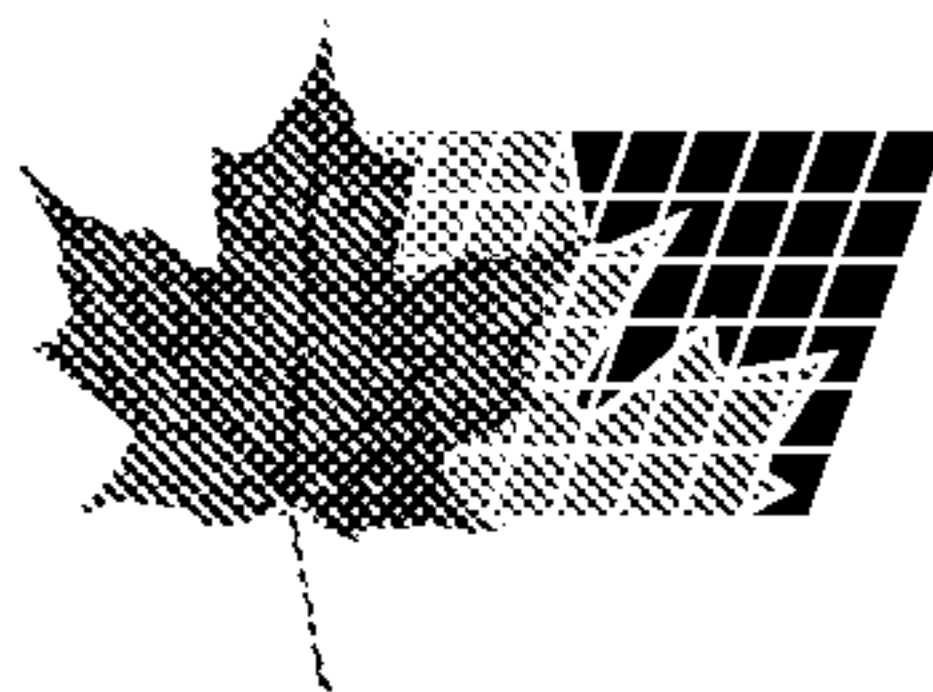




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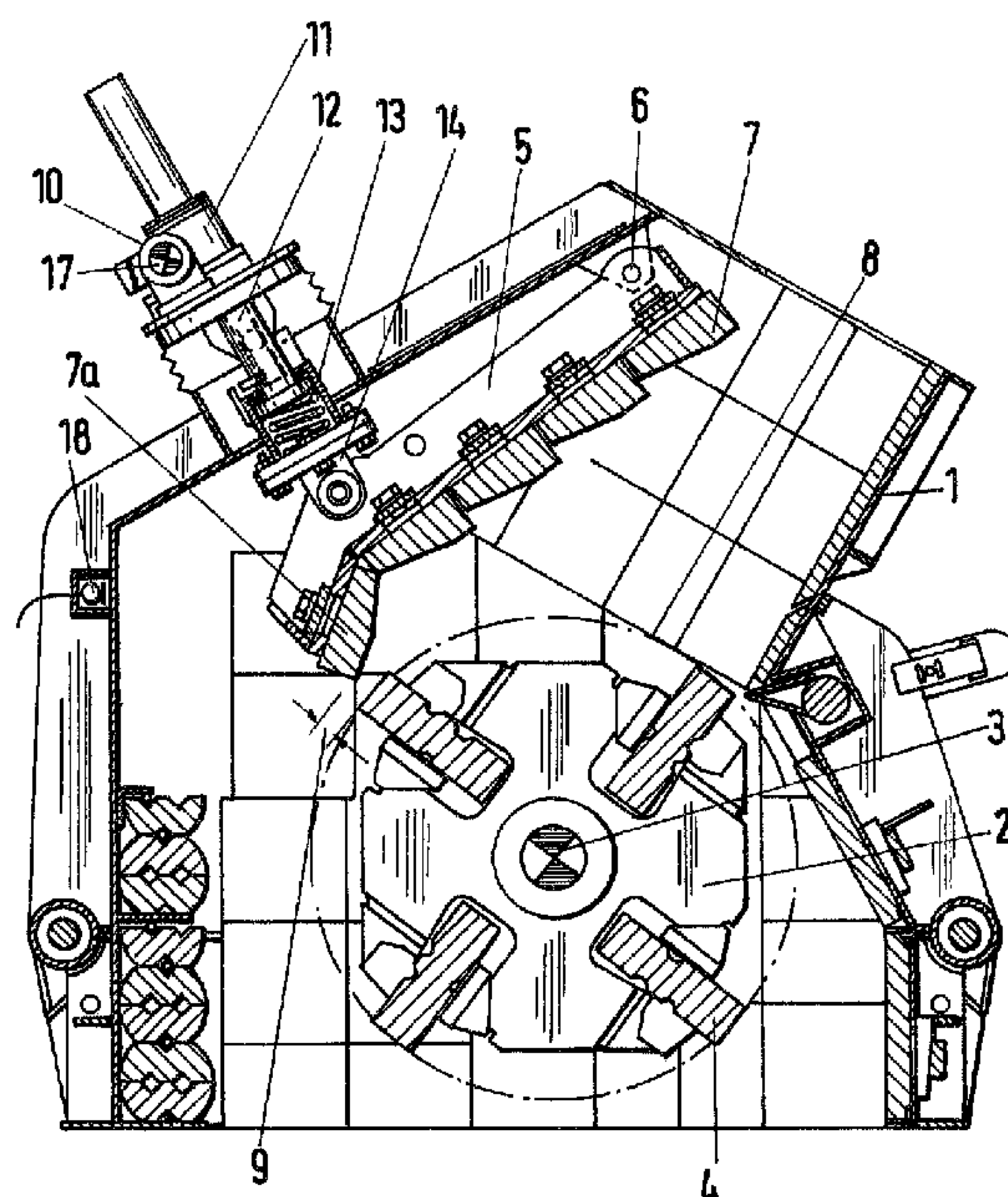
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(54) **METHODE DE REGLAGE AUTOMATIQUE DE  
L'ECARTEMENT DES CYLINDRES D'UN BROYEUR  
(DETERMINANT LA FINESSE DES ELEMENTS BROYES), ET  
APPAREIL CONNEXE**

(54) **METHOD FOR THE AUTOMATIC ADJUSTMENT IN A  
COMMINUTOR OF THE GRINDING GAP DETERMINING  
THE GRAIN STRUCTURE OF THE COMMINUTED  
MATERIAL AND AN APPARATUS THEREFOR**



(57) The present invention relates to a method for the automatic adjustment in a comminutor of the grinding gap determining the grain structure of the comminuted material, this comminutor comprising a first rotating comminuting tool and at least one additional comminuting tool allocated thereto. In particular, it relates to a method for operating an impact mill in which, to avoid substantial changes to the grain structure of the comminuted material, the impactor is moved towards the rotor by means of a drive mechanism when the impact mill is empty until first contact with the impeller bars occurs and after the resulting noises are noted by a microphone, the movement is reversed until the previously given grinding gap is reached. In accordance with the invention, a filter circuit arrangement is provided which allows a computer to identify the noises resulting from contact of the comminuting tools and to completely automatically carry out the steps required for the adjustment as provided in a predetermined program. The present invention also relates to an apparatus for carrying out the method.



ABSTRACT

The present invention relates to a method for the automatic adjustment in a comminutor of the grinding gap determining the grain structure of the comminuted material, this comminutor comprising a first rotating comminuting tool and at least one additional comminuting tool allocated thereto. In particular, it relates to a method for operating an impact mill in which, to avoid substantial changes to the grain structure of the comminuted material, the impactor is moved towards the rotor by means of a drive mechanism when the impact mill is empty until first contact with the impeller bars occurs and after the resulting noises are noted by a microphone, the movement is reversed until the previously given grinding gap is reached. In accordance with the invention, a filter circuit arrangement is provided which allows a computer to identify the noises resulting from contact of the comminuting tools and to completely automatically carry out the steps required for the adjustment as provided in a predetermined program. The present invention also relates to an apparatus for carrying out the method.

The present invention relates to a method for the automatic adjustment of the grinding gap which determines the grain structure of the comminuted material in a comminutor. The comminutor comprises a first rotating comminuting tool and at least one additional comminuting tool allocated thereto which is adjustable relative to the first comminuting tool. The said tools form a grinding gap, which avoids substantial changes to the grain structure of the comminuted material. The second comminuting tool is moved at intervals towards the rotating comminuting tool by means of a drive mechanism when the comminutor is empty until first contact with this comminuting tool occurs. Upon detection of the noise resulting through this contact by means of a microphone, the movement is reversed in order to space this comminuting tool a distance from the rotating comminuting tool to provide the desired operation.

The present invention relates in particular to a method of operating an impact mill or an impact breaker. These comminutors consist of a rotor provided with impact members, in particular impeller bars, and so-called impactors (counter tools) and if necessary also grinding paths which during operation form, with the impeller bars, a grinding gap which in addition to the rotor speed affects the degree of comminution. Due to wear and tear of the impeller bars and the impactors, this grinding gap gradually becomes larger during operation so that the product produced is coarser.

It is the object of the invention, however, to provide a comminutor which produces as constant a product as possible.

For this reason the impactors and the grinding paths are arranged to be adjustable with respect to the rotor. The impactors are pivotably arranged in the housing so that their distance from the rotor can be changed.

To simplify the description, reference is made herebelow and in the claims to only one impact mill and to only one such impact mill with only one impactor although impact mills and in particular impact breakers generally have a plurality of impactors and if necessary a grinding path connected in series.

10 Adjustment of the grinding gap most suitable for the respective comminuted material was previously carried out when the impact mill was stopped, at which time the distance between the impeller bars of the rotor and the impactor could be measured after opening the housing. However, since it is necessary to readjust the grinding gap at intervals as a result of the relatively high wear occurring in the impact mills, a loss of production occurs as a result of frequent stopping the impact mill. An attempt was therefore made to readjust the impactor during operation, by use of a non-contact limit sensor to prevent the  
20 impactor (which is adjustable as a function of the grain composition of the comminuted material) from coming into contact with the impeller bars of the rotor (German OS 20 18 496). However, this proposal presented considerable difficulties and it thus did not gain favour in practice.

Another proposal for adjusting the impactor during operation to the correct distance from the rotor (German OS 2 034 672) involved determining through a series of tests with

different comminuted material the wear to which the impellers bars and the impactor were respectively subjected during the operating period, and thereafter continuously or gradually placing the impactor closer to the rotor. This, however, necessitates extensive preliminary tests, the results of which are not sufficiently accurate due to fluctuations in the composition of the comminuted material.

10 Finally, an attempt was made to adjust the distance of the impactors from the rotor to that most suitable for the respective comminuted material by slowly advancing the impactor at intervals towards the rotor with the impact mill in each case empty of comminuted material and upon contact of the impeller bars of the rotor with the impactor made known by a microphone this impactor was moved back a measurable distance corresponding to the desired grinding gap. Such an impact mill is illustrated in the journal "Aufbereitungstechnik" 1975, No. 8, in Figure 7 of the article "Hartzerkleinerungsmaschinen für neue Verfahrenstechniken" (Comminutors for new Process Technologies) and was described in greater detail in operating instructions  
20 published December 12, 1974 for an impact mill delivered by the firm HAZEMAG Dr. E. Andreas GmbH & Co.

The required circuit arrangements (switching on the actuating drive for the impactor, reversing movement following signallying by a microphone during contact, switching off the actuating drive following a desired long return movement of the impactor) were carried out by hand.

Such a control system (similar to that according to

75514-2

4

U.S. Patent 3,035,782) requires a high degree of concentration by the operator with respect to hearing or visual impressions and the ability to react quickly, which the operator is not always capable of.

5           It is an object of the present invention to improve this known method to eliminate these human shortcomings and to provide automatic adjustment of the impactor. This provides for an impact mill that can be operated completely automatically by switching on its drive motor and starting the  
10 feed device for the comminuted material.

          The invention provides a method for automatic adjustment of a grinding gap determining grain structure of comminuted material in a comminator, said comminator comprising a first rotating comminuting tool and at least one second  
15 comminuting tool cooperating therewith, said second tool being adjustable with respect to the first comminuting tool and forming said grinding gap therebetween, wherein to avoid substantial changes to the grain structure of the comminuted material over time the second comminuting tool is periodically  
20 adjusted when the comminator is empty, movement of the second comminuting tool being controlled automatically by a computer which actuates a drive mechanism for moving said second tool, said adjustment method comprising: switching off supply of material feed to the comminator and passing a first signal to  
25 the computer after a delay to ensure that the comminator is empty; passing a second signal to the computer produced by a microphone from general running noises of the comminator when empty; said computer after receipt of said first and second signals causing said second comminuting tool to advance slowly  
30 towards said first rotating comminuting tool; generating a third signal that for the most part results only from hard noises occurring when the advancing second comminuting tool reaches a point of contact with the first rotating comminuting

75514-2

5

tool, and passing said third signal to the computer; upon receipt of said third signal the computer causing said second comminuting tool to reverse from said point of contact, the computer controlling reverse movement of the second comminuting  
5 tool and terminating such reverse movement after a predetermined distance.

The first signal ensures that the impact mill is in actual fact free of comminuted material and second signal  
10 confirms that the rotor of the impact mill is actually rotating. The modified third signal guarantees that the reversal of movement is actually controlled by the recurring noise produced by the impact of the impeller bars against the impactor and not by similar noises caused, e.g. by any stones  
15 or other random material still falling from the material feed into the impact mill.

The invention also provides an apparatus for automatic adjustment in a comminutor of a grinding gap  
20 determining grain structure, said comminutor comprising: a first rotating comminuting tool; at least a second comminuting tool which is provided with a drive unit to effect adjustment thereof and which can be adjusted with respect to the first rotating comminuting tool by means of the drive units; a  
25 microphone disposed on a housing of the comminutor, characterized by amplifiers following the microphone a divider transmitting an amplified signal coming from the microphone into two channels, one of which leads to a computer via a signal decoupler with a low trigger threshold and the other  
30 leading to the computer via a signal decoupler with a high trigger threshold, the computer being programmed in such a way that after receiving a delayed signal resulting from material feed being switched off, the computer actuates the drive unit to cause: the second comminuting tool to approach the first

75514-2

5a

rotating comminuting tool; reverse movement of said second tool as soon as a signal overcoming the high trigger threshold and of specific strength and duration reaches the computer; termination of the reverse movement according to an input  
5 program; and re-start of material feed.

This method, which is preferably to be used for impact mills, can however, also be used for other comminutors. For example, this can thus include a roller mill comprising two  
10 rotating rollers, one of which is adjustable with respect to the other roller by means of a drive mechanism. With the roller mill empty and with a predetermined grinding gap, only low level noise is audible, this noise differs sharply from the hard noise resulting

when the rotating rollers touch one another. Out-of-roundness of the rollers or processing or wear marks on the surface of the rollers, for example, can be responsible for this.

10 An advantageous embodiment of the method according to the present invention results if the movement of the second comminuting tool (impactor) towards the first comminuting tool is immediately stopped with the occurrence of a first partial signal resulting from a hard noise and is resumed if no additional partial signals follow, the movement being reversed if partial signals of a specific strength and length or a specific minimum number of partial signals in one unit of time indicate to the computer that the comminuting tools are touching one another.

The procedure according to the present invention for adjusting the impactor of an impact mill permits completely automatic operation of the impact mill if a computer program (software) is matched to the material to be comminuted. The program determines at what intervals the impactor is to be re-adjusted and causes the material feed to be stopped beforehand and started again afterwards.

20 If the comminuted material is relatively soft so that wear is very slight, then it may be sufficient that the impactor be adjusted in accordance with the invention at the start of work before the comminuted material is fed in and with no correction being necessary during the day.

It is advantageous if the computer determines by means of the program operating it, the distance of the impactor from the rotor according to the desired grain structure and

consequently carries out the adjustment of the impactor (of the grinding gap) automatically. By this means it is especially easy to change the grain structure of the comminuted material.

It is also possible to program the computer in such a way that after the input of new values for the distance of the comminuting tools from one another (the grinding gap) or other data relating to the comminuted material, re-adjustment may be carried out by use of the present invention.

10 To simplify the apparatus for carrying out the method, signals b) and c) are, according to a further embodiment of the present invention, derived from a common microphone with the signal coming from the microphone distributed to two channels following amplification.

20 It is advantageous if with each adjustment of the grinding gap, the computer stores the distance covered by the adjustable comminuting tool, the impactor, compares it with pre-programmed values and with help of the input program indicates the rate or the state of wear, the remaining working time or the necessity of changing the comminuting tools, the amount of comminuted material produced per set of comminuting tools and similar data to the operator or a superordinate computer. Completely automatic operation of the comminator is thus possible, this operation being interrupted only to change the worn comminuting tools by hand or possibly to carry out other repair work.

If the material to be comminuted by the impact mill consists of material in which there may also be uncomminutable

constituents, the device may include an elastic intermediate member in known fashion (German OS 35 25 101, EP 0 019 541) in the rods or the like transmitting the adjusting drive. This intermediate member allows the impactor to remain at a distance from the rotor at all times if such a constituent gets between the rotor and the impactor. However, in a fully automatic operation other dangers can arise with such a design. Pieces of the comminuted material may, for example, jam between the impactor and the side walls of the housing and through this stop the impactor. If, in such a case, the drive mechanism of the impactor is started so as to approach the rotor, then the elastic intermediate member is placed under tension by the drive mechanism. If, for example, the blockage is loosened as a result of vibrations occurring during comminution work, the impactor is brought into contact with the rotor by the action of the stressed intermediate member in such a way that it can impact against the impeller bars and can cause considerable damage to the impact mill.

To prevent this, the present invention provides for an additional intervention in the method characterized above in that the drive mechanism of the impactor is stopped during movement towards the rotor if the elastic intermediate member is compressed from the direction of the drive mechanism. In this situation, the impactor can be moved back and forth once or several times by means of the computer program or by manual control following a warning signal, until re-adjustment of the impactor to the rotor can occur after the blockage is loosened.

If the actuating drive of the impactor occurs by means of an electric motor, the elastic intermediate member is best formed by a spring and the means for triggering the warning signal is formed by a control element whose switching state changes if, as described above, the spring is compressed from the direction of the drive mechanism.

10 However, the elastic intermediate member can also be formed in known fashion (German OS 35 25 101) by a pneumatic spring, whereby the warning signal is then triggered by the increase in pressure occurring during compression of the air cushion from the direction of the drive mechanism. Use of a pressure gauge in a similar connection is known from German OS 35 25 101, Figure 2, part 21, though in contrast to its present use, it serves to maintain the pressure of the elastic intermediate member.

20 To carry out the method described at the beginning for operating a comminutor whose second comminuting tool can be adjusted to the desired distance from the first rotating comminuting tool by means of a drive unit with the aid of a microphone provided on the housing of the comminutor, a device is used according to the present invention which amplifies the signal coming from the microphone and then distributes it to two channels, the signal of the one channel being fed via a signal decoupler with a low trigger threshold and the signal of the other channel fed via a signal decoupler with a high trigger threshold to a computer programmed in such a way that - provided the signal overcoming the low trigger threshold reaches it -

after receiving a delayed signal resulting from the material feed of the comminator being switched off, it switches on the drive unit of the adjustable comminuting tool so that this comminuting tool approaches the first rotating comminuting tool, reverses this movement as soon as a signal overcoming the high trigger threshold and of a specific strength and duration reaches it, stops the return movement according to an input program and starts the material feed again.

10 To carry out the method described at the beginning for operating an impact mill whose impactor can be adjusted to the desired distance from the rotor by means of a drive unit with the aid of a microphone provided on the housing of the impact mill, a device is used according to the present invention which amplifies the signal coming from the microphone and then distributes it to two channels, the signal of the one channel being fed via a signal decoupler with a low trigger threshold and the signal of the other channel fed via a signal decoupler with a high trigger threshold to a computer programmed in such a way that - provided the signal overcoming the low trigger threshold reaches it - after receiving  
20 a delayed signal resulting from the material feed of the impact mill being switched off, it switches on the drive unit of the impactor so that this impactor approaches the rotor, reverses this movement as soon as a signal overcoming the high trigger threshold and in multiple sequence reaches it, stops the return movement according to an input program and starts the material feed again.

To process the signals after overcoming the trigger thresholds for improved pick-up in the computer, the signal

decouplers representing the trigger thresholds are followed by subsequently triggerable time-switches which convert the frequency signals into high signals and, starting at a minimum frequency, transmit a constant high signal to the computer.

To safeguard the impactor in case of blockage in the housing of the impact mill, a control element is provided on the part transmitting the drive of the impactor to this part and on the part connected thereto via an elastic intermediate member, the switching state of this control element changing during  
10 compression of the intermediate member from the side of the drive mechanism and generating a signal by means of which the drive of the impactor is stopped or changed via the computer, for example in such a way that the impactor is moved back and forth over a short distance several times until the blockage is loosened and the change in the switching state of the control element no longer exists.

The present invention is illustrated in the drawings which show in

20 Figure 1: an impact mill in vertical section with the apparatus required for automatic operation according to the invention,

Figure 2: a flow diagram of the devices provided for adjustment of the impactor, and

Figure 3: a suspension of an impactor with an elastic intermediate member, on an enlarged scale.

The impact mill illustrated in Figure 1 comprises a housing 1 in which a rotor 2 is rotatably disposed about a

horizontal axle 3. The rotor 2 is provided with four impeller bars 4. An impactor 5 is swivel-mounted about an axle 6 in the housing 1 above the rotor 2. The impactor 5 is equipped with wear plates 7 on the side facing the rotor. The bottommost wear plate 7a in conjunction with an imaginary cylindrical surface 8 described by the outer edges of the impeller bars 4 during rotation form a grinding gap 9 the width of which varies depending on the swivel position of the impactor 5. The impactor 5 is swivelled, as is also shown in Figure 3, by means of an electric motor 10, a worm gearing 11, a spindle 12, an elastic intermediate member 13 and an additional connecting link 14 which is hinged to the impactor 5. A control element 15 is provided on the spindle 12 and a switching lug 16 is provided on the intermediate member 13. The switching state of the control element 15 is changed with the aid of the switching lug if the elastic intermediate member 13 is compressed from the direction of the drive mechanism. This can happen if the impactor 5 cannot move forward in the direction of the rotor, for example because of blockage in the housing 1 of the impact mill. However, such a change in the switching state has no effect if the elastic intermediate member is compressed from the direction of the rotor, for example because a constituent that cannot be comminuted is between the rotor 2 and the impactor 5 and forced the latter away from the rotor.

A pulse counter comprising a toothed disk 17 and an approximation switch 28 is also provided in the drive mechanism 10, 11, 12 of the impactor 5. This pulse counter measures the

movement of the impactor 5 and evaluates it for the adjustment process.

A microphone 18, which converts the noise of the impact mill into electric signals, is provided on the housing 1.

As Figure 2 shows, the signals from the microphone 18 pass through a preamplifier 19 and an amplifier 20. The signals are then conducted through two channels 21, 22 which lead to two signal decouplers 23, 24 with differently set trigger thresholds. The signal decoupler 23 has a relatively low threshold which  
10 passes the noise resulting when the impact mill is empty. The corresponding signal is processed in a subsequently triggerable time-switch 25 into a longer lasting high signal which reaches the computer 27. The signal decoupler 24 has a high threshold and therefore only passes hard signals such as those resulting, for example, from the impact of the impeller bars 4 against the impactor 5. These signals are then coupled to the computer 27 as high signals via a subsequently triggerable time-switch 26. The subsequently triggerable time-switch 26 is set in such a way that starting from a specific number of pulses or impacts, for  
20 example 7/second, a constant high signal occurs at the output which is fed to the computer.

The computer is also influenced by the inductive proximity switch 28 which is controlled by the position of the impactor. This signal forms the basis for calculating the adjustment of the impactor relative to the rotor 2 via a geared motor 10. This adjustment is controlled by the computer by means of a program (software), not illustrated, which is adapted to

provide for the comminuter requirements. The computer also switches off and on the feed device for the material to be comminuted according to the program, so that acknowledgement of the disconnection is delayed by a switch cabinet 29 provided with contactors. Additional interventions in the operating method of the computer 27 can be carried out by hand through the members provided in the switch cabinet 29, provided such functions are not already carried out by means of the computer program. The control element 15, which is designed as a proximity switch, is also connected to the computer 27. This control element ensuring that the impactor 5 can also be adjusted.

The device according to the present invention operates as follows.

If the impactor 5 of the impact mill is to be moved closer to the rotor 2 because the grinding gap has become too large due to wear of the impeller bars 4 and the wearing plates 7 of the impactor (that is, it is to be moved to a distance that corresponds to a narrower grinding gap), then with the rotor running the material feed is stopped either by hand or automatically thus allowing the impact mill to empty. This is a prerequisite in order for the components dependent on the signals of the microphone 18 to work correctly. The microphone then only picks up the no-load noises of the impact mill. This signal is passed to the amplifiers 19, 20 and the channel 21 and hence to the low trigger threshold of the signal decoupler 23. The signal thereafter reaches the subsequently triggerable time-switch 25 from which it is picked up by the computer 27 as a high signal. If, in addition, a delay signal reaches the computer

from the switch cabinet 29, demonstrating that the material feed is in fact switched off - it would be possible that even with the material feed running no material is temporarily fed into the impact mill because, for whatever reason, no material is reaching the feed - this guarantees that adjustment of the impactor can be carried out without interference from the material.

10 The signals applied to the signal decoupler 24 from the microphone 18 via the amplifiers 19, 20 and the channel 22 (this involves the same signals reaching the signal decoupler 23) are first of all absorbed by this decoupler because of its high threshold. It is, however, possible that scattered signals resulting, for example, from material subsequently falling into the impact mill, overcome the threshold and reach the subsequently triggerable time-switch 26. These are individual signals or those in erratic sequence from which the subsequently triggerable time-switch cannot generate a constant high signal.

20 The following adjustment process of the impactor 5 consists of two phases. In the first phase the impactor is slowly brought closer to the rotor 2 by the electric motor 10. If it comes so close to the rotor that the impeller bars 4 hit against the foremost wearing plate 7a of the impactor, then hard impact noises result at regular intervals (four strikes per rotation of the rotor). These noises are picked up by the microphone 18 and are transmitted as strong signals capable of exceeding the threshold of the signal decoupler 24 and hence reach the computer 27 as corresponding high signals. The

subsequently triggerable time-switch 26 thereby ensures that the computer only reacts to these signals if a specific minimum number of these impact noise signals occur per unit of time and thus clearly establishes that they result from the impact of the impeller bars against the impactor and are not noises from other sources. To this end, the subsequently triggerable time-switch transmits a constant high signal to the computer. The computer then stops the movement of the impactor and reverses such movement. The return movement occurs until the gap width 9 between the rotor 2 and the impactor 5, which is determined by the computer program, is reached.

The computer can determine the number of rotations of a gear member required to move the impactor towards the rotor 2, 4, for example by means of a pulse counter 17, 28 mounted in the actuating drive 10 of the impactor 5, and then - starting from this number as the zero position of the impactor - can turn back the gear mechanism by the number of rotations that corresponds to the desired new distance of the impactor from the rotor, that is corresponds to the desired gap width 9. By means of the empirical values determined during practical operation and that can be incorporated into the respective program (software), re-adjustment of the impactor can occur automatically in that the adjustment process is from time to time carried out automatically at specific intervals and to the necessary extent.

75514-2

17

CLAIMS:

1. A method for automatic adjustment of a grinding gap determining grain structure of comminuted material in a  
5 comminator, said comminator comprising a first rotating comminuting tool and at least one second comminuting tool cooperating therewith, said second tool being adjustable with respect to the first comminuting tool and forming said grinding gap therebetween, wherein to avoid substantial changes to the  
10 grain structure of the comminuted material over time the second comminuting tool is periodically adjusted when the comminator is empty, movement of the second comminuting tool being controlled automatically by a computer which actuates a drive mechanism for moving said second tool, said adjustment method  
15 comprising:

switching off supply of material feed to the comminator and passing a first signal to the computer after a delay to ensure that the comminator is empty;

20 passing a second signal to the computer produced by a microphone from general running noises of the comminator when empty;

said computer after receipt of said first and second signals causing said second comminuting tool to advance slowly towards said first rotating comminuting tool;

25 generating a third signal that for the most part results only from hard noises occurring when the advancing second comminuting tool reaches a point of contact with the first rotating comminuting tool, and passing said third signal to the computer; upon receipt of said third signal the computer  
30 causing said second comminuting tool to reverse from said point of contact, the computer controlling reverse movement of the second comminuting tool and terminating such reverse movement after a predetermined distance.

75514-2

18

2. Use of the method according to claim 1 for operating an impact mill comprising a rotor equipped with impeller bars and at least one impactor cooperating therewith which is adjustable with respect to the rotor and with it forms said grinding gap, wherein to avoid substantial changes to grain structure of the comminuted material the impactor is periodically adjusted when the impact mill is empty, wherein:

movement of said impactor is controlled automatically by a computer which actuates a drive mechanism for moving said impactor, a first signal being passed to the computer when supply of material feed to the impact mill is switched off;

a second signal produced by general running noises of the impact mill when empty being passed to the computer;

upon receipt of said first and second signal, the computer, after a delay to ensure that the impact mill is empty, causing the impactor to slowly advance;

passing a third signal to the computer that for the most part results only from hard noises occurring when the advancing impactor reaches a point of contact with said impeller bars; upon receipt of said third signal the computer causing said impactor to reverse from said point of contact, the computer controlling reverse movement of the impactor and terminating such reverse movement after a predetermined distance.

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3. A method according to claim 1, characterized in that movement of the second comminuting tool towards the first comminuting tool is immediately stopped upon occurrence of a partial signal resulting from a hard noise and is resumed if no additional partial signals follow, the movement being reversed if a partial signal of a specific strength and length or a specific minimum number of partial signals in one unit of time indicate to the computer that the comminuting tools are touching one another.

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75514-2

19

4. A method according to claim 2, characterized in that the computer determines, by means of an interchangeable program matched to the material to be comminuted, the intervals at  
5 which the impactor is to be re-adjusted and causes the material feed to be stopped beforehand and started again afterwards.

5. A method according to claim 2 or claim 4, characterized in that the computer determines, by means of an  
10 interchangeable or influenceable program, said predetermined distance of the impactor from the rotor according to a desired grain structure and consequently carries out adjustment of the grinding gap automatically.

15 6. A method according to claim 1 or 2, characterized in that said a single microphone detects said second signal and said third and passes said signals, to two channels following amplification.

20 7. A method according to claim 2 for impact mills in which the second tool is an impactor driven in known fashion by an elastic intermediate member which allows the impactor to at all times be deflected if uncomminutable constituents get into the impact mill, characterized in that the drive mechanism is  
25 stopped during forward motion if the elastic intermediate member is compressed from the side of the drive mechanism as a result of blockage in the impactor.

8. An apparatus for automatic adjustment in a comminutor  
30 of a grinding gap determining grain structure, said comminutor comprising:

a first rotating comminuting tool;  
at least a second comminuting tool which is provided with a drive unit to effect adjustment thereof and which can be

75514-2

20

adjusted with respect to the first rotating comminuting tool by means of the drive units;

a microphone disposed on a housing of the comminator, characterized by amplifiers following the microphone a divider  
5 transmitting an amplified signal coming from the microphone into two channels, one of which leads to a computer via a signal decoupler with a low trigger threshold and the other leading to the computer via a signal decoupler with a high trigger threshold, the computer being programmed in such a way  
10 that after receiving a delayed signal resulting from material feed being switched off, the computer actuates the drive unit to cause:

the second comminuting tool to approach the first rotating comminuting tool;

15 reverse movement of said second tool as soon as a signal overcoming the high trigger threshold and of specific strength and duration reaches the computer; termination of the reverse movement according to an input program; and  
20 re-start of material feed.

9. An apparatus for automatic adjustment of an impactor in an impact mill comprising a drive unit for adjustment of the impactor relative to an impact path of a rotor, and a  
25 microphone arranged on a housing of the impact mill, characterized by amplifiers following the microphone, division of a channel transmitting an amplified signal coming from the microphone into two channels, one of which leads to a computer via a signal decoupler with a low trigger threshold and the  
30 other leading to the computer via a signal decoupler with a high trigger threshold, the computer being programmed in such a way that after receiving a delayed signal resulting from material feed being switched off, the computer:

75514-2

21

actuates the drive unit so that the  
impactor approaches an impact path of a rotor;

reverses movement of the impactor as soon  
as a signal overcoming the high trigger threshold and  
in multiple sequence reaches the computer;

stops the reverse movement according to an  
input program; and

re-starts the material feed.

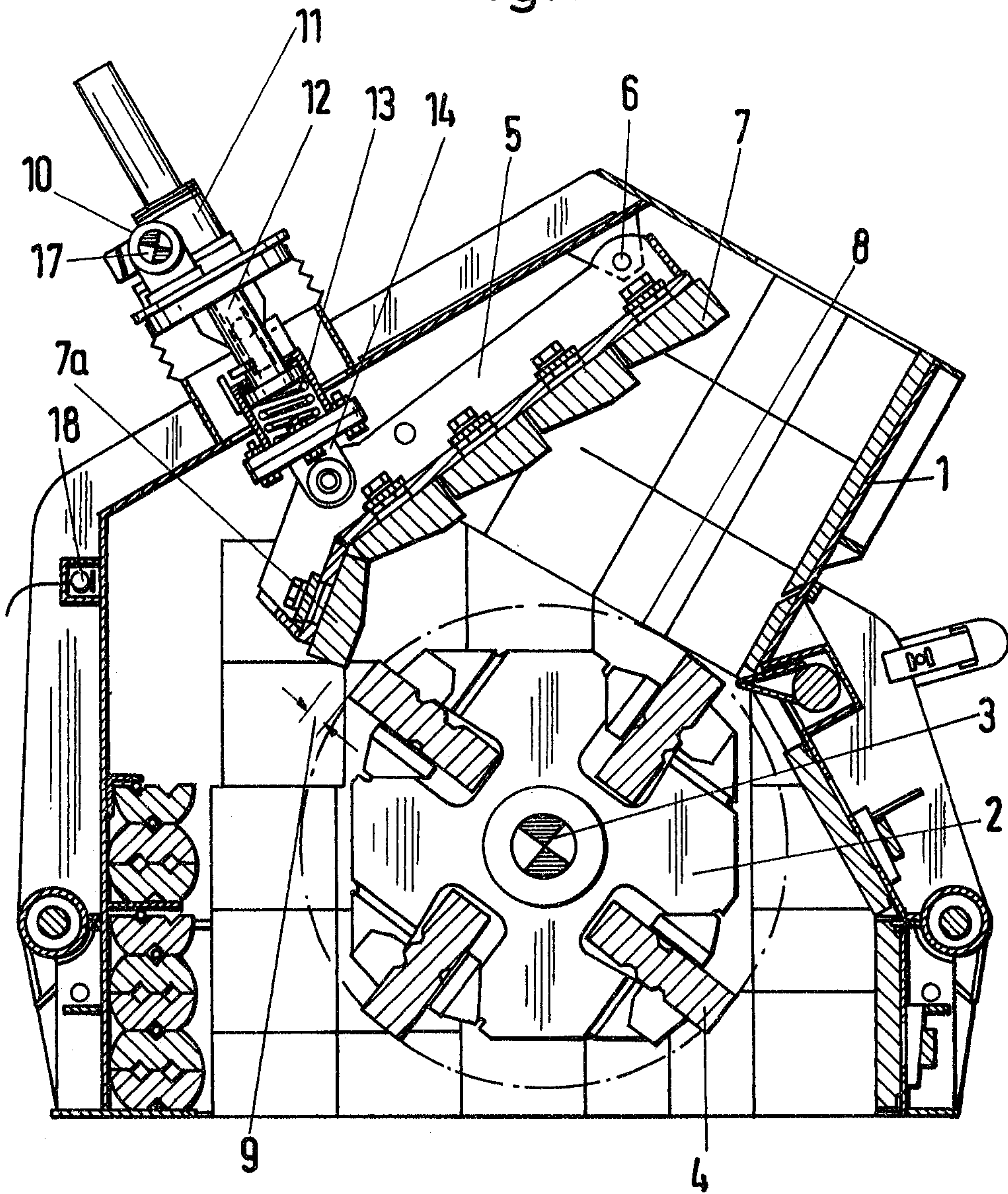
10 10. An apparatus according to claim 8 or 9, characterized  
in that subsequently triggerable time-switches follow the  
signal decouplers.

11. An apparatus for carrying out the method according to  
15 claim 7, characterized in that a control element is provided on  
parts of the elastic intermediate member that are movable  
relative to one another, a switching state of this control  
element changing during compression of the intermediate member  
from the side of the drive mechanism and thus generating a  
20 signal by means of which movement of the impactor is stopped or  
changed in another manner by the computer, by moving the  
impactor back and forth over a short distance several times  
until the change in switching state of the control element no  
longer exists.

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PATENT AGENTS

Fig.1



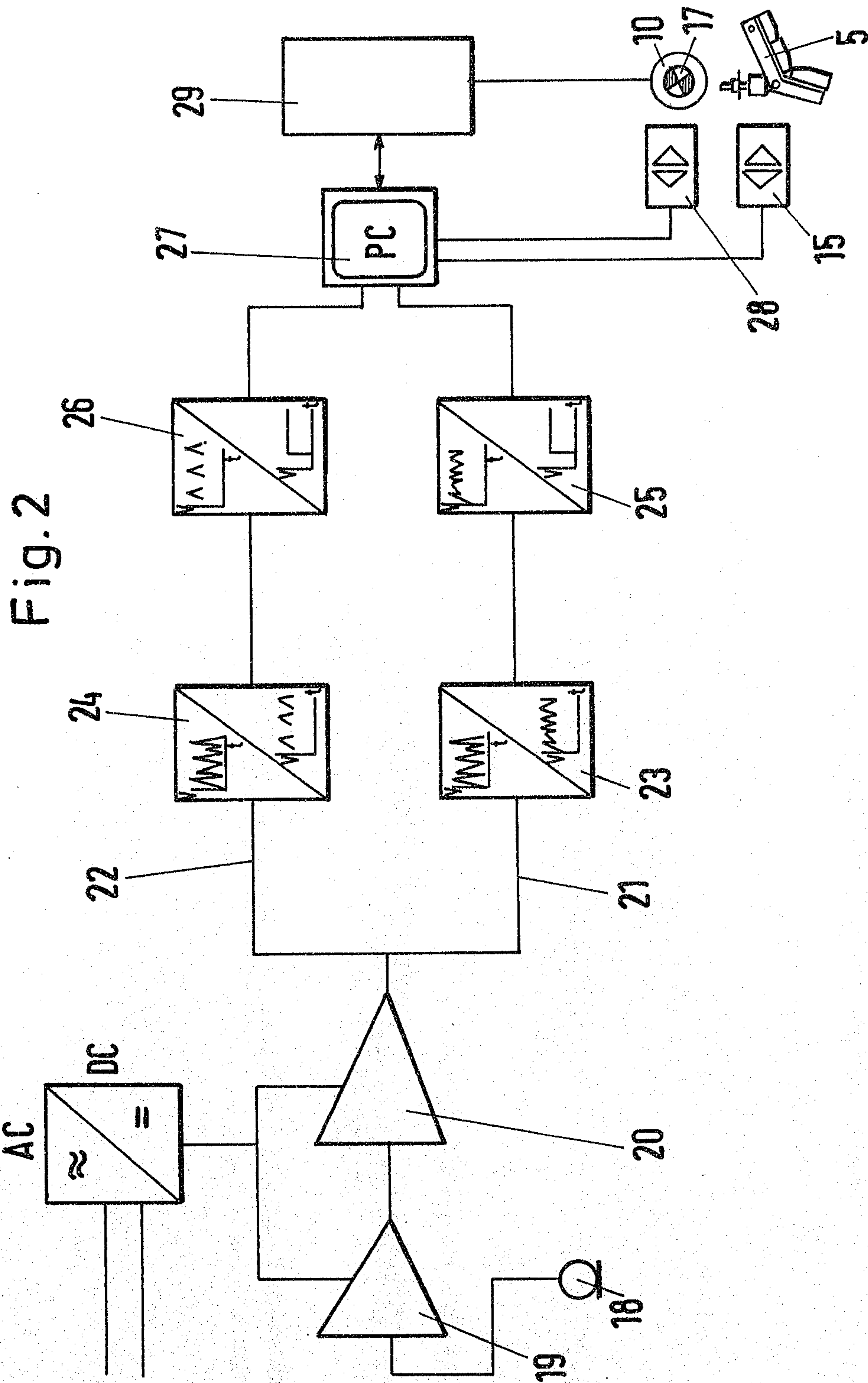


Fig. 3

