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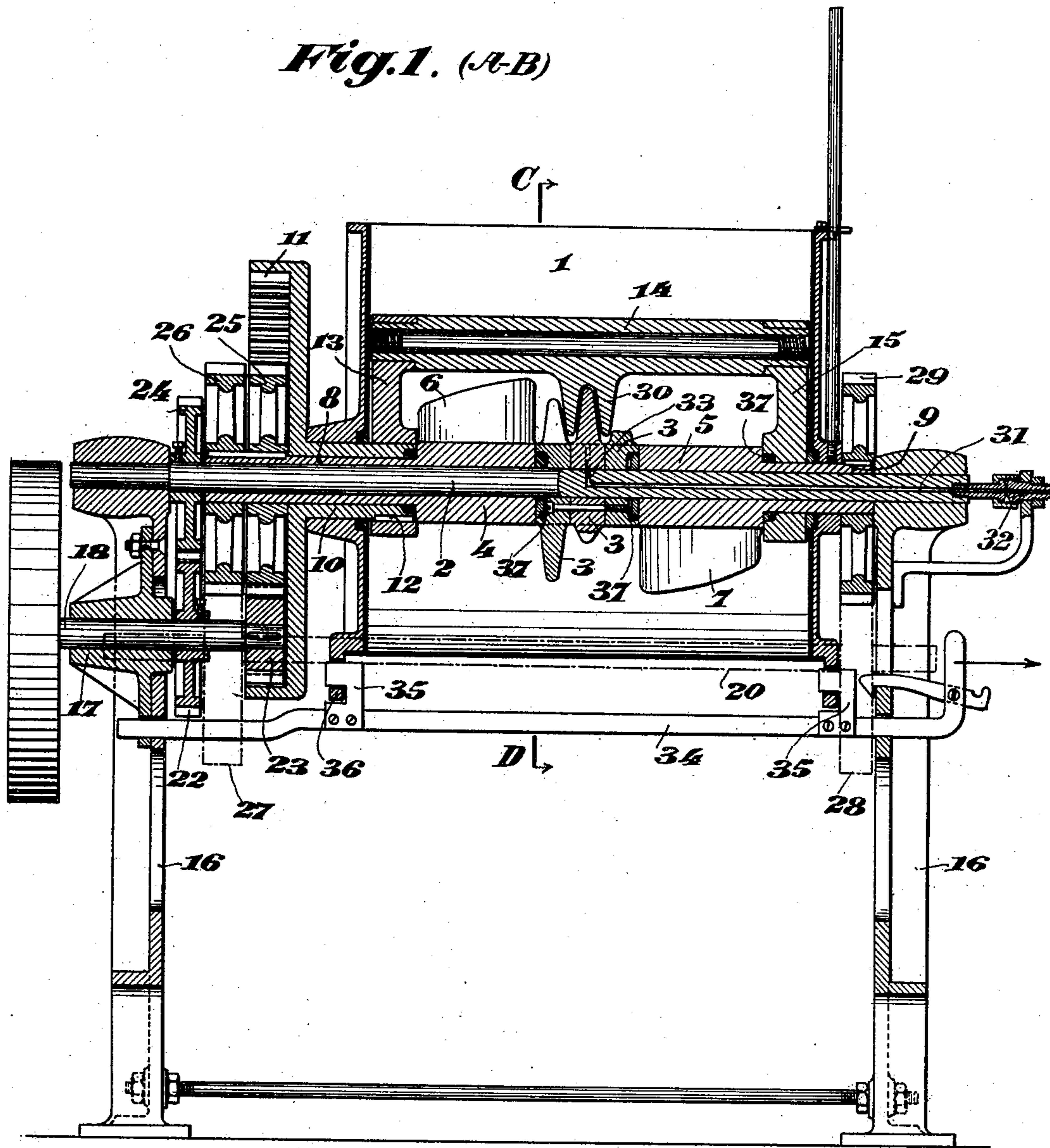
Patented Nov. 11, 1902.

A. FRIEDRICH.  
MIXING AND KNEADING MACHINE.

(Application filed June 30, 1902.)

(No Model.)

3 Sheets—Sheet 1.



Witnesses:

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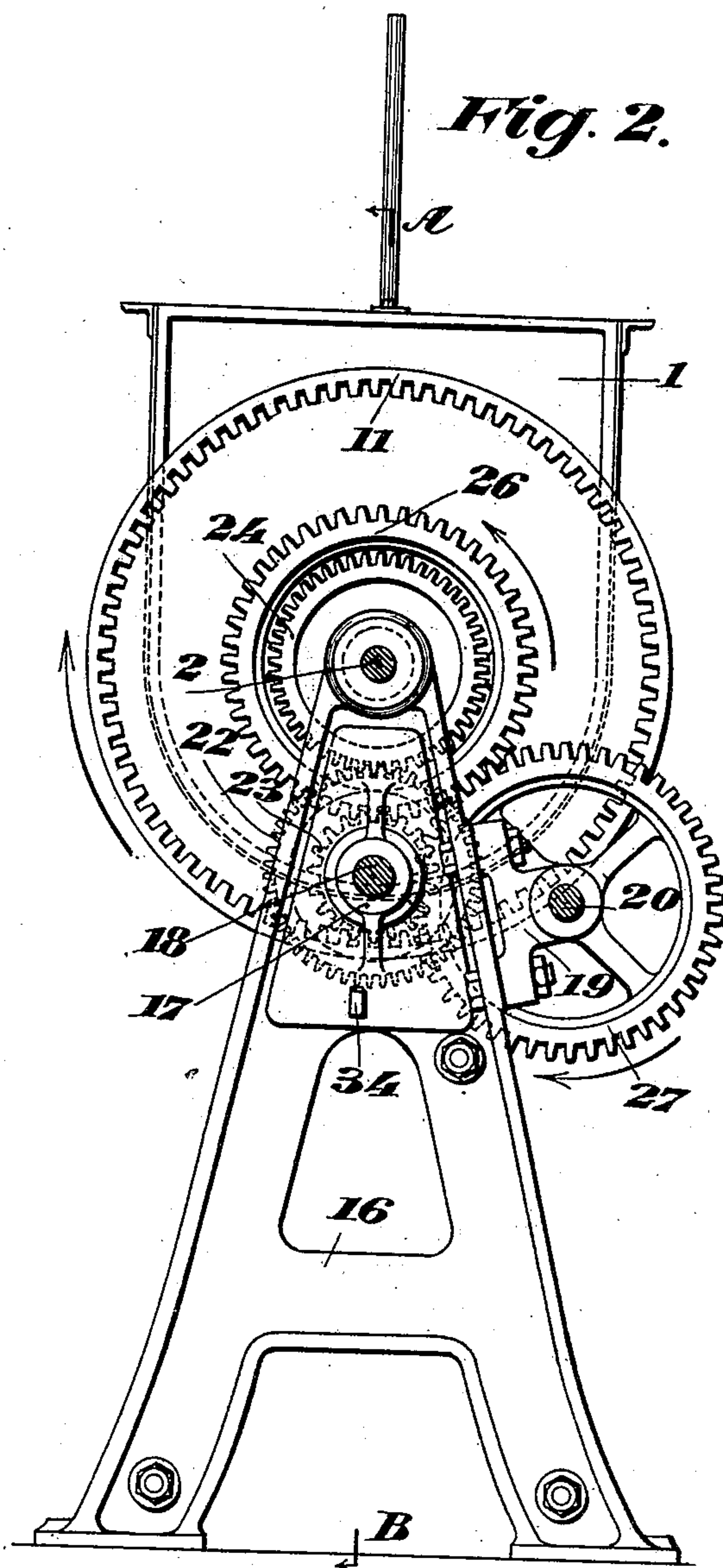
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3 Sheets—Sheet 2.



Witnesses.

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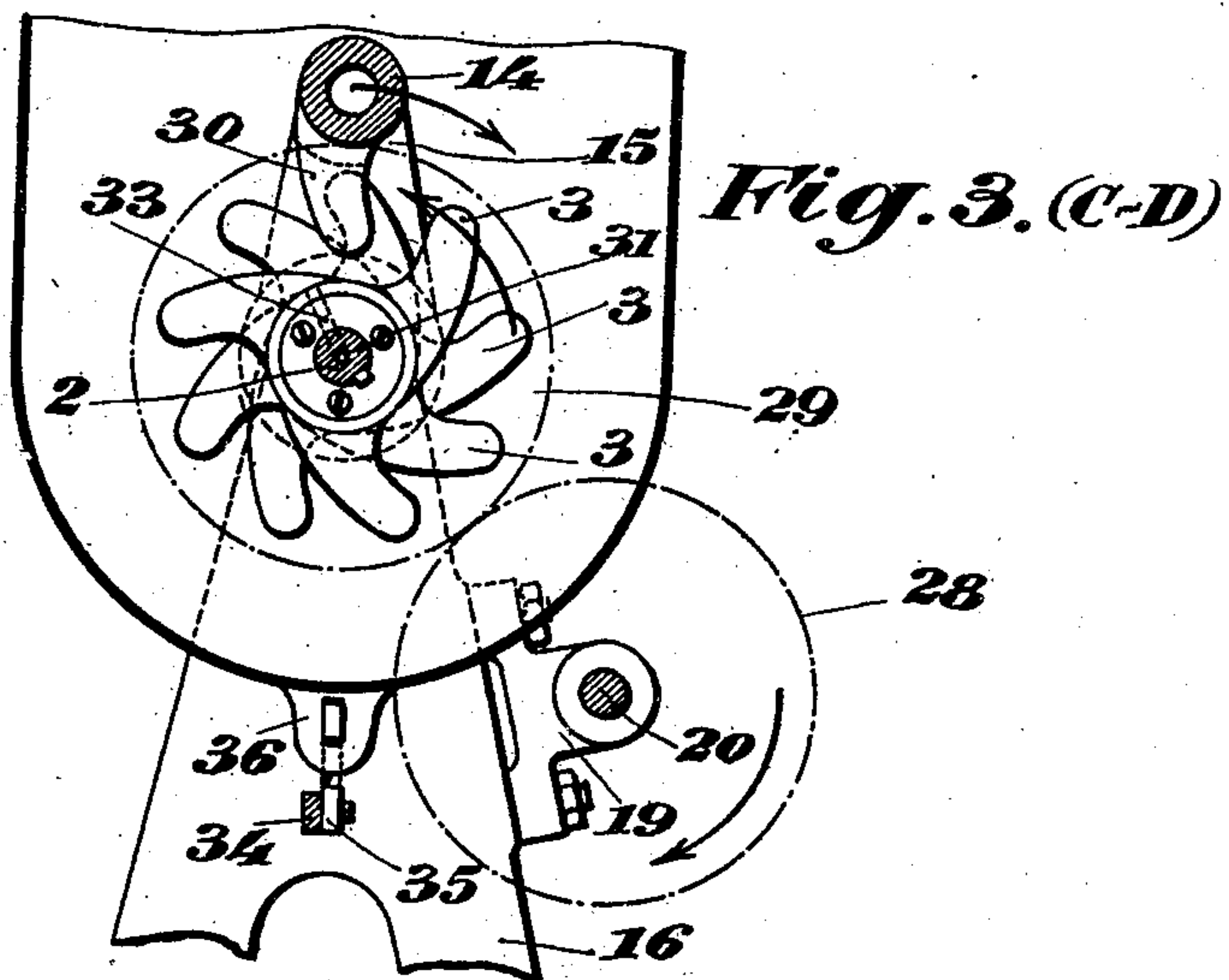
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(No Model.)

3 Sheets—Sheet 3.



Witnesses:

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# UNITED STATES PATENT OFFICE.

AUGUST FRIEDRICH, OF WINTERTHUR, SWITZERLAND.

## MIXING AND KNEADING MACHINE.

SPECIFICATION forming part of Letters Patent No. 713,088, dated November 11, 1902.

Appl cation filed June 30, 1902. Serial No. 113,767. (No model.)

*To all whom it may concern:*

Be it known that I, AUGUST FRIEDRICH, a citizen of the Republic of Switzerland, residing at Winterthur, Switzerland, have invented new and useful Improvements in Mixing and Kneading Machines, of which the following is a specification.

This invention has for its object a mixing and kneading machine, one form of construction of which is shown as an example in the accompanying drawings, in which—

Figure 1 is a longitudinal section on the line A B of Fig. 2; Fig. 2, an end view, and Fig. 3 a cross-section on the line C D of Fig. 1. Three groups of fingers 3 are arranged in proximity to one another on a shaft in the center of a kneading-trough 1, through which the said shaft 2 is carried, and also to left and right of these fingers bushings 4 and 5 are revolubly mounted on the shaft 2, on which bushings mixing-blades 6 and 7 are mounted. The bushings 4 and 5 have prolongations 8 and 9 at their outer ends, which carry the bushings beyond the walls of the kneading-trough 1. On the extension 8 is revolubly mounted the hub 10 of a cog-wheel having an internal ring of teeth 11, on which hub an arm 13 is fixed by means of a wedge 12 within the kneading-trough. This arm is connected with a second arm 15 by means of a cross-piece 14, said arm 15 being revolubly mounted on the extension 9 of the bushing 5 within the kneading-trough. The shaft 2 is mounted in a frame 16, on which the driving-shaft 18 is also mounted by means of a support 17, attached to the frame, and a transmission-shaft 20 is also mounted on the frame by means of a bracket 19. On the driving-shaft 18 cog-wheels 22 and 23 are fixed, of which the cog-wheel 22 gears with a cog-wheel 24, mounted on the shaft 2, and the cog-wheel 23 in turn with the cog-wheel 25, fixed on the prolongation 8 of the bushing 4 and also with the cog-wheel 11. By means of a cog-wheel 26, also mounted on the bushing 4, a cog-wheel 27, mounted on the transmission-shaft 20, is driven, said shaft 20 in turn driving a cog-wheel 29, mounted on the prolongation 9 of the bushing 5, by means of a cog-wheel 28. On the center of the cross-bar 14 two fingers 30 are arranged, projecting inward toward the shaft 2, which fingers engage be-

tween the three groups of fingers 3 on the shaft 2. The latter is provided with a central longitudinal bore 31, extending from the middle of the shaft to one end, at which latter it is connected with a water-pipe 32, while in the middle of the shaft said bore communicates with the interior of the kneading-trough by means of a bore 33, passing through one of the groups of fingers. The kneading-trough is thus loosely revolubly mounted, by means of its end walls, on the bushing 10 and the prolongation 9; but it is prevented from turning or rotating by means of a stop mechanism which is adjustably mounted in the frame 16, consisting of a rod 34 and bolt 35, the latter of which engages in a socket 36, formed on the kneading-trough. In order to prevent the water introduced into the kneading-trough through the bore 31 of the shaft 2 from soaking through the bearings of the same, washer-rings 37 are inserted on the shaft 2 between the bushings and the groups of fingers.

The mode of working of the machine hereinbefore described is as follows, assuming that it is to be employed for preparing meat for the manufacture of sausages: So much of the meat to be dealt with—for instance, chopped meat—is introduced into the kneading-trough that the fingers 3, mounted on the shaft 2, are quite covered thereby. If, then, the machine be set in operation, the blades 6 and 7, arms 13 and 15, with the cross-piece 14, and the fingers 30 and the groups of fingers 3 revolve around the central axis of the shaft 2 in the kneading-trough, being operated from the driving-shaft by the transmission-gear; but they rotate in different directions and at different speeds. The groups of fingers 3, which are directly connected with the shaft 2, are operated or, rather, turned by the latter through the cog-wheels 22 and 24 at the same speed as the driving-shaft 18. The mixing-blades 6 and 7 are rotated in the same direction as the groups of fingers 3, but at a lower speed. Their movement is imparted to them by means of cog-wheels 23 25 26 27 28 29, of which cog-wheels 25 to 29 are of uniform size, and the cog-wheel 23, mounted on the driving-shaft, is smaller than the others. The arms 13 and 15, with the cross-piece 14, are turned by means of the internal toothing 11



slowly in the opposite direction from the mixing-blades and groups of fingers, the cog-wheel 23, mounted on the driving-shaft, gearing with the internal toothing of the wheel 11.

5 In the kneading-trough thus three kinds of bodies are caused to rotate at different speeds and in different directions, whereby the following result is produced. The groups of fingers 3, rotating at the same speed as the  
10 driving-shaft, engage the pieces of meat or the like and carry them through between the slowly-rotating fingers 30. As the latter project between the groups of fingers the meat carried along thereby is squeezed and rubbed,  
15 and is thus treated in a similar manner to that of kneading and rubbing by hand. By the rapidly-rotating groups of fingers the water discharged from one of these is mixed with the meat. The two mixing-blades, which  
20 stand transversely to the central axis of the shaft 2 and at an obtuse angle to one another, in their rotation convey the meat to the groups of fingers and mix the same also in the kneading-trough. By the introduction of water  
25 into the mass of meat through the bore 31 of the shaft 2 between the groups of fingers (in contrast to what takes place on the present machines, in which water is sprinkled from  
30 above into the kneading-trough upon the mass of meat) the water is at once mixed evenly and thoroughly with the particles of meat on its discharge, which is of importance for the good appearance of the product.

In order to allow of the kneading-trough  
35 being more easily discharged, the stop mechanism—that is to say, the rod 34—is drawn in the direction indicated by the arrow, by which means the bolt 35 is drawn out of the sockets 36, and the kneading-trough may be  
40 turned so that its opening is at the bottom or at one side, as desired.

As the temperature of the meat to be treated is of importance for the tastiness of the product, the mixing-water is usually warmed  
45 in winter and cooled in summer. This can be effected in this improved kneading-machine by passing the water which enters the shaft through a suitable apparatus—for instance, a series of spiral tubes in a refrigerat-  
50 ing or heating vessel—so that the meat in the kneading-trough may be kept at the correct temperature by means of the water which is introduced therein.

Instead of a shaft 2 two such shafts with  
55 mixing-blades and mutually-engaging groups of fingers may be provided, in which case the

cross-piece 14 with its fingers may be omitted and the water be introduced into the trough in the center between the two shafts.

This improved machine might also be employed in bakeries for kneading dough and the like. 60

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, 65 I declare that what I claim is—

1. In a mixing-machine, the combination with a trough, of slowly-rotating fingers, sets of more rapidly rotating fingers coöperating therewith and conveyer-blades to convey the 70 contents of the trough to said coöperating fingers, substantially as described.

2. In a mixing-machine, the combination with a trough, of a pair of rotating fingers, three sets of intermeshing fingers and conveyer-blades on each side of the three sets of 75 fingers, and means to drive the blades, the pair and the sets of fingers at different speeds, substantially as described.

3. In a mixing-machine, the combination 80 with a trough, of two rotating fingers, a shaft, a central set of fingers thereon to take between the first-mentioned one and adjacent sets of fingers to coöperate with said first-mentioned ones, means to admit water be- 85 tween fingers of the central set, conveyer-blades and means to drive the two blades, the sets of blades and the conveyer-blades at different speeds, substantially as described.

4. In a mixing-machine, the combination 90 with a trough, of a shaft having a bore, three adjacent sets of mixing-fingers thereon, said bore adapted to deliver water between fingers of the central set of these fingers, a bushing on said shaft at each side of the adjacent sets 95 of fingers, conveyer-blades on the bushings, a cross-piece having a pair of fingers coöperating with the first-mentioned ones, said cross-piece revoluble on the said bushings, means to drive the sets of fingers and the conveyer-blades at different speeds in the same 100 direction, and means to drive the cross-piece and fingers thereon at still a different speed in an opposite direction, substantially as described. 105

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

AUGUST FRIEDRICH.

Witnesses:

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