the main drive-shaft or center of the entire battery of pumps. Now should it be desired to stop the middle pump at one side it is only necessary to slide back the clutch member 6^f, as indicated in dotted lines in Fig. 3, which releases the sleeve and its pump-disk from the driving power. To release the end pump and yet continue the inner or middle pump, the member 6^f remains coupled to the double clutch 6^e and the slip member L is disengaged from the member 7^a. To quickly disconnect all of the pumps at one side, it is only necessary to slide back the member 6^c to disengage it from the clutch member 6^e. This provides for stopping the shafts 7 and 8 without stopping the jack or driver shaft.

So far as described it will be noticed the drive-shaft passes entirely through all the intermediate pumps and has its ends fitted in the casing to the outer or end pumps.

While I prefer to arrange the battery of pumps in the manner shown and described, yet under certain conditions it may be desirable to use but two pumps. In this case to provide for one pump counteracting the entire strain of the other pump on the shaft the drive-shaft is passed through a gland and stuffing-box on the side nearest the power and thence through the pump and connecting with another single suction-pump, so as to drive both. By thus connecting the driving-shaft to the pumps such shaft will be kept at all times in a true and good working condition.

By providing a battery of pumps arranged in accordance with my invention it is obvious that a lift or suction action can be maintained at all times, even while stopping one or more pumps of the battery, without any appreciable loss of capacity, as the other or running pumps can be quickly speeded to a greater supply, or, if desired, one of the pumps of the battery held as an emergency-pump.

Usually the pump-battery is set near the edge of the bayou, but under some circumstances better results can be obtained by placing the pump mechanism directly within the

stream. In such case the battery is supported on a crib especially constructed, as shown in Fig. 6.

One of the great advantages of my system of pumps is that instead of driving each pump singly and employing an engineer, &c., for each pump and using, say, six pumps of one-hundred-horse power each in the battery I can use one engine of six-hundred-horse power and one set of boilers therefor with but one engineer and fireman and one rope or drive means common to all pumps. Another advantage is I provide for a vast collection of water where streams or springs are shallow, as the suction or lift action can be so distributed as to give a smaller quantity with each pump where an insufficiency in supply would not admit of working a large pump to its full capacity. Again, water is distributed through each pump direct, and one pump can be stopped and the supply thereof cut off when not wanted, thereby saving fuel, which could not be done where the pumping is effected by a single large pump.

While I have not described any special form of centrifugal pump to be used in connection with my arrangement of pump-battery, yet I prefer to employ that kind of pump as is specifically described and illustrated in my co-pending application, Serial No. 662,487. When this form of pump is used, I connect the several pumps of the battery by pipes having valves (see dotted lines in Fig. 2) which enter the pumps above the valve of the induction-pipe, the purpose of which is to fill any of the pumps above the water-valve (priming it, as it were) when the column of water has been lost by something entering the valve or stopping it for any other reason.

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

1. A pumping mechanism, comprising a plurality of pumps; a continuously-operating single driver or jack shaft; a supplemental shaft formed of sections, one section for each pump, said sectional shaft being held in alignment with the jack-shaft and forming a continuation thereof; independently-operated clutch mechanism for joining the several sectional shaft portions and for joining that section of shaft adjacent the jack-shaft with the said jack-shaft; a sleeve mounted on the inner shaft-section; a clutch mechanism for throwing the said sleeve into or out of a fixed engagement with the said inner shaft-section, one of the pumps being mounted upon the sleeve and having its disk fixedly connected therewith, and a pump mounted on the outer shaft-section having its piston fixedly connected therewith, all being arranged substantially as shown, whereby one or all of the pumps can be thrown out of operation without stopping the jack-shaft.

2. In a pumping mechanism as described, the combination with the jack-shaft, the shaft-sections 7 and 8, held in a plane with the jack-shaft, a double clutch 6^e held on the end of the shaft-section 7, a clutch member on the jack-shaft for coöperating with the clutch 6^e, a sliding-clutch connection for joining the adjacent ends of the shaft-sections 7 and 8; of a pump having its disk member connected directly to the shaft-section 8, a sleeve mounted on the shaft-section 7 to turn freely thereon, a pump having its disk held on the sleeve to turn therewith, and a sliding clutch 6^f on the sleeve adapted to engage the double clutch 6^e, all being arranged substantially as shown and described.

EDMUND M. IVENS.

Witnesses:

B. W. BARR,
W. E. BIRCHMORE.