No. 777,413. PATENTED DEC. 13, 1904.

E. HAYNES.

MULTIPLE FEED LUBRICATING PUMP.

APPLICATION FILED FEB. 13, 1904.

NO MODEL. 2 SHEETS—SHEET 1.

Fig. 1.

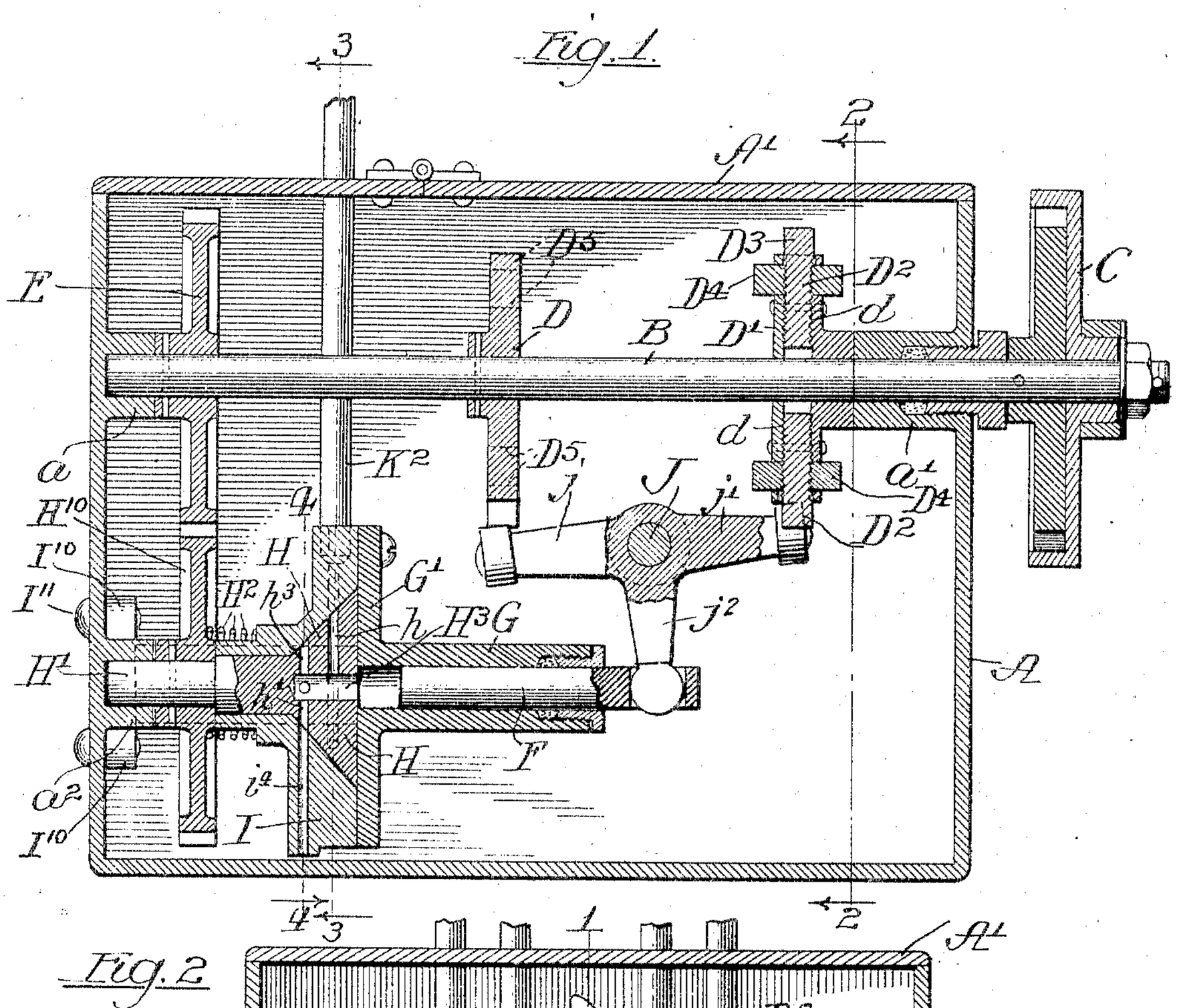
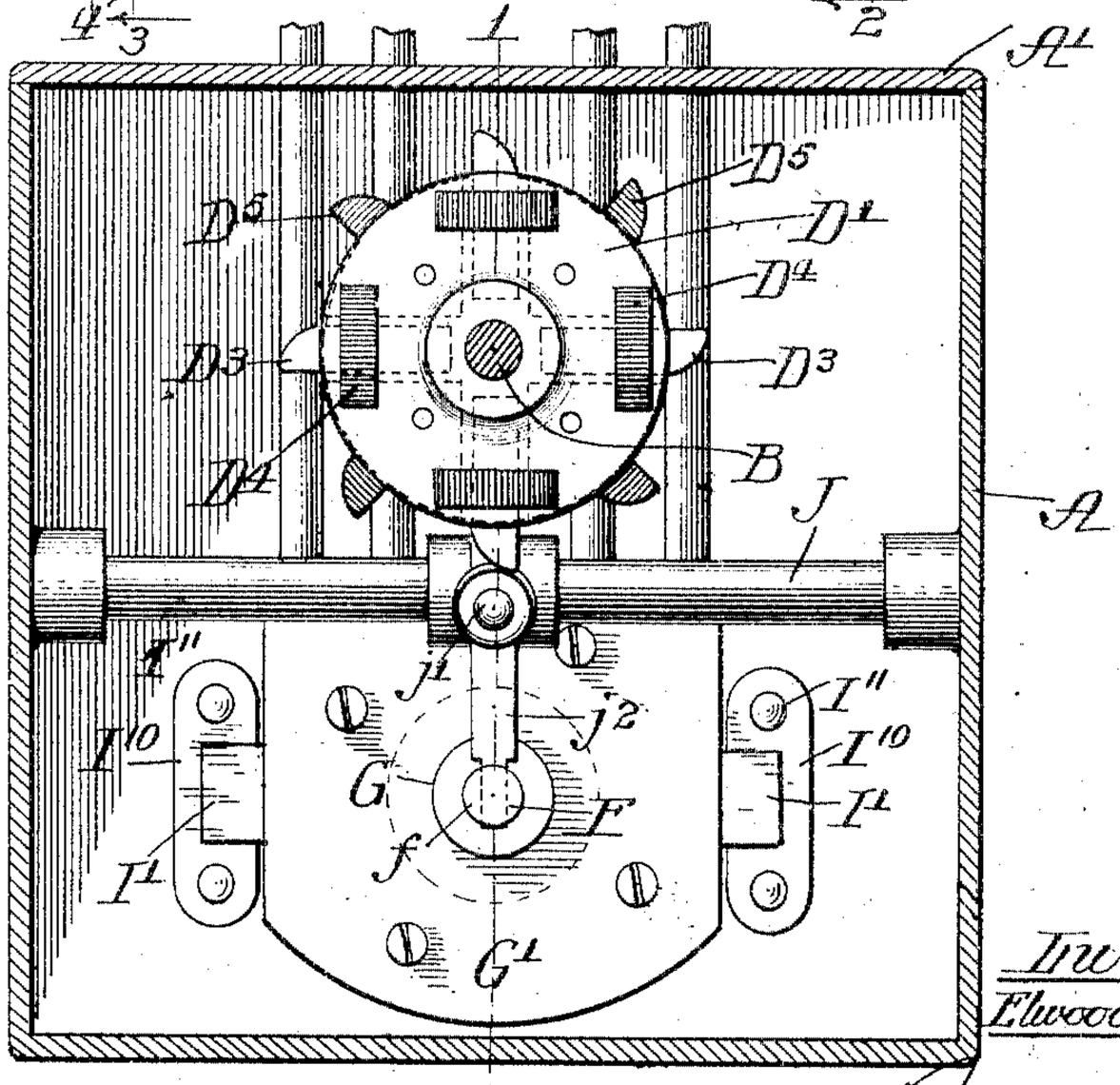


Fig. 2.



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NO MODEL. 2 SHEETS—SHEET 2.

Fig. 3

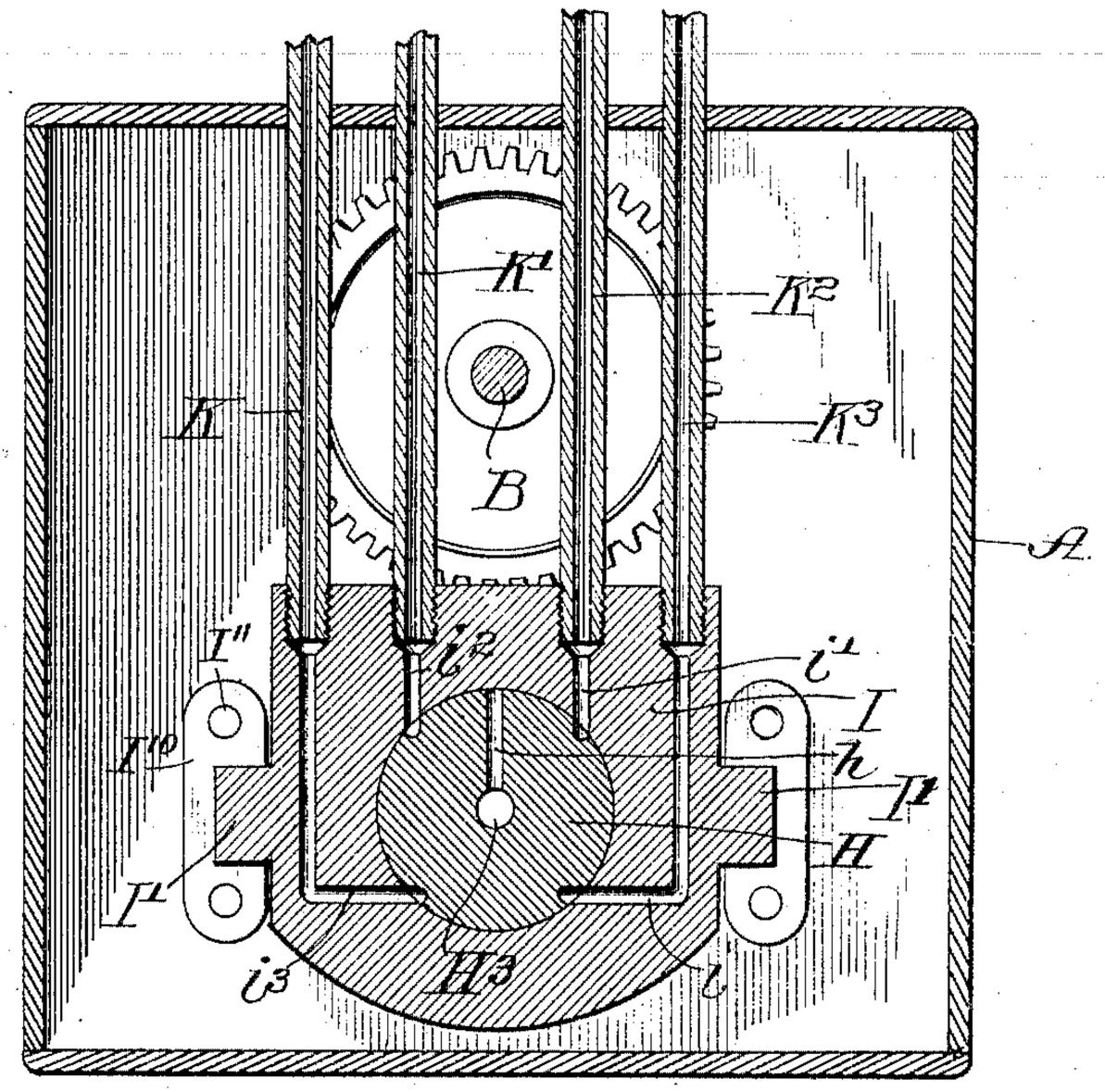


Fig. 4

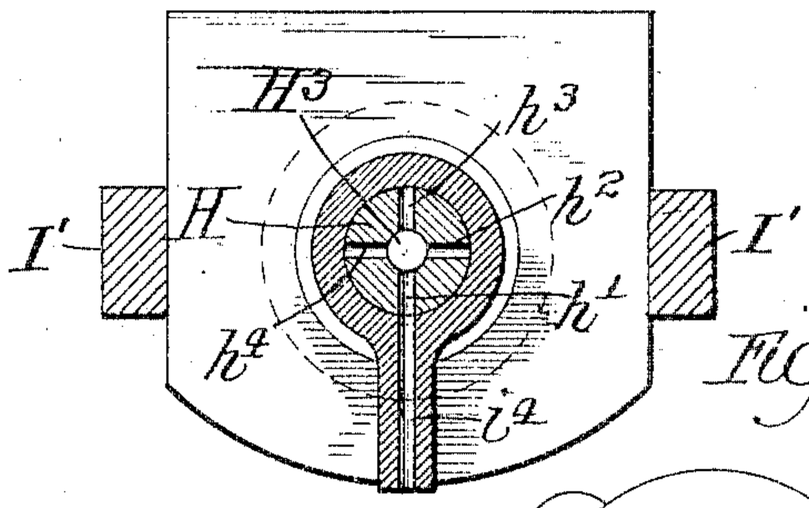


Fig. 5

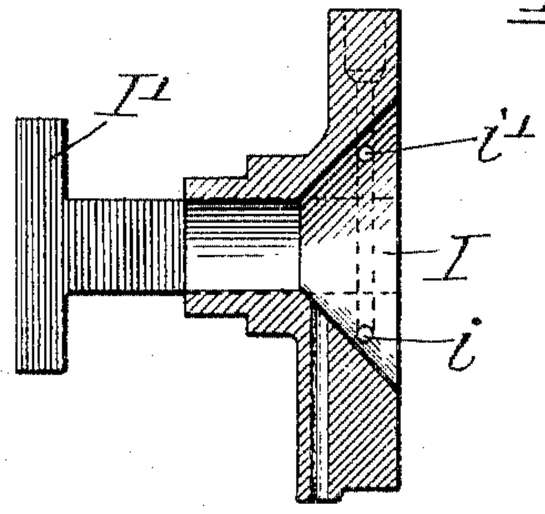


Fig. 7

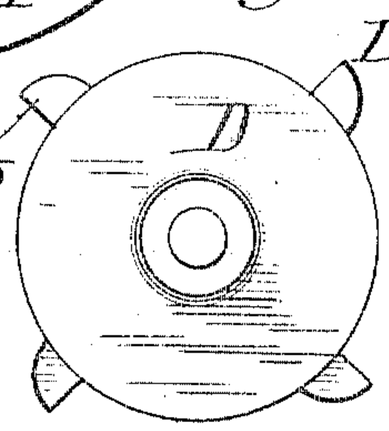
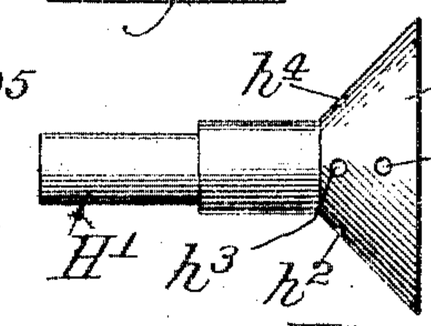


Fig. 6



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No. 777,413. Patented December 13, 1904.

UNITED STATES PATENT OFFICE.

ELWOOD HAYNES, OF KOKOMO, INDIANA.

MULTIPLE-FEED LUBRICATING-PUMP.

SPECIFICATION forming part of Letters Patent No. 777,413, dated December 13, 1904.

Application filed February 13, 1904. Serial No. 193,436. (No model.)

To all whom it may concern:

Be it known that I, ELWOOD HAYNES, a citizen of the United States, and a resident of Kokomo, in the county of Howard and State of Indiana, have invented certain new and useful Improvements in Multiple-Feed Lubricating-Pumps; and I do hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, and to the letters of reference marked thereon, which form a part of this specification.

This invention relates to improvements in multiple-feed oil or lubricating pumps.

The purpose of the invention is to provide a single automatically-operating device which shall furnish a supply of oil in regulated quantities to a plurality of bearings or parts to be lubricated.

My invention may be more readily understood by reference to the accompanying drawings, in which—

Figure 1 is a view in central vertical section of the main parts of an apparatus embodying my invention, the section being taken upon line 1 1 of Fig. 2. Fig. 2 is a sectional view taken upon line 2 2 of Fig. 1. Fig. 3 is a like sectional view taken upon line 3 3 of Fig. 1. Fig. 4 is a detail section taken upon line 4 4 of Fig. 1. Fig. 5 is a detail view of a part of the casing of the pump. Fig. 6 is a detail side elevation of the rotative valve-plug that is contained within said casing. Fig. 7 is a detail view of one of the actuating cam-disks.

As shown in said drawings, A indicates a casing or housing which constitutes the means for supporting the several operative parts of the apparatus and which in the particular construction shown constitutes an inclosure which surrounds the principal operative parts thereof, and also a receptacle or reservoir for supplying the oil or lubricant to be pumped. Said casing or housing A, as shown, has the form of a rectangular box provided with a hinged lid A′.

B indicates the main driving-shaft of the apparatus, which extends horizontally through the box A, near the upper part thereof, and is mounted or turns in bearing-boxes a a' on the end walls of said casing or housing. Said shaft extends at one end through the end wall of the box and is provided outside of the box with a ratchet-wheel C, which may be actuated or revolved by means of a reciprocating rod or other device operated by a moving part of the machine to be lubricated. On the said shaft B are mounted two disk-wheels D D′ and a gear-wheel E. Said disk-wheels D D′ serve as a means for actuating a plunger F, which reciprocates in a pump-barrel G. The gear-wheel E serves to operate a rotative valve-plug H, which turns in a valve-casing I, which valve-casing and plug constitute a distributing-valve. Said plug H is provided with a stem H′, on which is mounted a gear-wheel H^{10}, that intermeshes with the gear-wheel E on the said shaft B.

The pump-plunger F is arranged in axial alinement with the rotative distributing-valve H, and the central axes of the pump-barrel G and the valve-casing I are located horizontally below and parallel with the shaft B. In the particular construction shown the pump-casing G is provided with a wide flange G′, which forms a cap for the valve-casing I and is rigidly secured thereto, while said valve-casing is attached to the rear wall of the casing A by two integral arms I′, which extend rearwardly therefrom at each side thereof and are provided at their rear ends with flanges I^{10}, into which extend screws I^{11}, by which the arms are fixed to said rear wall. The extremity of the valve-stem H′ is mounted in a bearing a^2, which is formed directly upon said end wall of the casing.

The body of the valve H is of conical form with its larger end or base directed toward the pump-barrel G. The valve-casing I is provided with a seat or recess of corresponding conical form, which is engaged by the said valve. In order to insure a tight fit of the conical valve-plug in its conical seat and to take up any looseness produced by wear, a coiled expansively-acting spring H^2 is applied between the end of the valve-casing and the hub of the wheel H^{10}, so as to press the valve-stem H′ endwise and hold the conical face of the valve pressed against its seat. Said valve has at its center an axially-arranged bore H^3, which forms an endwise continuation of the

interior space of the pump-barrel G and through which the several parts in said plug, hereinafter described, are brought into communication with the pump-barrel.

The valve-casing I is provided with four outlet-passages i i' i^2 i^3, which terminate at their inner extremities at four equidistant points on the inner face of the conical valve-seat or bearing-surface of the valve-casing, as clearly seen in Fig. 3, preferably near the larger end or base of the conical body of the valve. The outer ends of said outlet-passages are upwardly directed and terminate near the upper edge of the valve-casing I, where they are connected with four delivery-pipes K K' K^2 K^3. The body H of the valve is provided with a radial outlet-port h, which extends from the central bore thereof outwardly to the conical surface of the valve-plug H and has its outer end arranged in the same plane with the several outlet-passages i i' i^2 i^3, so that during the rotation of said valve-plug the said outlet-port h will come successively into communication with the outlet-passages in the casing. Said port h is preferably located near the base of the conical valve-plug. The valve-casing I is also provided with a single inlet-port i^4, the inner end of which terminates in the inner conical face of the valve-casing, preferably near the smaller end of the conical valve-plug. This inlet-passage i^4 extends downwardly to the bottom of the casing I and opens through the latter. The lower end of said passage i^4 terminates near the bottom of the housing A, which constitutes a receptacle for the oil or lubricant to be fed to different bearings by the apparatus. Said conical valve-plug is also provided with four radially-arranged inlet-passages h' h^2 h^3 h^4, the inner ends of which communicate with the central bore H^3 of the valve-plug H, and the outer ends of which are arranged in the same vertical plane with the inlet-passage i^4 of the casing, so that during the rotation of said valve-plug said inlet-passages will be brought successively into communication with said inlet-passage, Fig. 4. The outlet-ports of the valve-casing I are arranged at intermediate angular positions with respect to the inlet-port i^4 of the casing, so that when said latter port is in communication with one of the plug inlet-passages h', h^2, h^3, and h^4 said outlet-ports will all be out of line with the plug outlet-port h. These relative positions of the passages are illustrated in the sectional views, Figs. 3 and 4. It follows from the construction described that as the valve-plug is turned or rotated the central bore or chamber of the valve-plug H will be successively brought into communication with said inlet-passage i^4 and with the outlet-passages i to i^3, inclusive. When one of the inlet-passages h' to h^4 is in communication with the said inlet-passage i^4, the outlet-passage h of the plug will be out of communication with one of the outlet-passages i to i^3, and likewise when said outlet-passage h is in communication with one of said outlet-passages i to i^3 communication between the said inlet-passage i^4 and the central recess of the valve-plug will be cut off. Endwise movement is given to the pump-plunger in the pump-barrel G, which pump-barrel, as before described, communicates with the central bore or recess H^3 of the rotative plug in such manner that the backward or suction stroke of the plunger will occur when one of the inlet-ports h' to h^4 is in communication with the inlet-passage i^4, and the inward or pressure stroke of the plunger will occur when the outlet-port h of the valve-plug is in communication with one of the outlet-passages i to i^3. Devices for so actuating the piston F include the cam-disks D D' hereinbefore referred to and are made as follows: J indicates a rock-shaft extending across the casing A below the main driving-shaft B and at right angles to the same, said rock-shaft having bearing at its ends on the walls of said casing. Said rock-shaft is located midway between the two cam-disks D D' and is provided with two oppositely-extending arms j j', which terminate opposite the said disks and are preferably provided with antifriction-rollers adapted for contact with the cam projections on said disks. Said rock-shaft is also provided with a depending arm j^2, which is rigid with the arms j j', and the lower end of which is engaged with the outer end of the plunger F, the engaging means shown consisting of a rounded head on the lower end of the arm j^2, adapted to engage a vertically-extending slot f, formed in the end of the plunger F. The cam-disk D' is provided with four radial guide-apertures d d, in which are adapted to slide radially-arranged rods D^2, Figs. 1 and 2, which terminate at their outer ends in cam projections D^3. Said rods D^2 are exteriorly screw-threaded, and the body of the disk D' is provided with transverse slots in which are located milled nuts D^4, which have screw-threaded engagement with the rods D^2, and which when rotated in the slots serve to move inwardly and outwardly the said rods and the cam projections D^3 thereon. Such cam projections are arranged to act on the rocker-arm j'' in such manner as to move the rocker-arm downwardly or in a direction to give inward movement to the plunger F. The cam-disk D is also provided with four cam projections D^5 D^5, corresponding generally in shape and location with the cam-shaped projections D^3 and having intermediate angular locations with respect thereto, Fig. 2. Said cam projections D^5 act to throw downwardly the rocker-arm j and to thereby give outward movement to the plunger F. The form of the cam-disk D is shown in Fig. 7. Adjustment of the cam projections D^3 on the cam-disk D' inwardly and outwardly has the effect of varying the stroke of the plunger F to correspond with the quantity of lubricant that is desired

to be delivered in any particular instance, and by adjusting the four cam projections D^3 at varying distances from the central axis of the disk D′ the plunger F may be moved through varying distances in successive strokes, so that varying quantities of oil may be delivered to the different delivery-pipes and the bearings which are fed thereby. It will of course be understood that the projections on the cam-disk D will always throw the plunger F outwardly to a certain point in its retracting stroke and that the spaces between said cam projections will be deep enough to enable the said plunger F to have a maximum inward throw without being limited in its movement by contact with the body of the disk, excepting when the piston reaches the extreme inward limit of its stroke. The cam projections on the cam-disks D D′ are located in such angular positions on the driving-shaft B, and the rotative valve-plug H is operatively connected with the said shaft B in such manner that the outward strokes of the plunger F will occur at times when the inlet-ports h' to h^4 are in passing communication with the inlet-passage i^4, and the inward or ejecting strokes of said plunger will take place at times when the outlet-port h of the valve-plug is passing in communication with the outlet-passages i to i^3 of the valve-casing. It follows from the above that at each outward or backward or suction stroke of the piston oil will be drawn from the receptacle formed by the housing A or any other receptacle with which the inlet-passage i^4 communicates into and through said passage i^4 and one of said ports h' to h^4 and through the central bore H^3 of the plug to the pump-barrel, and likewise at each forward or inward stroke of said plunger oil will be forced from the pump-barrel through said bore H^3 and the port h to one of the outlet-passages i to i^3.

Each of the outlet-pipes K to K^4 is shown as extending upwardly through the top wall of the casing A and may or may not in practice have suitable connection with a sight-feed device by the use of which the action of the apparatus may be observed to enable its operation to be properly controlled.

I claim as my invention—

1. The combination with a valved lubricating-pump, of means for actuating the movable part of the pump embracing a rotative cam-disk having a plurality of cam projections which are separately adjustable to vary the stroke of the movable part of the pump.

2. The combination with a lubricating-pump provided with a rotative distributing-valve, of means for actuating the pump embracing a rotative cam-disk having a plurality of cam projections which are separately adjustable to vary the stroke of the pump.

3. The combination with a lubricating-pump provided with a rotative distributing-valve, of means for actuating the pump embracing a rotative cam-disk, radially-adjustable cam projections provided with rods which slide radially in said disk, said rods being screw-threaded, and milled nuts on said rods engaging the said disk for effecting radial adjustment of said rods.

4. The combination with a lubricating-pump provided with a rotative distributing-valve, of means for actuating the pump comprising a driving-shaft provided with two cam-disks, two connected rocker-arms adapted to engage the cam projections of said disks, and a third rigid arm which is connected with and actuates the plunger of the pump.

5. A lubricating-pump comprising a pump-barrel provided with a plunger, a valve-casing attached to the pump-barrel and provided with a conical valve-seat, a conical rotative valve-plug engaging said valve-seat, and means for rotating said valve-plug; said valve-casing being provided with a plurality of outlet-passages and a single inlet-passage opening to the conical valve-seat in different planes, and the valve-plug being provided with a single port arranged in the same plane with the said outlet-passages and a plurality of inlet-ports arranged in the same plane with said inlet-passage, said ports in the valve-plug communicating at their inner ends with the pump-barrel.

6. A lubricating-pump comprising a pump-barrel provided with a plunger, a valve-casing attached to the pump-barrel and provided with a conical valve-seat, a conical, rotative valve-plug in said valve-seat, and means for rotating said valve-plug; said valve-casing being provided with a plurality of outlet-passages and a single inlet-passage opening to the conical valve-seat in different planes, and the valve-plug being provided with a single port arranged in the same plane with said outlet-passages, and a plurality of inlet-ports arranged in the same plane with said inlet-passage, said ports in the valve-plug communicating at their inner ends with the pump-barrel, and a spring applied to hold the said conical valve-plug in contact with its conical seat.

7. A lubricating-pump comprising a pump-barrel, a plunger therein, a valve-casing provided with a conical valve-seat, said pump-barrel being provided with an integral flange which is attached to the valve-casing, a conical valve-plug engaging said valve-seat, and means for rotating said valve-plug; said valve-casing being provided with a plurality of outlet-passages, and a single inlet-passage which are arranged in different planes and terminate at the surface of the conical valve-seat, and the valve-plug being provided with a single outlet-port arranged in the same plane with the said outlet-passages of the valve-seat, and with a plurality of inlet-ports which are arranged in the same plane with the inlet-passage of the valve-seat, said ports communicating through the larger end of the valve-

plug with the pump-barrel, and means for giving reciprocatory motion to said pump-plunger.

8. A lubricating-pump comprising a pump-barrel, a reciprocating plunger therein, a valve-casing provided with a conical valve-seat, a rotative conical valve-plug in said casing, said casing being provided with a plurality of outlet-passages, and with a single inlet-passage arranged in different planes and opening to the conical valve-seat, and the valve-plug being provided with a single outlet-port and with a plurality of inlet-ports arranged, respectively, in the same planes with the outlet-passages and inlet-passage of the valve-casing, said ports communicating with the said pump-barrel, a driving-shaft provided with two cam-disks, three rigidly-connected rocker-arms, two of which are engaged with and actuated by the cam-disk, and the third of which engages with and operates the pump-plunger, and gearing for driving said valve-plug from said driving-shaft.

9. A multiple-feed lubricating device comprising a closed casing or housing adapted to contain oil, a horizontal driving-shaft in the upper part of said casing or housing which projects at one end through the wall of the same, a pump-barrel in the lower part of said housing, a valve-casing attached to said pump-barrel, a rotative valve-plug in said casing, a plunger in said pump-barrel and means for actuating said plunger from the driving-shaft, and means also for actuating the said rotative valve-plug therefrom, said valve-casing being provided with an inlet-passage which opens near the bottom of said casing or housing and communicates with the pump-barrel and with a plurality of outlet-passages which also communicate with said pump-barrel.

In testimony that I claim the foregoing as my invention I affix my signature, in presence of two witnesses, this 4th day of February, A. D. 1904.

ELWOOD HAYNES.

Witnesses:
N. B. SMITH,
JOHN E. MOORE.