

April 1, 1930.

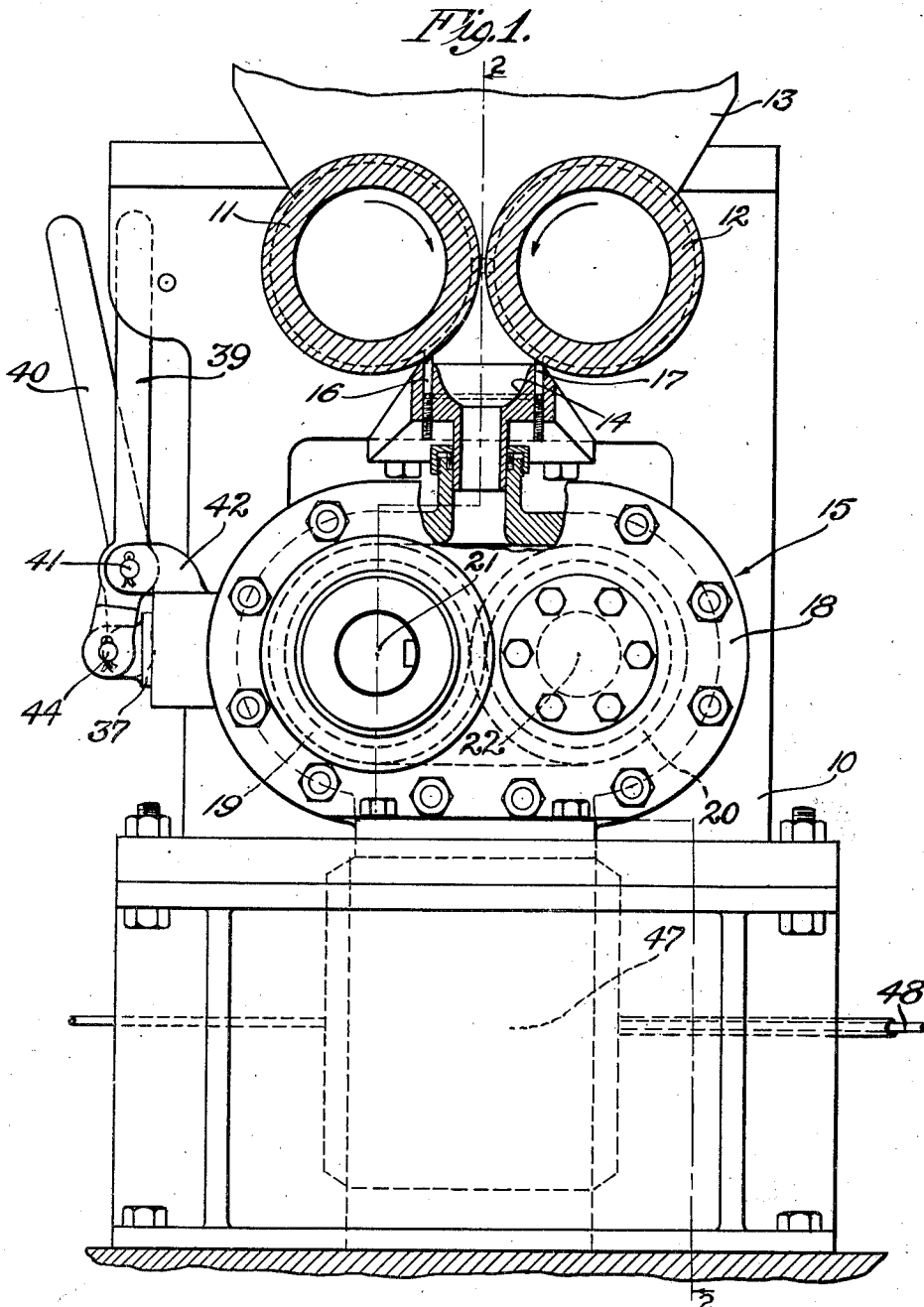
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1,752,471

EXTRUSION MACHINE

Filed May 24, 1924

3 Sheets-Sheet 1



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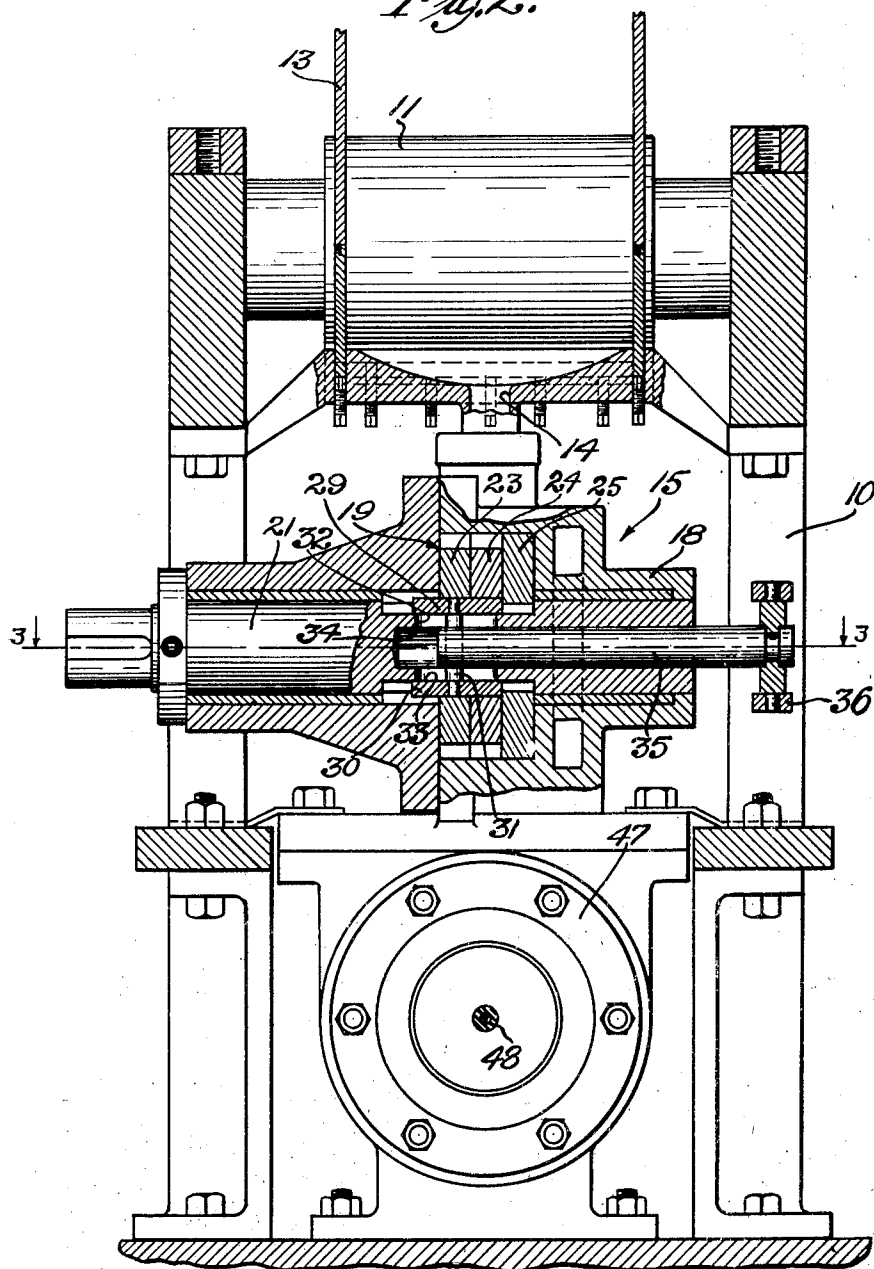
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Fig. 2.



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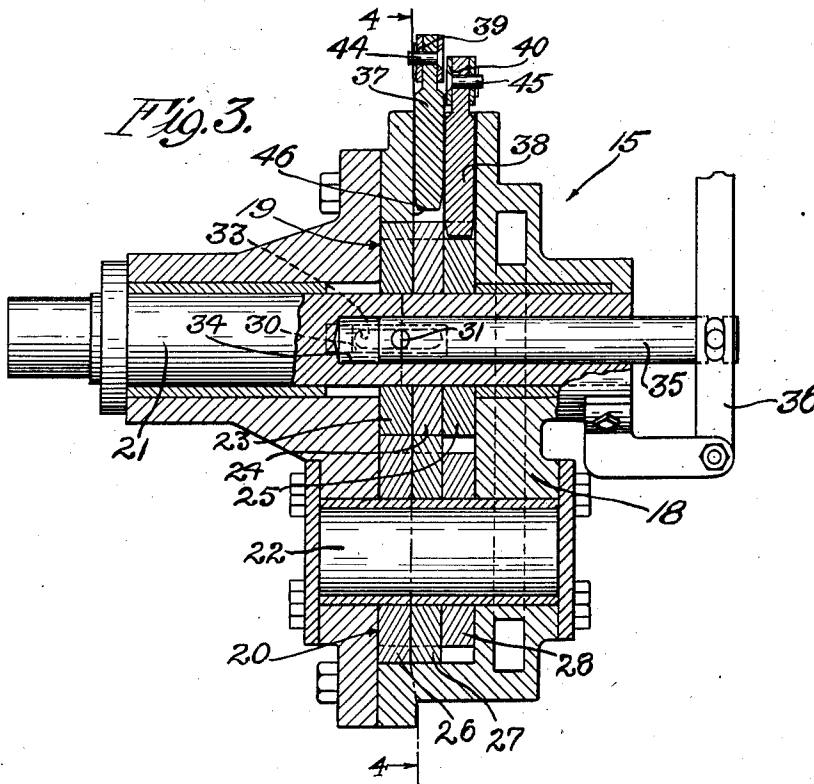
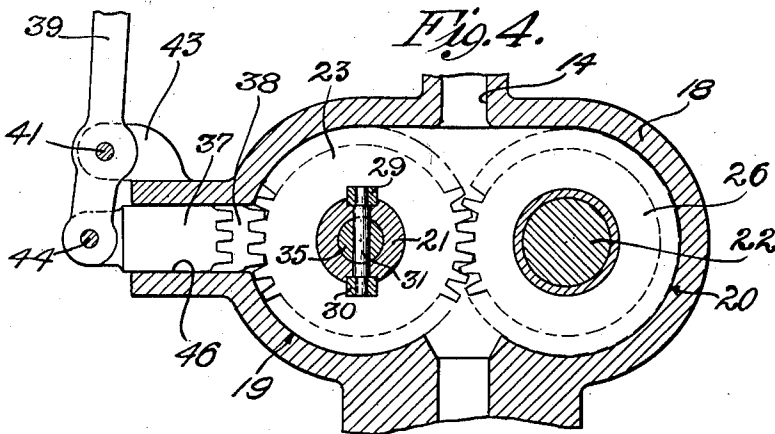
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EXTRUSION MACHINE

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3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE

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EXTRUSION MACHINE

Application filed May 24, 1924. Serial No. 715,650.

This invention relates to extrusion machines, and more particularly to pumps therefor.

An object of this invention is to provide an extrusion machine wherein improved means is provided for controlling the output therefrom.

Still another object of this invention is to provide an improved gear pump for extrusion machines in which the output may be varied without changing the speed of the gear or gears thereof.

In accordance with the preferred embodiment the invention contemplates the provision of an extrusion machine wherein means is provided for causing the material to be extruded which may be effectively varied to control the amount of material extruded. Specifically, the invention embodies a gear pump arrangement designed primarily for extrusion machines wherein the elements through the instrumentalities of which the material is forced to the extrusion machine are made up of a plurality of laminations which may be selectively operated to cause their engagement or disengagement with corresponding laminations to thereby vary the output of the pump without changing the speed of the means employed for imparting motive power to the pump.

Other objects and advantages will more fully appear from the following detailed description taken in connection with the accompanying drawings which illustrate one embodiment thereof and in which,

Fig. 1 is a side elevation, partly in section, of an extrusion machine embodying the features of the invention,

Fig. 2 is a front view of the machine shown in Fig. 1 showing a sectional view taken on the line 2—2 thereof and an elevation of the extruding head,

Fig. 3 is a horizontal sectional view taken on the line 3—3 of Fig. 2, and

Fig. 4 is a vertical sectional view taken on the line 4—4 of Fig. 3 looking in the direction indicated by the arrows.

Referring now to the drawings in detail in which like reference numerals designate similar parts throughout the several views, 10 de-

notes a frame which is of usual construction. Suitably mounted in the upper part of the frame 10 are a pair of steam heated kneading rolls 11 and 12 (Fig. 1) which may be revolved by any suitable means (not shown). Positioned above the rolls 11 and 12 is a hopper 13 into which plastic material to be extruded is fed. The plastic material, which may be rubber, gutta-percha or the like, is kneaded and forced by the rolls 11 and 12 into the intake chamber 14 leading to the gear pump denoted generally by the reference character 15. Scrapers 16 and 17 embrace the surfaces of the rolls 11 and 12, respectively, and are adapted to remove and direct any of the plastic material, which might adhere to the rolls 11 and 12, into the intake chamber 14.

The gear pump 15 comprises essentially a casing 18 and two gears 19 and 20 rotatably mounted therein on shafts 21 and 22, respectively. Shaft 21 is adapted to be driven by any suitable source of power (not shown). The gear 19 is composed of three laminations or toothed disks 23, 24, and 25, and the gear 20 is composed of three similar laminations or toothed disks 26, 27, and 28 which are loosely mounted on shaft 22, the ends of which shaft are journaled in casing 18. The laminations 26, 27, and 28 are in mesh with the laminations 23, 24, and 25 which are adapted to be splined to the shaft 21 by slidable keys 29 and 30, secured to a pin 31 which rides in grooves 32 and 33 in the shaft 21. The shaft 21 is provided with a bore 34 in which is located a rod 35 through which rod the pin 31 passes and to which it is secured. The rod 35 may be reciprocated in the bore by any suitable means such as a lever 36. Located to one side of the gear 19 are two toothed sectors 37 and 38 which are adapted to be brought into and out of engagement with laminations 24 and 25, respectively, locking them against rotation. Levers 39 and 40, pivotally mounted on a pin 41 (Fig. 1), suitably carried in arms 42 and 43 extending from the casing 18, are pivotally secured to the sectors 37 and 38, respectively, by pins 44 and 45, respectively.

The levers 39 and 40 are adapted to reciprocate the sectors 37 and 38 into and out

of engagement with laminations 24 and 25 respectively, the said sectors riding in a slot 46 formed in the casing 18.

It will be noted that only the laminations 24 and 25 of the gear 19 are adapted to be locked against rotation, the other lamination 23 being constantly splined to the shaft 21. Upon the application of power to the shaft 21, lamination 23 actuates lamination 26 of gear 20 and any other laminations of gear 19 which are keyed to the shaft 21 also function to actuate the associated laminations of gear 20 on shaft 22. Furthermore, by locking a lamination of gear 19, the associated lamination of gear 20, meshing therewith, is also locked against rotation. It is readily apparent, therefore, that the smallest volume of material which may be forced through by the pump 15 is that amount which one pair of laminations is adapted to force therethrough, inasmuch as lamination 23 is always splined to the power driven shaft 21. By actuating either of the levers 39 or 40, the toothed sectors 37 or 38 may be brought into engagement with laminations 24 or 25, respectively, which mesh with laminations 27 and 28, thereby enabling the locking of the said laminations against rotation.

By reciprocating the rod 35 through the medium of the lever 36, laminations 24 and 25 may be disengaged from the shaft 21. In order to exemplify this more clearly, the drawings disclose lamination 24 as being splined to the shaft 21 by keys 29 and 30, and lamination 25 disengaged from the shaft 21 and locked against rotation by the toothed sector 38. Furthermore, although the gears of the pump 15 are shown on the drawings as each being composed of only three laminations, it is to be understood that the invention is not to be thereby limited, but is to be restricted only by the scope of the appended claims.

The plastic material after it leaves the kneading rolls 11 and 12 (Figs. 1 and 2) is forced by the gear pump 15 into the extruding head 47 which is of any usual construction and then out around a cable core 48 passing through the said extruding head.

It is believed that the operation of the mechanism is clearly apparent from the above detailed description.

The gear pump herein disclosed is particularly advantageous in cases where plastic material is to be extruded as it enables the controlling and varying of the output of the mechanism in accordance with whatever rate of extrusion is desired, but it is to be understood that this gear pump may be used with many other machines and for many other purposes without departing from the spirit and scope of the invention.

Then too, the speed of this gear pump need not be varied in order to change or control the output of the pump, this control being

accomplished by selectively engaging or disengaging the laminations and thereafter locking the disengaged laminations as has already been fully described.

What is claimed is:

1. In an extrusion machine, an extruding head, and a gear pump for forcing material through the said extruding head, the gear pump comprising a plurality of sets of elements, and means for varying the relation of the elements of the respective sets for varying the output therefrom without changing the speed thereof.

2. In an extrusion machine, an extruding head, and a gear pump for forcing material through the said extruding head, the gear pump comprising a gear composed of a plurality of laminations.

3. In an extrusion machine, an extruding head, and a gear pump for forcing material through the said extruding head, the gear pump comprising a pair of gears composed of a plurality of laminations, and means for selectively engaging or disengaging the laminations with or from each other.

4. In an extrusion machine, an extruding head, and a gear pump for forcing material through the said extruding head, the gear pump comprising a pair of gears composed of a plurality of laminations, means for selectively engaging or disengaging the laminations with or from each other, and means for locking the disengaged laminations.

5. In an extrusion machine, an extruding head, and a gear pump for forcing material from the said extruding head, the gear pump comprising a pair of gears in mesh with each other, composed of a plurality of laminations, means for selectively engaging or disengaging the laminations with or from each other, means for locking the disengaged laminations, and means for rotating the gears.

6. In an extrusion machine, an extruding head, and a gear pump for forcing plastic material therethrough, comprising a pair of gears in mesh with each other, composed of a plurality of toothed disks, means for selectively engaging or disengaging the disks with or from each other, means for locking the disengaged disks, and means for rotating the gears.

7. In an extrusion machine, an extruding head, and a gear pump for forcing plastic material therethrough, comprising a casing, a pair of gears rotatably mounted therein, meshing with each other, the gears being composed of a plurality of laminations, means for selectively engaging or disengaging the laminations with or from each other, means for locking the disengaged laminations, and means for rotating the gears.

8. In an extrusion machine, a pair of kneading rolls, an extruding head, and a gear pump, for forcing material supplied by the kneading rolls through the said extruding

head, comprising a pair of gears, composed of a plurality of laminations, means for selectively engaging or disengaging the laminations with or from each other, and means for locking the disengaged laminations.

5 9. In an extrusion machine, a pair of kneading rolls, an extruding head, and a gear pump, located intermediate said rolls and extruding head for forcing plastic material supplied by the kneading rolls through
10 the said extruding head, comprising a pair of gears in mesh with each other, the gears being composed of a plurality of laminations.

15 10. In an extrusion machine, a pair of kneading rolls, an extruding head, and a gear pump, positioned intermediate said rolls and extruding head for forcing material supplied by the kneading rolls through
20 the said extruding head, comprising a pair of gears in mesh with each other, the gears being composed of a plurality of laminations, means for selectively engaging or disengaging the laminations with or from each other,
25 means for locking the disengaged laminations, and means for rotating the gears.

In witness whereof, I hereunto subscribe my name this 16th day of May, A. D., 1924.

BRUNO MAX ALFRED TREBES.

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