A. LARSON.

FAN BLAST REGULATOR.

APPLICATION FILED MAY 1, 1920.

1,388,581. Patented Aug. 23, 1921.

2 SHEETS—SHEET 1.

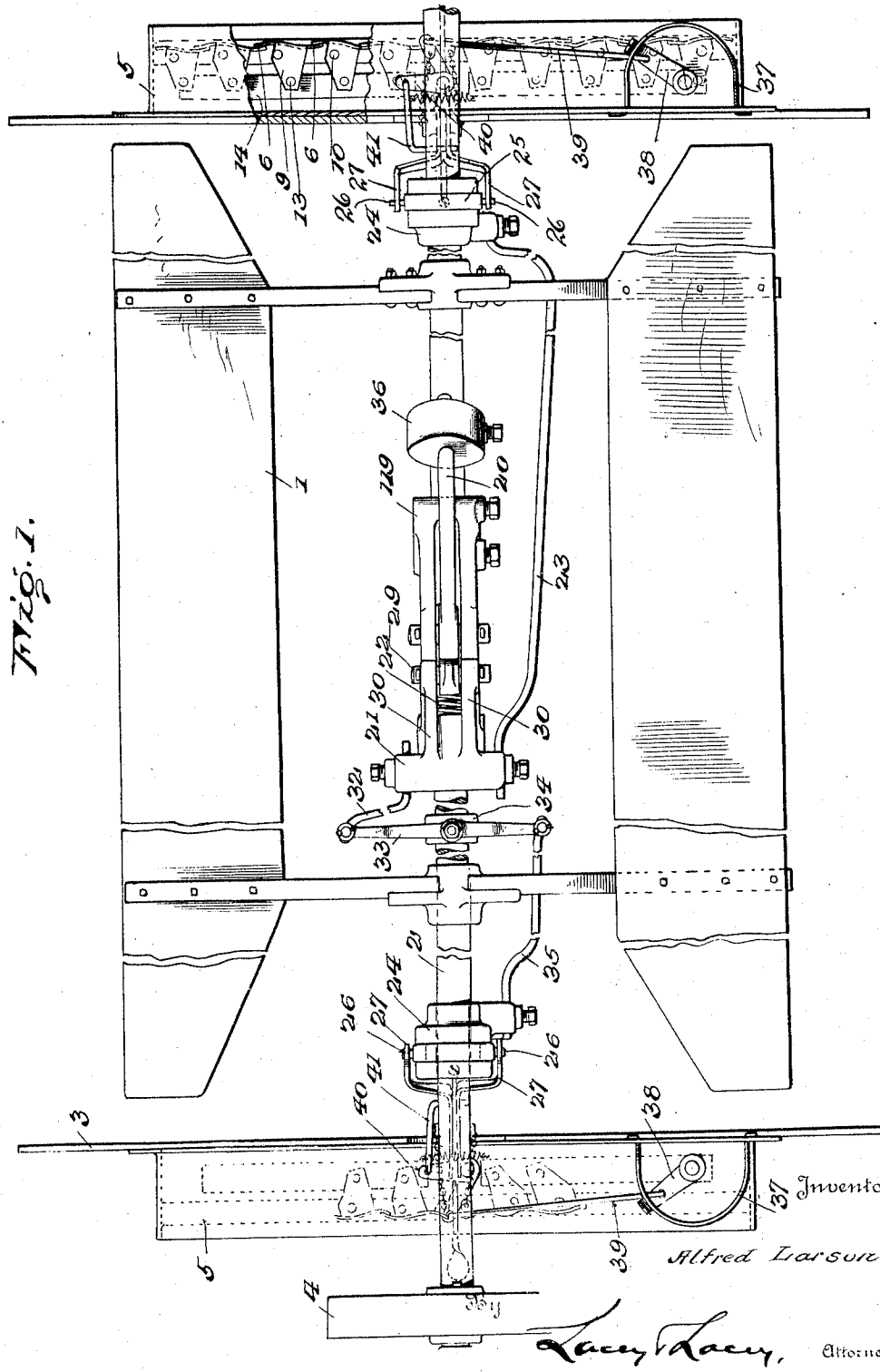


Fig. 1.

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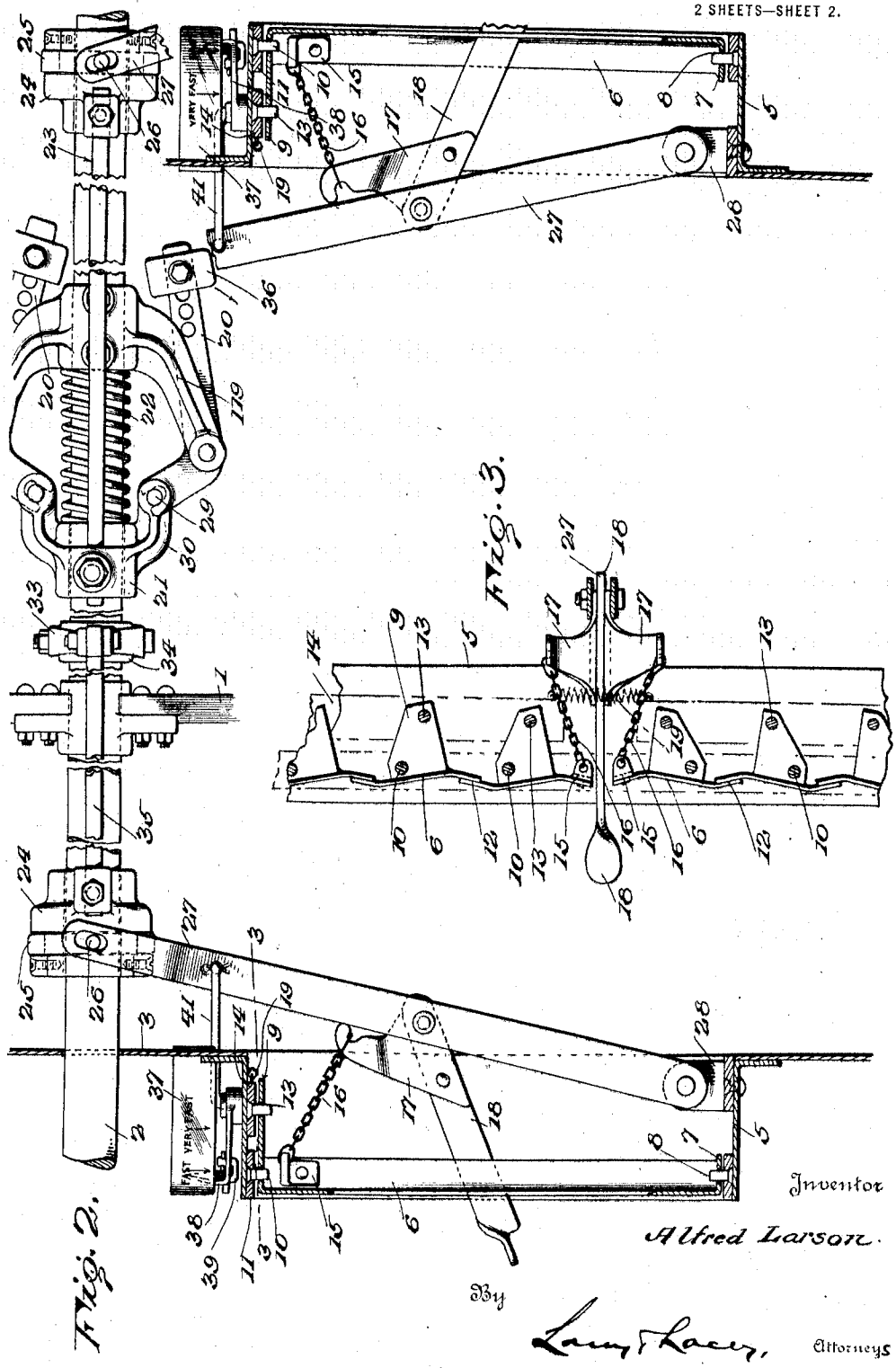


Fig. 2.

Fig. 3.

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UNITED STATES PATENT OFFICE.

ALFRED LARSON, OF SCOBEY, MONTANA, ASSIGNOR OF ONE-HALF TO GUSTAV OIE, OF SCOBEY, MONTANA.

FAN-BLAST REGULATOR.

1,388,581. Specification of Letters Patent. Patented Aug. 23, 1921.

Application filed May 1, 1920. Serial No. 378,163.

To all whom it may concern:

Be it known that I, ALFRED LARSON, a citizen of the United States, residing at Scobey, in the county of Sheridan and State of Montana, have invented certain new and useful Improvements in Fan-Blast Regulators, of which the following is a specification.

The object of this invention is to provide simple and efficient means whereby the volume of air drawn into the casing of a fan may be automatically regulated and kept uniform under the varied speed of the fan shaft. Another object of the invention is to provide simple means whereby the speed of the fan will be indicated, and a further object of the invention is to provide means whereby a governor rotatable with the fan will be conected with a shutter so that said shutter will close as the speed of the fan increases and open as the speed of the fan decreases so that the volume of air flowing into the fan casing will be uniform. The invention will be found especially advantageous in connection with threshing machines, fanning mills, or similar machines, but is, of course, capable of use in other apparatus.

In the accompanying drawings—

Figure 1 is a plan view of a rotary fan having my invention applied thereto;

Fig. 2 is an enlarged view partly in elevation and partly in transverse section, with parts broken away, showing the embodiment of the invention illustrated in Fig. 1;

Fig. 3 is an enlarged sectional plan view of a portion of the shutters, the plane of the section being indicated by the line 3—3 on Fig. 2.

The fan 1 may be of the usual construction and is carried by a fan shaft 2 journaled in the sides of the fan casing 3, said fan casing being constructed with openings in its sides to permit the entrance of air and the fan shaft being equipped at one end with a pulley 4 which may be rotated by power applied from any convenient or preferred prime motor. Over each inlet opening in in the fan casing, and of such form and dimensions as to surround said opening, is secured a frame 5 in which are pivotally mounted a plurality of shutters 6 and these shutters are, in the illustrated embodiment of the invention, composed of vertically disposed plates having offsets 7 at their lower ends to be engaged over pivot studs 8 in the lower side of the frame 5 and at their upper ends provided with cranks 9 which receive pivot studs 10 carried by the top of the frame 5 or by a reinforcing bar 11 secured to and extending longitudinally of the top of the said frame. The shutters 6 are arranged in series, as shown most clearly in Fig. 3, with their edges overlapping, as indicated at 12, and the plates or cranks 9 extend inwardly beyond the pivots 10 to be pivotally engaged by studs 13 extending from a connecting bar 14 which is disposed longitudinally of the frame 5 and parallel with the fixed or anchor bar 11 and serves to transmit the motion of one shutter to all the shutters of the series. As shown in Fig. 3, the shutters of each series adjacent the center of the frame are provided with lugs 15 on their inner sides in which are engaged the outer ends of chains 16, the inner ends of said chains being engaged by hooks or brackets 17 on a hand lever 18 which projects outwardly through the frame between the innermost shutters of the series of shutters. By raising the outer end of the hand lever 18, the chains 16 will be drawn inwardly so that the shutters will be swung to open position, as will be readily understood upon reference to Fig. 3. A spring 19 connects the inner ends of the bars 14 and normally draws them toward each other so as to hold the shutters normally closed.

When the fan is in operation, the shutters will be automatically adjusted according to the speed of the fan by mechanism which, in the present instance, is all inclosed within the fan casing. This mechanism comprises a governor mounted upon the fan shaft and including a head or bracket 119 fixed upon the fan shaft and having governor arms 20 pivotally mounted upon its opposite extremities. A sleeve 21 is slidably mounted upon the fan shaft and a spring 22 is coiled about the shaft between the said sleeve and the fixed bracket or body 119, as clearly shown. The sleeve 21 is connected by a link 23 with a second sleeve or collar 24 which is likewise slidably or loosely fitted upon the fan shaft. The collar 24 is constructed with an annular groove which receives a ring 25 having diametrically opposite studs or pins 26 and these studs or pins 26 are engaged in the upper end of a shutter-controlling lever 27 which is fulcrumed at its lower end upon a bracket or lug 28 in the lower portion of the frame

5. The governor arms 20 have pin and slot connections 29 with the arms 30 of the slidable sleeve 21 and the link 23 passes between the spokes of the fan 1, as will be readily understood. At one side of the fan casing, the link 23 extends directly between the collar 24 and the sleeve 21 but at the opposite side the sleeve 21 is connected by a link 32 with one arm of a lever 33 which is fulcrumed upon a collar 34 fixed upon the fan shaft, as shown. The lever 33 extends across the fan shaft and a link or connecting rod 35 serves to connect the collar 24 with that end of said lever opposite the end to which the link 32 is connected. It will thus be readily seen that when the weights 36 upon the governor arms 20 swing outwardly under centrifugal action as the speed of the fan shaft increases, the sleeve 21 will be drawn toward the body 19 against the tension of the spring 22 and a push will be exerted upon the collars 24 through the described connections so that the levers 27 at the opposite ends of the fan casing will be swung outwardly, slackening the chains 16 and permitting the springs 19 to pull the bars 14 endwise and turn the crank 9 so as to close the shutters and thereby cut-off or reduce the volume of air admitted into the fan casing. Of course, as the speed decreases, the levers 27 will swing inwardly and pull upon the chains 16 to open the shutters. The hand levers 18 permit the operator to set the shutters so as to admit any desired volume of air.

On the upper side of each frame 5 at one end of the same is an indicator plate 37 which has displayed thereon legends designating various speeds of the fan shaft, such as "Slow", "Normal", "Fast", or "Very fast" and pivotally mounted upon the frame concentric with this plate is an indicator arm or pointer 38 having its terminal disposed adjacent but external to the plate whereby it will play over the same according to the speed of the fan shaft. This indicator finger 38 is connected by a link 39 with an angle lever 40 which is fulcrumed upon the top of the frame 5 at about the center of the same and is connected by a link 41 with the shutter-controlling lever 27. It will be readily seen that the oscillations of the lever 27 will be transmitted directly to the indicator and its position relative to the plate 37 will be varied and the speed of the fan shaft thus made known at all times.

My device is exceedingly simple and may be readily applied to any rotatable fan. It is entirely automatic in its operation after having been once properly adjusted and it is not liable to get out of order.

Having thus described the invention, what is claimed as new is:

1. The combination with a fan, and a fan casing having an opening in its side, of a shutter mounted on the fan casing over the opening therein, and means operatively connected with the fan for actuating said shutter to open or close the same as the speed of the fan shaft decreases or increases.

2. The combination with a fan casing, and a rotary fan mounted therein, of a shutter mounted on the fan casing and controlling the flow into the same, and a governor rotatable with the fan and operatively connected with the shutter to adjust the same as the speed of the fan increases or diminishes.

3. The combination with a fan casing, and a rotary fan therein, of a shutter mounted on the fan casing and controlling the entrance of air into the same, a link extending from said shutter, a lever connected with said link, a governor rotatable with the fan and including a movable member, and a link connecting said movable member of the governor with the said lever.

4. The combination of a fan casing, and a rotary fan therein, of a series of shutters mounted upon the fan casing and controlling the entrance of air thereto, a connecting bar extending longitudinally of the series of shutters, crank plates extending from the several shutters and pivoted to said bar, a shutter-controlling lever mounted in the fan casing, connections between said lever and one of the shutters, a governor rotatable with the fan, and connections between the governor and said lever.

5. The combination with a fan casing, and a rotary fan mounted therein, of a plurality of shutters mounted upon the fan casing and controlling the flow of air into the same, a connecting bar having a pivotal connection with all the shutters whereby to effect simultaneous similar movement thereof, a controlling lever mounted adjacent the shutters, a hand lever pivoted to said lever and extending outwardly beyond the shutters, a chain connecting one of the shutters with said hand lever, a governor rotatable with the fan, and connections between the governor and the controlling lever.

6. The combination with a fan casing, and a fan rotatably mounted therein, of a lever mounted upon the fan casing, an indicator plate secured upon the fan casing, a pointer movable over said indicator plate, operative connections between said pointer and said lever, a governor rotatable with the fan, and operative connections between the governor and said lever.

In testimony whereof I affix my signature.

ALFRED LARSON. [L. S.]