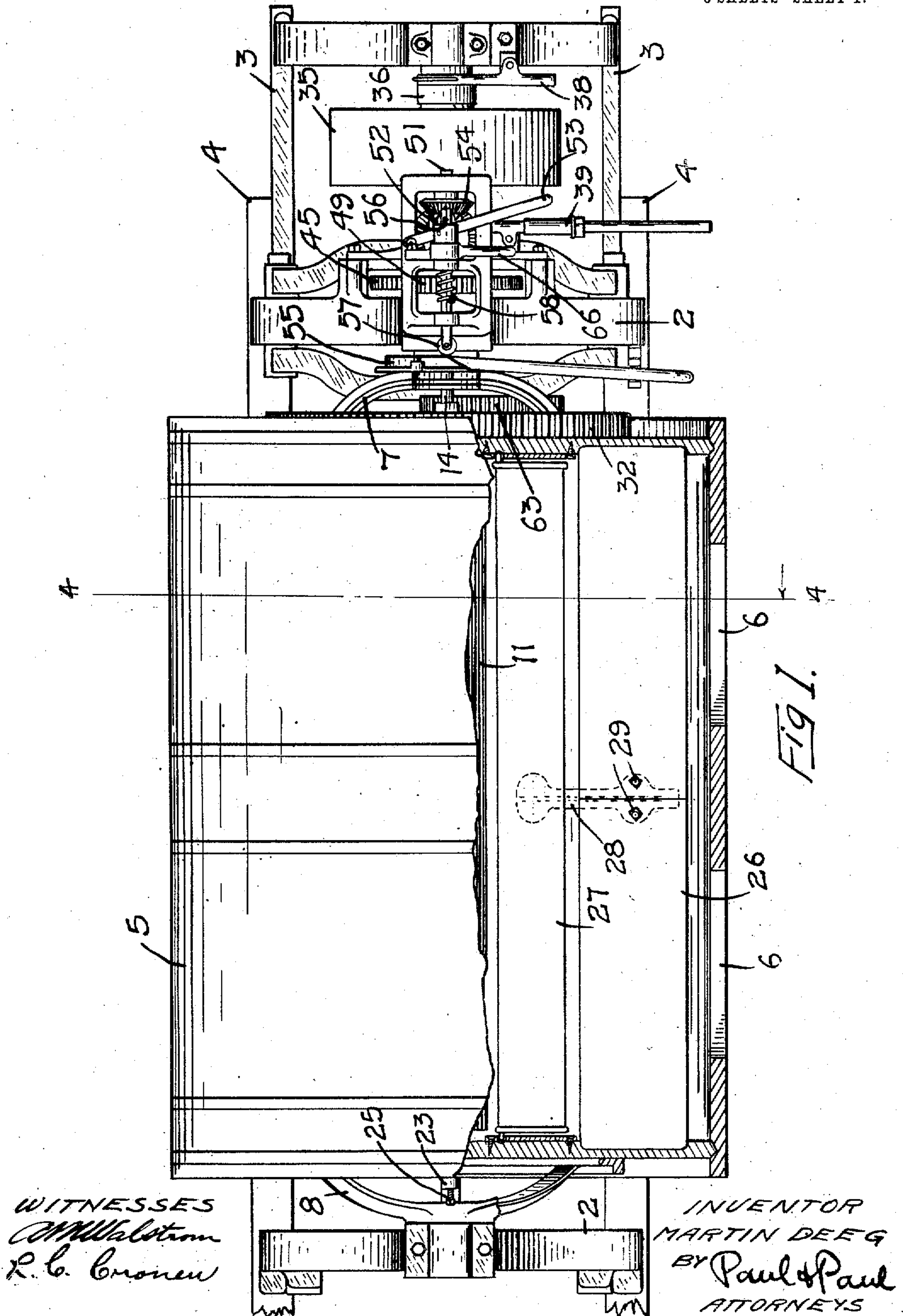


M. DEEG.
COMBINED CHURN AND BUTTER WORKER.
APPLICATION FILED NOV. 28, 1909.

954,079.

Patented Apr. 5, 1910.

3 SHEETS—SHEET 1.



M. DEEG.
COMBINED CHURN AND BUTTER WORKER
APPLICATION FILED NOV. 26, 1909.

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Patented Apr. 5, 1910.

3 SHEETS—SHEET 2.

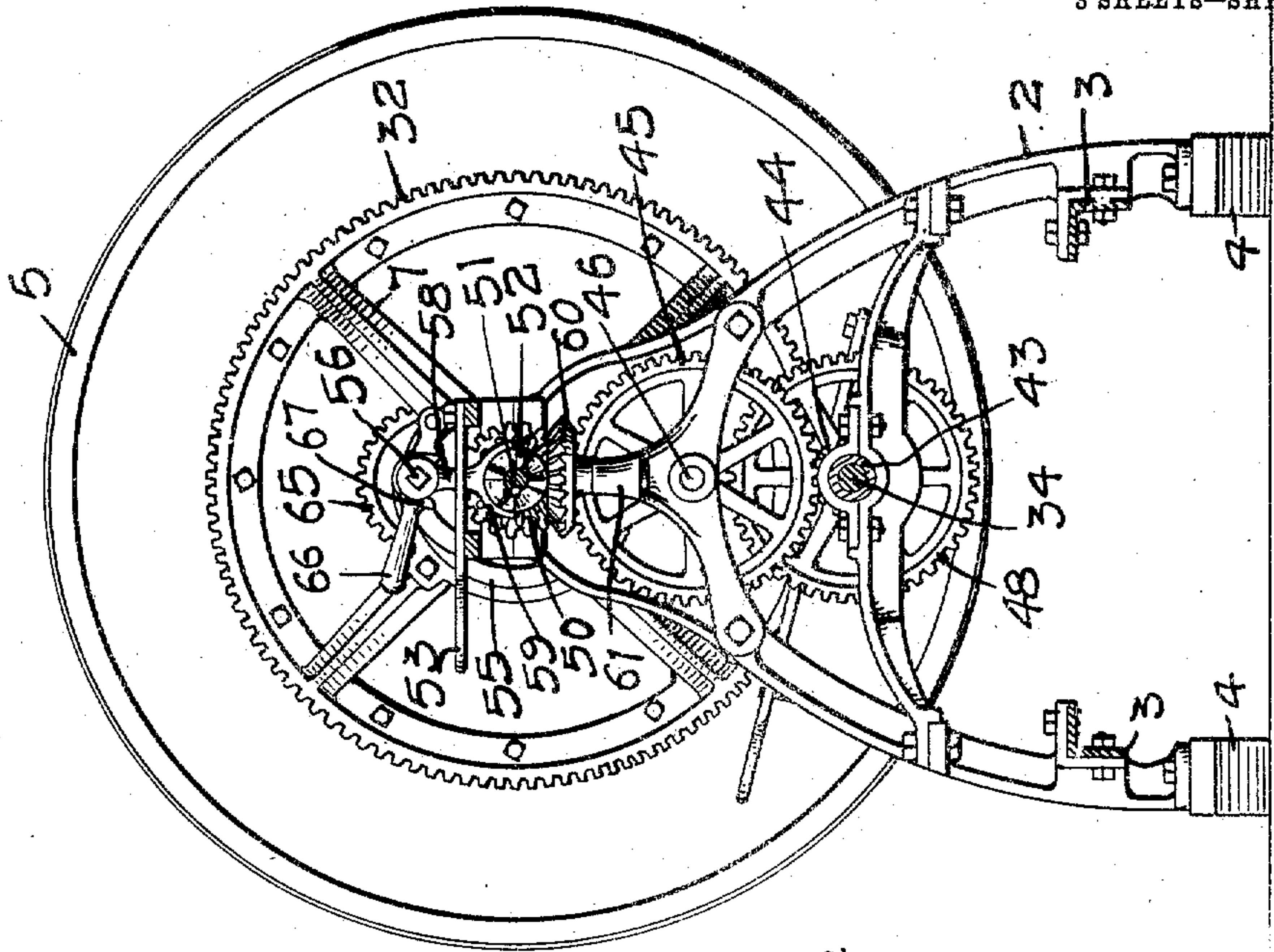


Fig. 3.

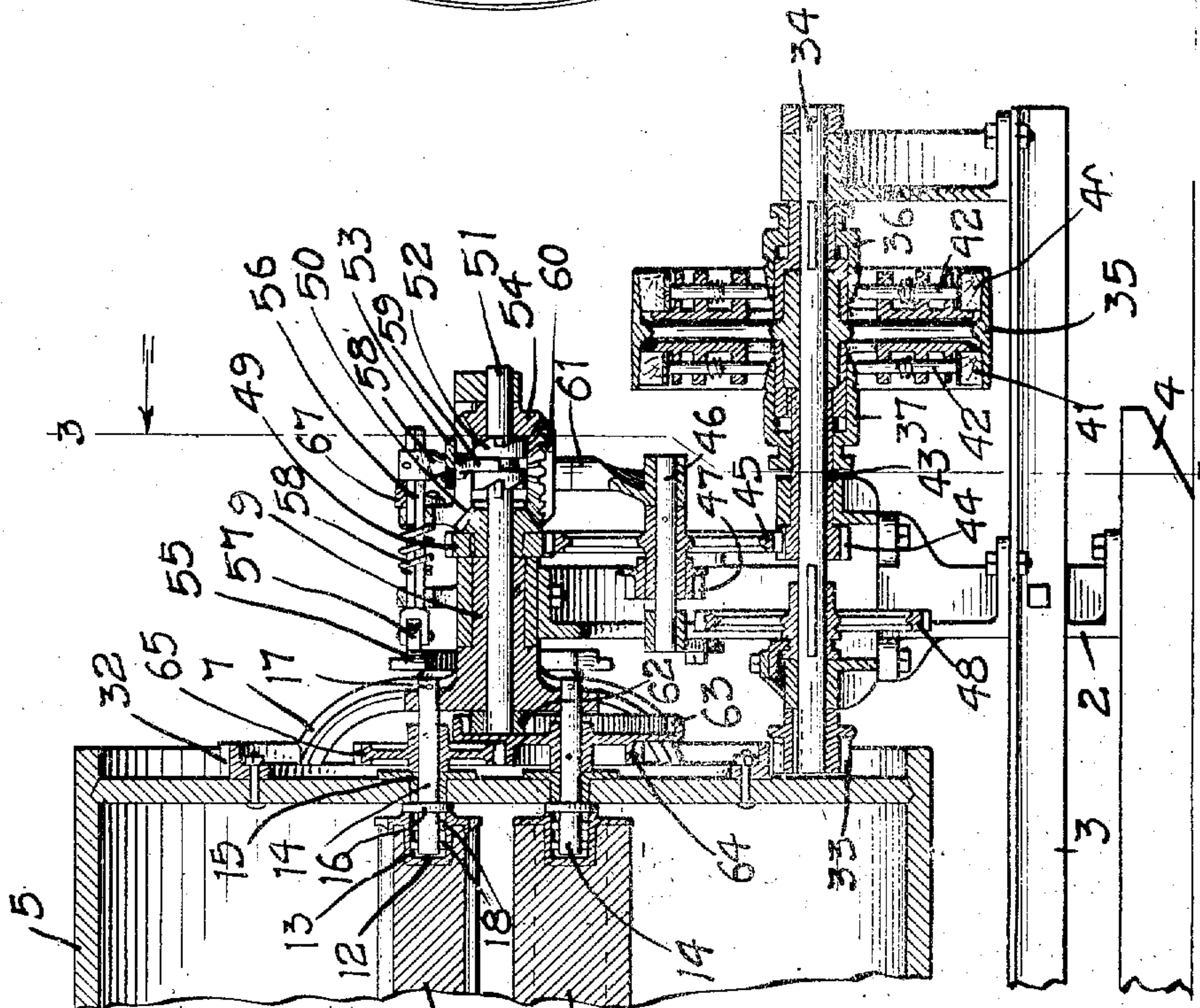


Fig. 2.

WITNESSES
Amund Valstrom
L. G. Cronin

INVENTOR
MARTIN DEEG
BY *Paul & Paul*
ATTORNEYS

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3 SHEETS—SHEET 3.

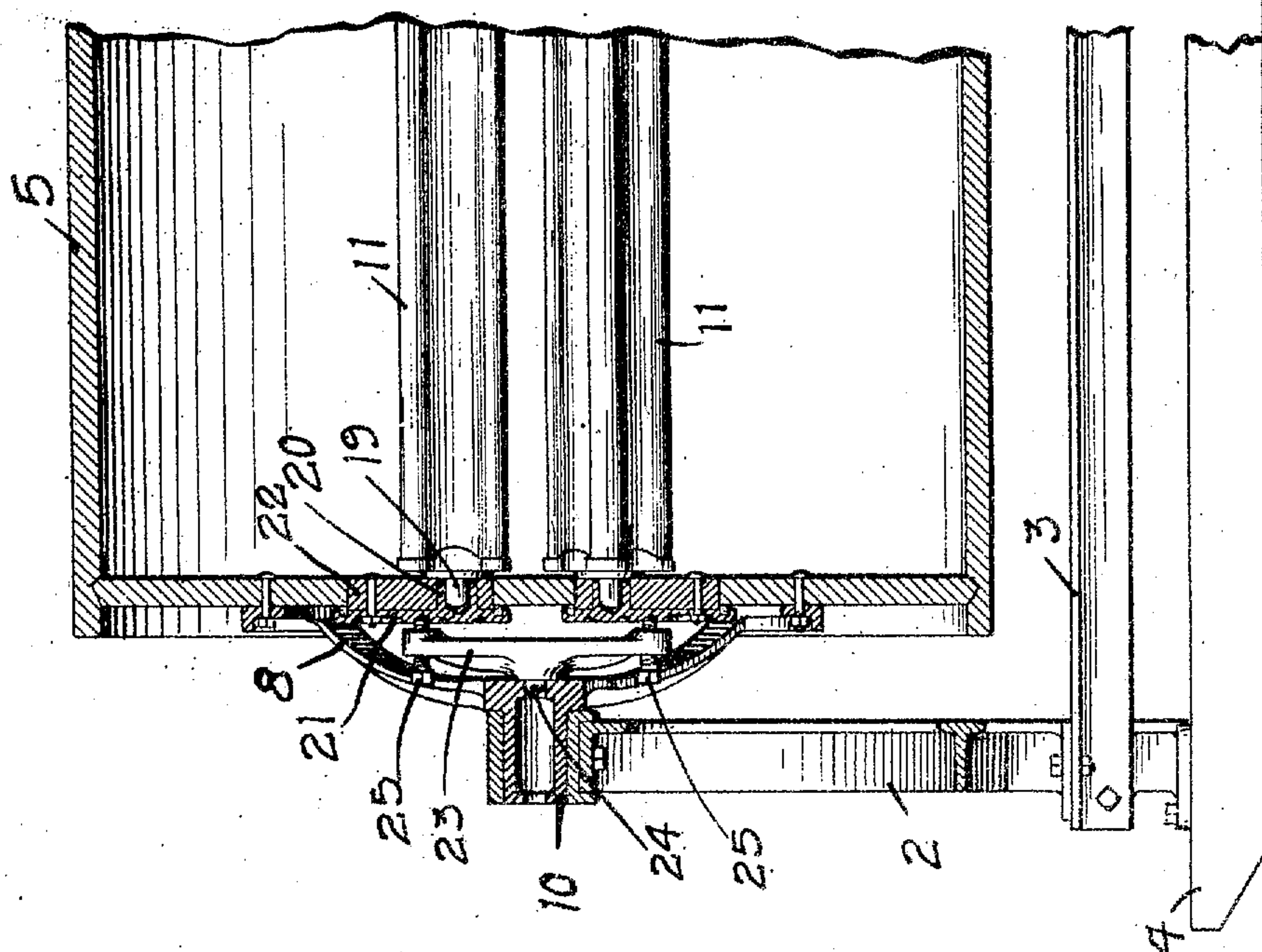


Fig. 5.

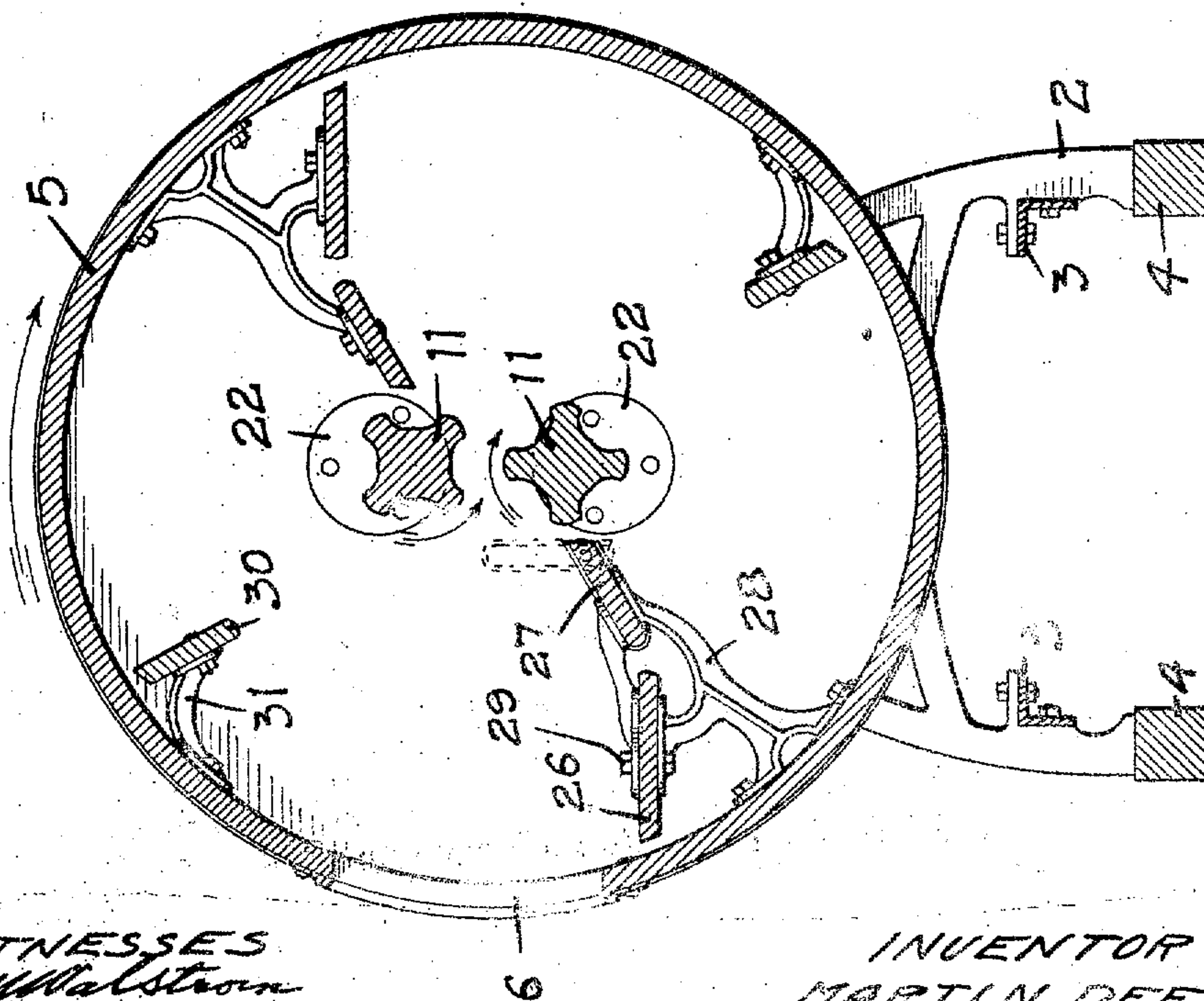


Fig. 4.

WITNESSES
M. Walstrom
L. C. Brown

INVENTOR
MARTIN DEEG
BY *Paul & Paul*
ATTORNEYS

UNITED STATES PATENT OFFICE.

MARTIN DEEG, OF OWATONNA, MINNESOTA.

COMBINED CHURN AND BUTTER-WORKER.

954,079.

Specification of Letters Patent.

Patented Apr. 5, 1910.

Application filed November 26, 1909. Serial No. 529,895.

To all whom it may concern:

Be it known that I, MARTIN DEEG, a citizen of the United States, residing at Owatonna, in the county of Steele and State of Minnesota, have invented certain new and useful Improvements in Combined Churns and Butter-Workers, of which the following is a specification.

This invention relates to improvements in the type of combined churns and butter workers illustrated and described in Letters Patent of the United States No. 634,074, issued Oct. 3rd, 1899 to Dennis E. Virtue and myself and the objects of my present invention are to provide improved means for reversing the butter-working rolls during the revolution of the drum in the butter-working operation; also to provide the drum with flights or shelves for carrying the butter to the rolls, that are readily removable so that access may be had to the lower part of the drum when taking the butter out of the churn; and to provide improved means for supporting the butter working rolls within the drum and permitting their ready removal therefrom.

To these ends, my present invention consists generally in the constructions and combinations hereinafter described and particularly pointed out in the claims.

In the accompanying drawings forming part of this specification, Figure 1 is a sectional plan view of a combined churn and butter worker embodying my invention. Fig. 2 is a vertical longitudinal section of a portion of the machine showing particularly the construction and arrangement of the operating mechanism. Fig. 3 is an end elevation of the machine looking in the direction of the arrow in Fig. 2. Fig. 4 is a transverse vertical section of the machine, said section being taken on the line 4-4 of Fig. 1. Fig. 5 is a vertical longitudinal section through a portion of the rear part of the machine.

In all of the drawings 2, 2 represent the standards which constitute the principal part of the frame of the machine. These standards are preferably connected by suitable angle bars 3, 3, and the frame-work formed by the standards and connecting bars is preferably bolted to and supported upon suitable longitudinally extending timbers 4, 4. The churn drum or barrel 5 is of usual form, preferably cylindrical, and it is provided with door openings 6, through

which cream may be placed in the drum, and through which the butter is removed. These door openings will in practice be closed cream-tight during the churning operation, by means of suitable doors, (not shown). The drum is supported so as to revolve upon its axis, in the standards 2, 2, by means of suitable spiders 7 and 8 suitably secured to the drum-heads and provided with the trunnions 9 and 10. These trunnions are arranged in line with each other axially of the drum and form the means by which the drum and the rolls contained therein are supported in the standards.

I prefer to provide a single pair of butter working rolls 11, 11, which are arranged within the drum in close proximity to each other and at opposite sides of the axis of the drum. These rolls are of any ordinary or preferred construction, and they are preferably so mounted in the drum as to be capable of ready removal therefrom. I prefer to support these rolls by the following means: Each roll is provided at one end with a socket 12 having grooves 13. Stub shafts 14 extend through boxes 15 in the head of the drum and also have bearings in the spider 7, (see Fig. 2). These stub shafts are capable of rotating upon their axes, but are fixed against longitudinal movement by the collars 16 and pins 17. The shafts 14 are provided with lugs 18 that are adapted to fit into the grooves 13 in the sockets 12 of the butter-working rolls, thereby coupling said rolls to said shafts and causing said rolls and shafts to rotate together. At the opposite ends the rolls 11 are provided with the short trunnions 19 which are seated in suitable boxes 20 projecting inwardly from plates 21. The plates 21 are of circular form, preferably, and secured to their inner faces are the wooden disks 22 which fit into circular holes in the end of the drum. The plates 21 and disks 22, which I have shown of circular form, but, which might be of any other suitable form, close tightly the openings in the ends of the drum, and said disks 22 are apertured for the boxes 20 which receive and support the roll trunnions 19. The openings into which the disks 22 fit, are of sufficient size to permit the insertion or removal through them of the butter-working rolls, and these openings are located opposite the spaces between the legs of the spider 8, so that said rolls may be inserted or re-

moved while the drum is supported by the spiders 7 and 8 upon the standards. For holding the plates 21 and disks 22 firmly in position, I provide the cross-bar or cross-head 23, formed with a bearing lug 24 that rests against the inner end of the drum trunnion. At its ends this cross-head is provided with set-screws 25, 25, the ends of which engage the plates 21. By screwing up these set-screws the plates 21 and disks 22 are firmly seated in the openings of the drum-head and a cream-tight closure of these openings is secured. When it is desired to remove the rolls, the set-screws are loosened, the cross-head taken out, and the disks 22 and the plates 21 to which they are attached, may be removed and the rolls may then be drawn out through the openings in the drum-head, the sockets at the opposite end sliding out of connection with the stub-shafts to which they are coupled as hereinbefore described.

I provide, between each of the butter-working rolls and the wall of the drum, a longitudinal butter-carrying shelf, or, preferably, two such shelves 26 and 27. These shelves are preferably arranged in substantially the relation shown in Fig. 4 of the drawings to the butter-working rolls, so that, as the drum rotates, the butter which accumulates in the bottom of the drum, is carried upward and directed between the rotating rolls, and it passes again into the bottom of the drum to be taken up again by the next succeeding pair of shelves, and so on as long as the drum is rotated. I prefer to support the inner shelf 27 on the side of the drum having the door openings, by a pivotal connection with the drum-head, so that said shelf may be turned up in the position shown by dotted lines in Fig. 4 when it is desired to remove butter from the bottom of the drum. I prefer also to provide, below each pair of shelves and at a point near the center of the drum, a bracket 28 upon which the center of the pivoted shelf rests when in working position as shown in Fig. 4 and which also forms a support for the other shelf 26. This shelf 26 is preferably made in two sections, each having one end supported in a groove or casting on the inside of the drum-head, and the other ends of the sections abutting together and resting upon the casting 28, to which they are secured by suitable bolts 29. This construction enables me to readily remove any section of the shelves for renewal or repairs. I also prefer to provide auxiliary shelves 30, supported in the drum by brackets 31 and arranged preferably about mid-way on the inner circumference between the other pairs of shelves. These auxiliary shelves carry up some of the butter which then slides off said shelves to a point where it is close to the butter-

working rolls. It then passes between the rolls in the usual manner.

While the machine is being used for churning, the butter working rolls have no rotation upon their axes, but whirl with the drum, and the rolls and shelves together serve as flights or beaters to assist in agitating the cream and thus causing the separation of the butter. During the working operation the rolls are connected with the churn driving mechanism, so that said rolls are rotated in opposite directions, and this rotation causes the surfaces of the rolls that are toward the ascending side of the drum body, to move toward each other, and, this rotation of the rolls is reversed at each half revolution of the drum, and thereby the faces of the rolls that are toward the upward moving side of the drum will always be caused to turn inward toward each other. This is the same motion that is given to the rolls in the machine shown and described in the patent issued to Dennis E. Virtue and myself above referred to. In my present machine I have however, provided improved means for imparting the desired rotation to the butter-working rolls and reversing the movement thereof at each half revolution of the drum.

I will now proceed to describe the drum driving mechanism and the means that I employ for rotating the rolls and reversing the motion thereof: One head of the drum is provided with the usual ring gear 32, which is engaged by a driving pinion 33 on the driving shaft 34. The shaft 34 is mounted in suitable bearings upon the frame of the machine and the driving pulley 35 is mounted so as to rotate freely upon said shaft. Two clutches 36 and 37 are provided, one upon either side of said driving pulley. Levers 38 and 39 are also provided for operating these clutches. The clutches may be of any suitable or preferred construction. I have here shown radially moving blocks 40 and 41 engaged by spring controlled pins 42, the inner ends of said pins bearing upon the conical surfaces of the clutch hubs. When the right hand clutch 36 is moved toward the driving pulley, said pulley is clutched directly to the shaft 34, and the drum is driven directly from said shaft. When the clutch 37 is operated the driving pulley is clutched to the sleeve 43 which is mounted so as to rotate upon the shaft 34. This sleeve carries a pinion 44 which meshes with a gear 45 mounted upon a short shaft 46. Upon the hub of the gear 45 is a pinion 47. Splined upon the shaft 34 is a gear 48 which may be moved into or out of mesh with the pinion 47. When it is desired to drive the drum at a fast speed for churning, the drive is from the pulley 35 direct to the shaft 34 and then to the drum gear 32 through the pinion 33. When it is desired

to drive the drum at a slow speed motion is communicated from the pulley 35 through the sleeve 43, pinion 44, gear 45, pinion 47 and gear 48 to the shaft 34, pinion 33 and drum gear 32.

Mounted centrally in the drum trunnion 9 is a shaft 51 which has splined upon it the clutch sleeve 52. This sleeve must rotate with the shaft but is capable of being moved longitudinally on the shaft by the hand lever 53. Mounted upon the shaft 51 are the bevel gears 50 and 54 each of which has upon its inner face a clutch surface adapted to be engaged by one of the faces of the clutch sleeve 52. A spur pinion 49 is secured to or formed integrally with the hub of the bevel gear 50, and the pinion 49 is in mesh with the gear 45 hereinbefore described. Secured to the arms of the spider 7 is a cam ring 55 and a shipper rod 56 is mounted in bearings in the frame of the machine and carries at its inner end a wheel or roll 57 that bears against the face of the cam ring 55. A spring 58 upon the shipper rod tends to hold the wheel in the end of the rod against the face of the cam ring. By this means the shipper rod is moved forward and back during each revolution of the drum. The shipper rod is suitably connected by means of a sleeve 58 and fork 59 with the clutch sleeve 52, whereby as the shipper rod reciprocates, the clutch sleeve 52 is also reciprocated on the shaft 51, and thereby first one of said bevel gears is connected or clutched to the shaft 51 and then the other. A bevel gear 60 mounted upon a suitable stud 61 meshes with the two bevel gears 50 and 54. At its inner end, the shaft 51 carries a pinion 62 which engages with the internal ring gear 63 mounted upon one of the stub shafts 14. A gear 64 is secured to or formed integrally with the ring gear 63 and this gear meshes with a similar gear 65 secured to the other stub shaft 14. The ring gear 63 and gear 64 are also secured to the stub shaft upon which they are mounted.

When it is desired to work the butter, motion is imparted through the gear 45 to the gear 49 and bevel gear 50. This in turn drives the bevel gear 54 through the bevel gear 60. If the clutch sleeve 52 is in engagement with the bevel gear 54, the shaft 51 is driven in one direction and if it is in engagement with the other gear, said shaft is driven in the opposite direction.

With the construction and arrangement of the gearing as described, when the driving pulley is clutched to the sleeve 43, the shaft 51 is driven first in one direction and then in the other, the reversal of motion being obtained from the drum body through the reciprocating shipper rod and sliding clutch sleeve 52, and thereby the butter working rolls are rotated in one direction during a half revolution of the drum and in the other

direction during the other half revolution, and this motion of the rolls effects the working of the butter in the manner already described.

I prefer to provide a lever 66, pivoted upon the frame of the machine and provided with a fork 67 adapted to engage the shipper rod 56, for the purpose of locking said rod and preventing a reciprocation thereof when the butter-working rolls are not being rotated.

I do not confine myself to the details of the constructions herein shown and described as it is obvious that the same may be varied in many particulars without departing from my invention.

I claim as my invention:

1. In a combined churn and butter-worker, the combination, with a rotary drum, of removable butter-working rolls, arranged within said drum and each provided with a socket in one end and a trunnion in the opposite end, stub shafts, arranged in one drum-head and adapted to engage the sockets in the ends of the rolls, the opposite drum-head being provided with roll apertures, closing plates, provided with bearings to receive the trunnions in the ends of the roll, a cross-head arranged outside of the drum-head, and means, on said cross-head, for clamping said plates to the drum head and closing the roll apertures, substantially as described.

2. In a combined churn and butter worker, the combination, with a rotary drum, of butter working rolls arranged within said drum, means for operating said drum and rolls, a shelf arranged parallel with said rolls, and means located near the inner edge of the shelf for pivotally supporting said shelf in said drum, substantially as described.

3. In a combined churn and butter-worker, the combination, with a rotary drum of butter-working rolls arranged in said drum, means for operating said drum and rolls and sectional shelves removably supported in said drum parallel with said rolls.

4. In a combined churn and butter-worker, the combination, with a rotary drum, of butter-working rolls arranged within said drum, means for operating said drum and rolls, a butter carrying shelf in said drum parallel with and in close proximity to said rolls, and means for securing said shelf in position and permitting its ready removal from the drum, substantially as described.

5. In a combined churn and butter-worker, the combination, with a rotary drum, of butter-working rolls arranged within said drum, means for continuously rotating said drum, means for rotating said rolls, first in one direction and then in the other, a double clutch arranged to control the direction of rotation of said rolls, a shipper-rod engag-

ing said clutch and a cam moving with the churn-drum and engaging said shipper-rod, substantially as described.

6. In a combined churn and butter-worker,
5 the combination, with a rotary drum, of
butter-working rolls arranged within said
drum, means for continuously rotating said
drum, means for operating said rolls, first
in one direction and then in the other, said
10 rolls operating means including a pair of

beveled gears, a reciprocating clutch, and means for moving said clutch at each half revolution of the drum, substantially as described.

In witness whereof, I have hereunto set 15
my hand this 1st day of Nov. 1909.

MARTIN DEEG.

Witnesses:

CARL K. BENNETT,
GEO. J. SCHAFER.