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(54) Abstract Title
Meat shredding machine

(57) A meat shredding machine comprises a rotatable drum 1 within which is disposed a rotatable centre spinner 19 for shredding or pulping meat and a rotatable outer spinner 16 for picking meat up and returning it to the centre spinner for shredding and pulping, the centre spinner, outer spinner and drum each being provided with independent motor and gear reduction means 14 and 15, 22 and 23, 26 and 27.

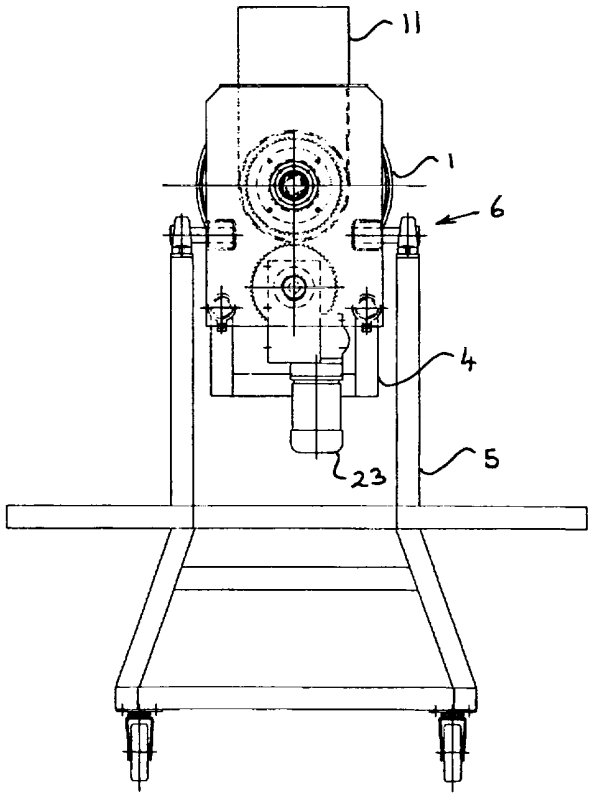

FIGURE 3

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The claims were filed later than the filing date but within the period prescribed by Rule 25(1) of the Patents Rules 1995.

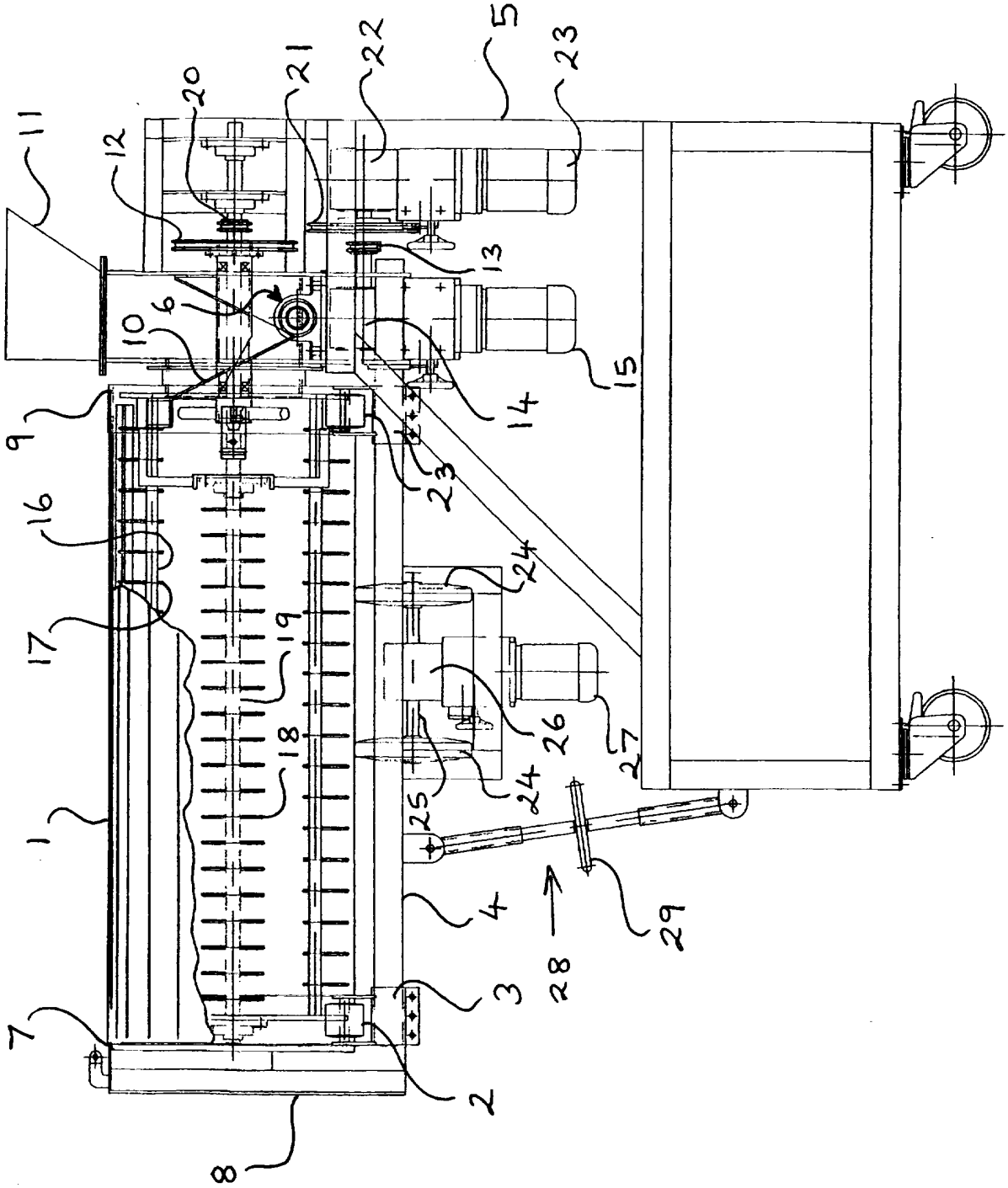
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FIGURE 1

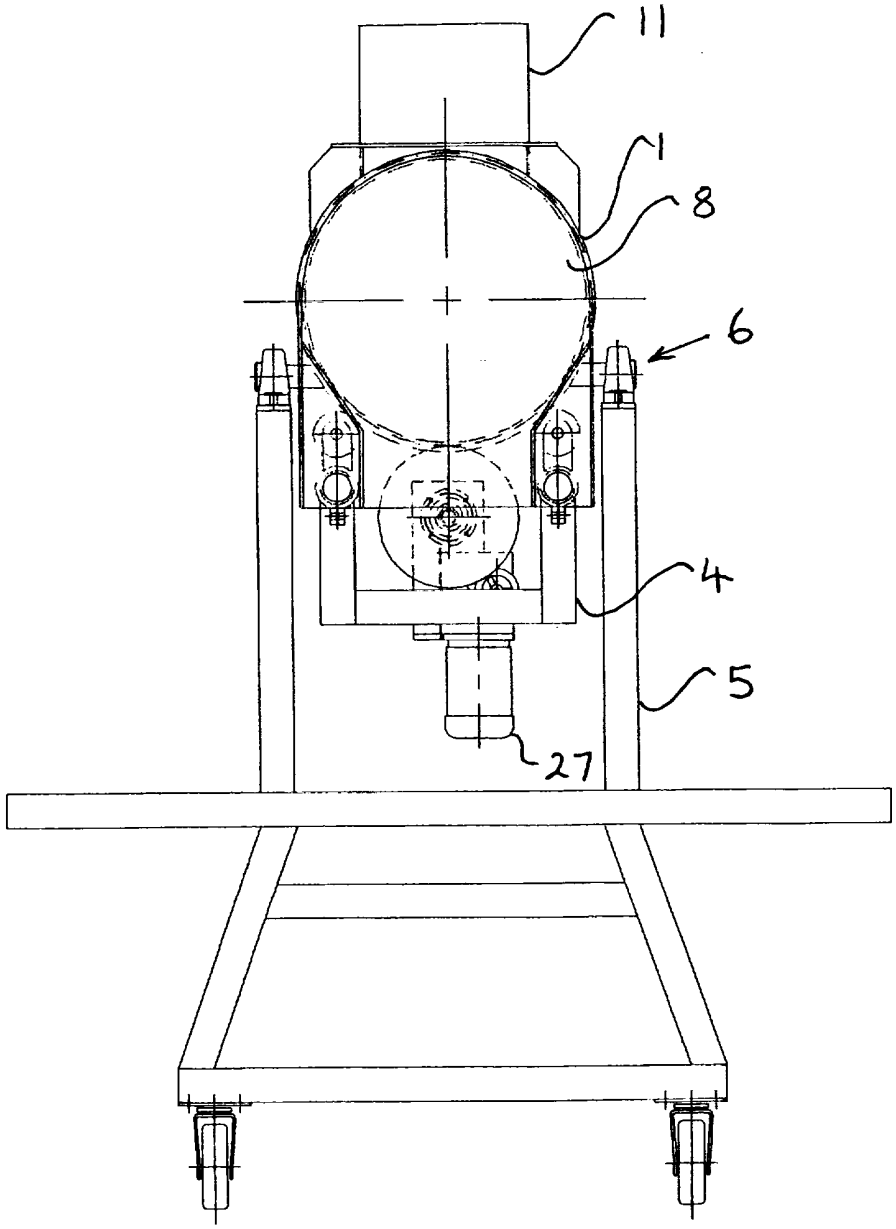


FIGURE 2

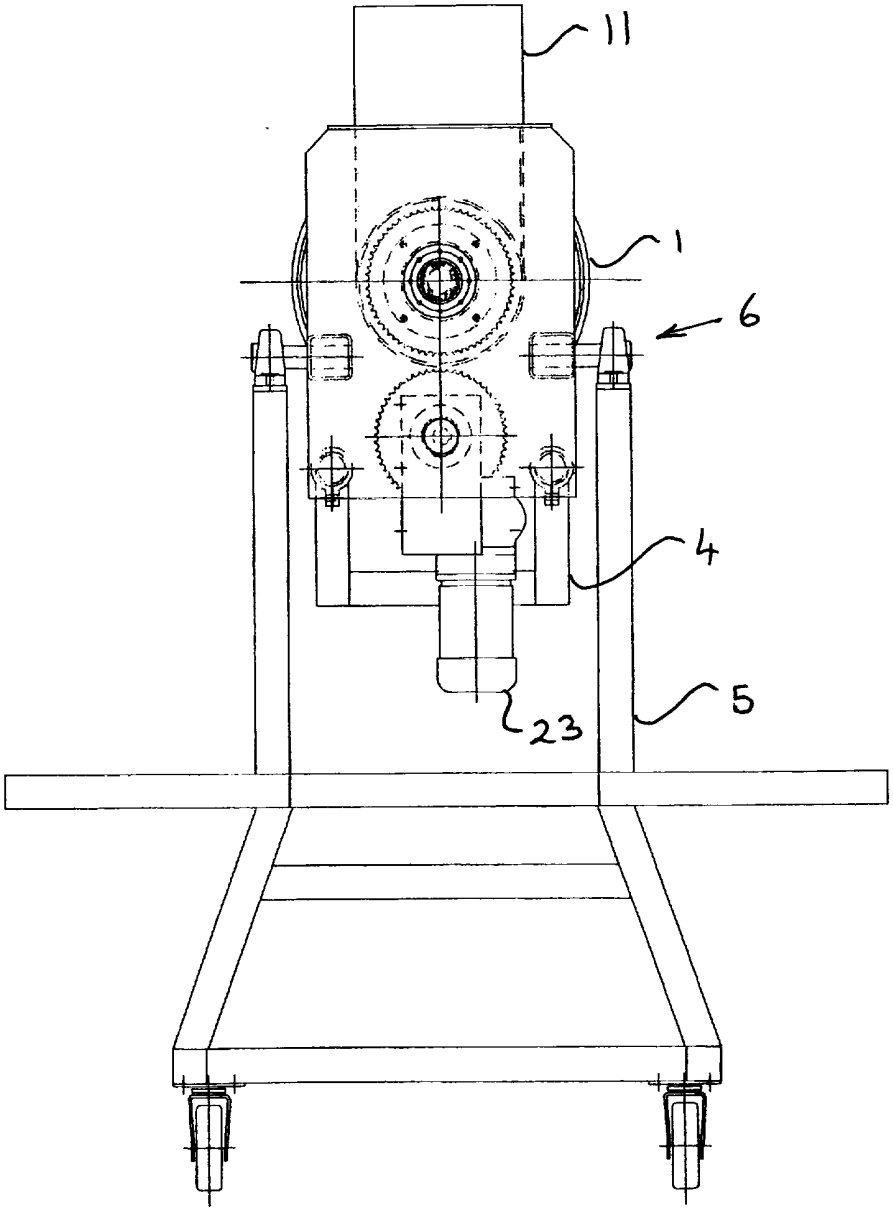


FIGURE 3

FIGURE 4

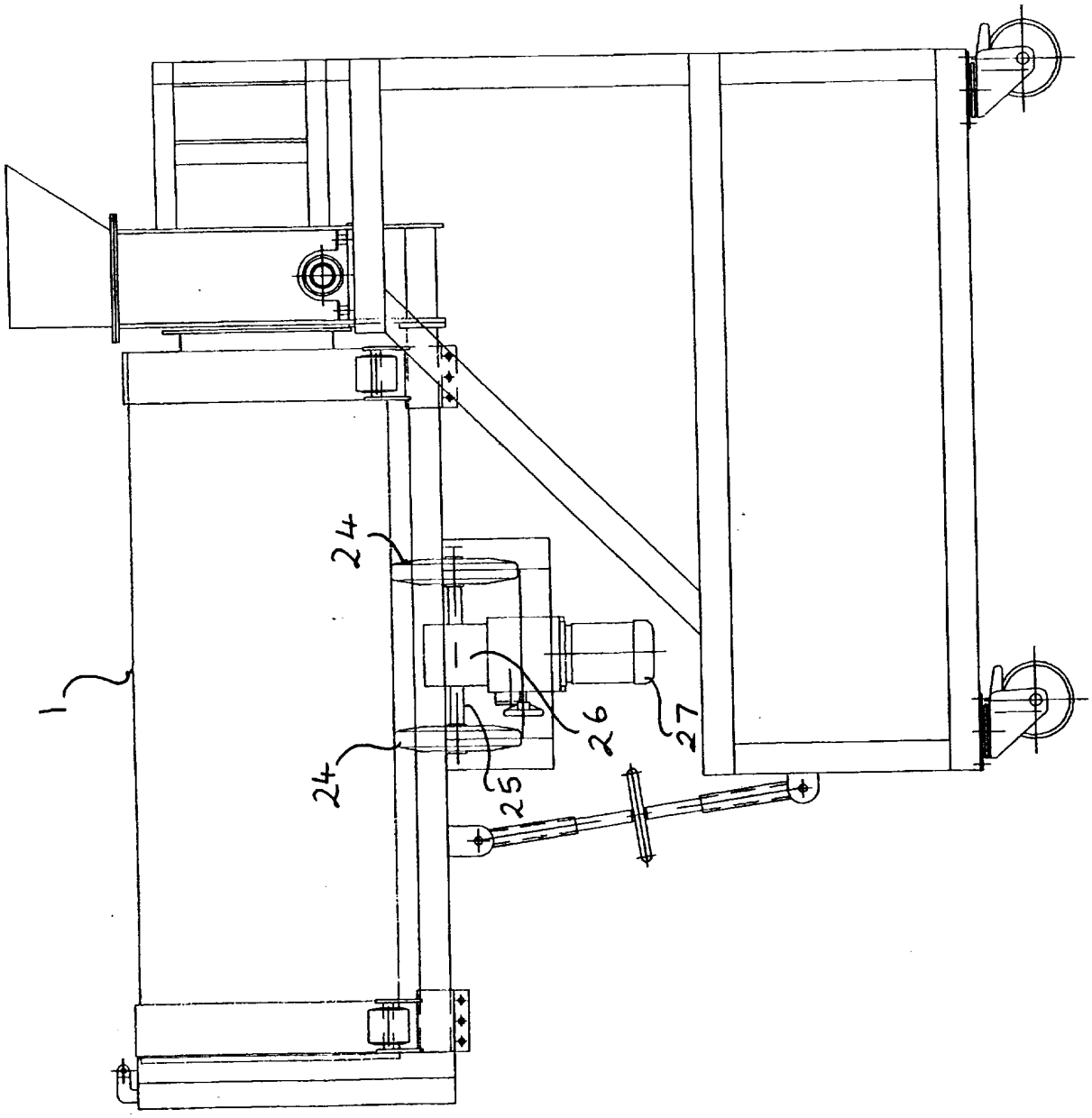


FIGURE 5

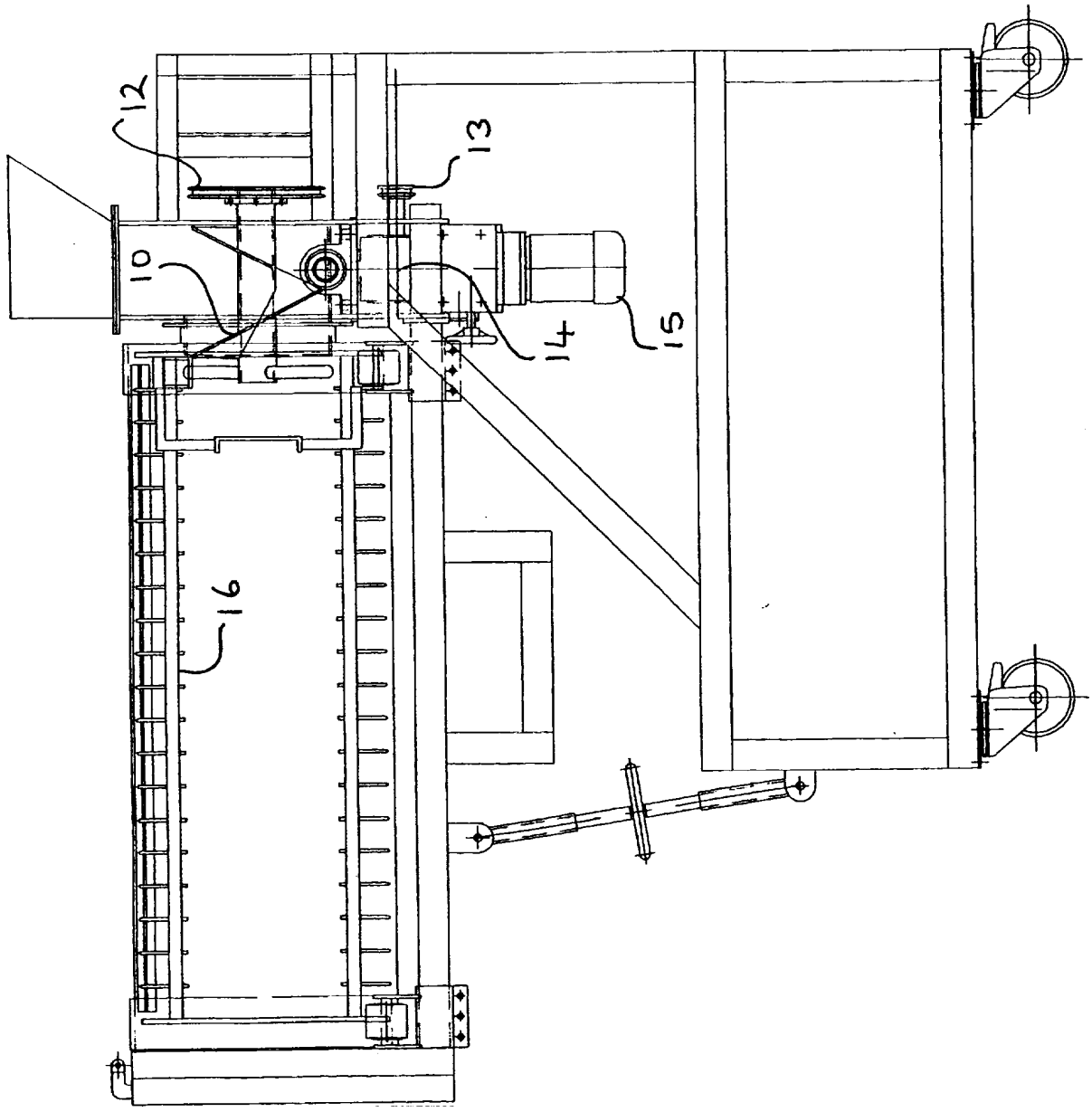
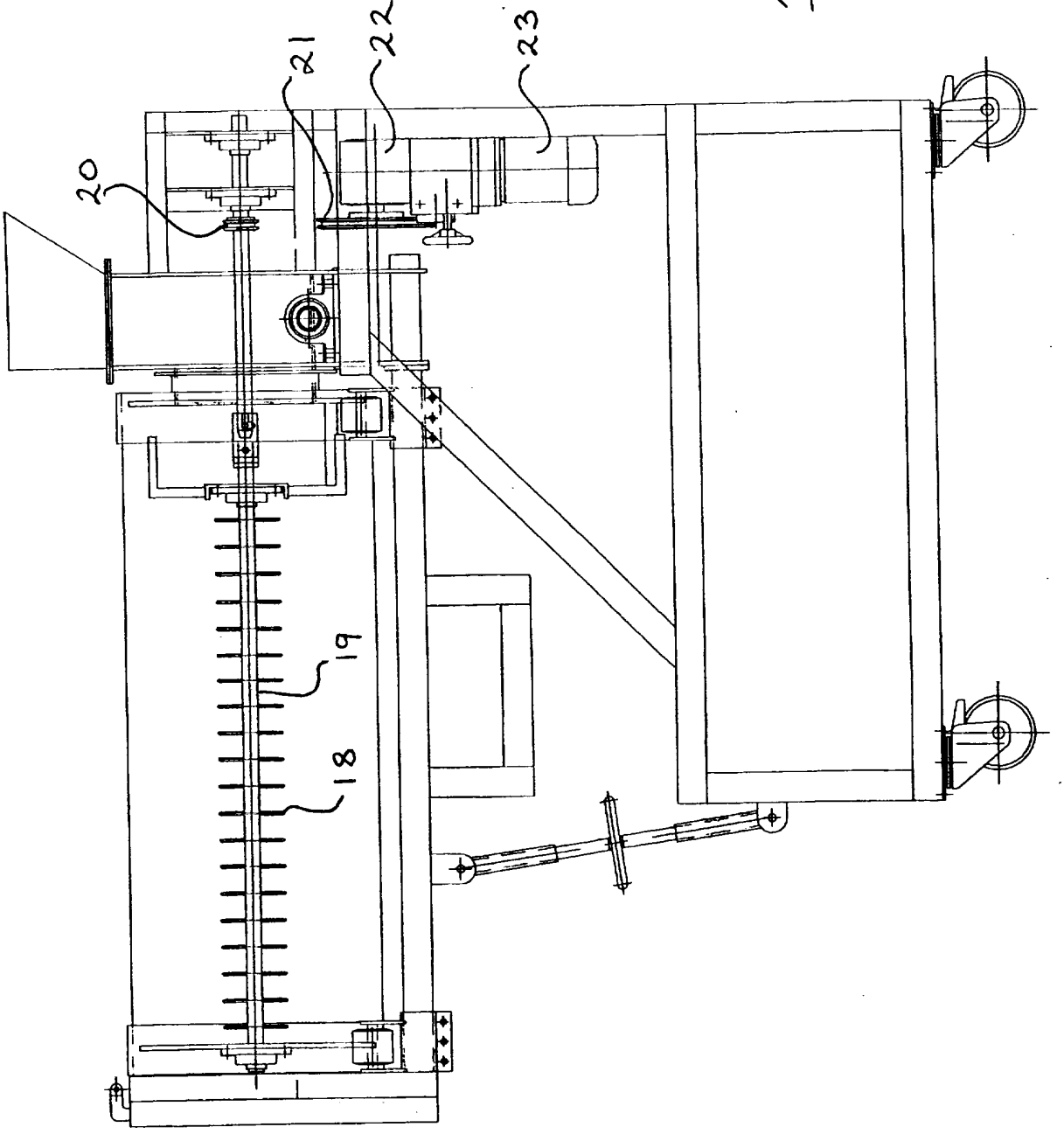


FIGURE 6



IMPROVEMENTS IN AND RELATING TO MEAT SHREDDING MACHINES

This invention relates to meat shredding machines which may typically be used to shred meat into strips for use in sandwiches, or to pulp meat into a pulp mix.

Meat shredding machines typically comprise a rotatable drum into which meat to be shredded is introduced by means of a hopper and an auger or worm drive, with the drum having a high speed centre spinner in which the spikes rip through meat to be shredded and an outer spinner which picks up meat and drops it back onto the centre spinner during the meat shredding or pulping process.

Conventionally, although such shredding machines have different parts which are required to rotate at different speeds, nevertheless they use a single electric motor and gear box assembly having power take off shafts to the various parts to be rotated. A problem with this arrangement is that because the drum, the outer spinner and the centre spinner all have to rotate at significantly different speeds, a single gear box for achieving this object is necessarily complicated and hence expensive, such that when problems arise with the machine, for example if one of the rotating parts becomes broken or worn, the entire gear box has to be disassembled and perhaps even dismounted from the structure of the machine in order to gain access for the purposes of rectifying the fault. This is time consuming and can also mean that where a relatively minor fault has occurred the entire cost of replacing or repairing the gear box still has to be met.

It is an object of the present invention to provide a meat shredding machine in which the aforementioned disadvantages are obviated.

According to the invention there is provided a meat shredding machine comprising a rotatable drum within which is disposed a rotatable centre spinner for shredding or pulping meat and a rotatable outer spinner for picking meat up and returning it to the centre spinner for shredding or pulping, characterised in that the drum, the centre spinner and the outer spinner are each provided with independent motor and gear reduction means.

Conveniently, the drum is rotatably mounted on rollers at either end thereof and is driven by one or more drive wheels, such as rubber tyres, rotatably connected to a motor and gear reduction assembly mounted immediately beneath the drum.

Conveniently, the motor and gear reduction means for driving the centre spinner and the outer spinner are adjacent to each other at the feed end of the drum, and depend downwardly from the meat input end such that substantially all three motor and gear reduction means occupy a common plane. This is particularly advantageous since it allows ease of access to each of the independent motor and gear reduction means whilst allowing for a very compact configuration so that the length of the shredding machine can be minimised.

Conveniently, the drum, centre spinner and outer spinner, together with

their attendant motors and gear reduction means, are supported on a pivotable frame or cradle which may be selectively inclined from the horizontal to allow for shredding meat to progressively advance towards the output end of the drum and that end of the drum incorporates a lockable door through which shredded or pulped meat can be extracted after processing.

The invention will now be described, by way of example only, with reference to the accompanying drawings in which:-

Figure 1 is a part cut-out side view of a meat shredding machine according to this embodiment of the invention,

Figure 2 is an output end view of the shredding machine of Figure 1,

Figure 3 is an input end view of the shredding machine of Figure 1,

Figure 4 is a schematic side view of the meat shredding machine of Figure 1 showing the means by which the outer drum is driven,

Figure 5 is a schematic side view of the meat shredding machine of Figure 1 showing the means by which the outer spinner is driven, and

Figure 6 is a schematic side view of the meat shredding machine of Figure 1 showing the means by which the centre spinner is driven.

Referring to the drawings, the general arrangement of the meat shredding machine according to the invention is shown with reference to Figures 1 to 3 in which a rotatable drum 1 is shown rotatably mounted on rollers 2 mounted on brackets 3 secured to a pivotable cradle-like frame 4 which in turn is pivotally mounted on a fixed frame 5 via a pivot linkage shown generally at 6. The drum 1 has an openable output end 7 which is closed by means of a hinged door 8, and a feed or input end 9 into which meat to be shredded can be introduced by a spiral auger 10 rotatably mounted beneath a hopper 11 for introducing meat to be shredded into the meat shredding machine. The auger 10 is driven at one end via a large sprocket 12 connected by a duplex chain (not shown) to a small sprocket 13 connected to a gear box 14 which, in turn, is driven by an electric motor 15 depending therefrom. The large sprocket 12, small sprocket 13 and gear box 14 collectively comprise gear reduction means for driving the auger 10 which, in turn, is drivingly connected to an outer spinner 16 rotatably mounted within the drum 1, so that upon rotation of the auger 10 the spinner 16 also rotates.

The spinner 16 has a plurality of spaced spikes 17 for picking up pieces of fallen meat from the lower end of the drum 1 returning it for shredding by the spikes 18 of a centre spinner 19 drivingly connected via a small sprocket 20 to a large sprocket 21 via a duplex chain (not shown). In turn the large sprocket 21 is connected to the output end of a second gear box 22 driven by a second electric motor 23 mounted at the rear of the shredding machine.

The drum 1, by virtue of being rotatably mounted on the rollers 2, can therefore be driven in a clockwise or anti-clockwise direction and to achieve this a pair

of rubber drive wheels 24 are drivingly connected thereto and are mounted on a drive shaft 25 driven by a third gear box 26 which, in turn, is driven by a third electric motor 27.

The pivotable frame 4 and fixed frame 5 are each interconnected by means of a turn buckle arrangement shown generally at 28 which includes an adjustment wheel 29 for shortening and lengthening the turn buckle 28 to allow the drum 1 and its attendant parts to be tilted downwardly to, in turn, adjust the progression of meat being shredded through the drum 1 towards the output end 7 to thereby, in turn, vary the amount of shredding of the meat within the drum 1 as required.

In Figures 4-6 are shown, respectively, the individual motor and gear reduction means for driving the drum 1, the outer spinner 16 via the auger 10 and the centre spinner 19.

As can be seen from Figure 4, the drum 1 is driven directly via the rubber drive wheels 24 bearing against its outer surface, this being a particularly advantageous arrangement in view of the simplicity of access to the moving parts thereof which also make it possible to easily remove one drum and replace it with another if necessary.

As seen with reference to Figure 5, the auger 10 and hence the outer spinner 16 is driven by a large sprocket 12 which, in turn, is driven by a small sprocket 13 drivingly connected to the first gear box 14.

In contrast, as can be seen with reference to Figure 6, the centre spinner 19 is driven by a small sprocket 20 which, in turn, is driven by a large sprocket 21 drivingly connected to the second gear box 22 so that for any given speed of revolution of each of the motors 15 and 23 the centre spinner 19 rotates considerably faster than the outer spinner 16 but counter-clockwise relative thereto, with the outer spinner 16 and drum 1 having the same direction of rotation. Typically, the centre spinner may rotate between 160 revolutions per minute to 1678 revolutions per minute whereas the outer spinner 16 may rotate typically at between 14 revolutions per minute and 133 revolutions per minute. Similarly, the drum 1 may typically be driven at speeds in the range of 5-50 revolutions per minute so that, collectively, the drum 1, outer spinner 16 and centre spinner 19 each rotate at varying speeds according to the required amount of shredding or pulping of meat being introduced into the hopper 11 and thereafter into the inside of the drum 1 by means of the auger 10.

As will be seen with reference to Figures 2 and 3, the electric motors 15, 23 and 27 and their attendant speed reduction means including first, second and third gear boxes 14, 22 and 26 are all in line but, as can be seen more clearly with reference to Figures 4, 5 and 6, are spaced apart, thereby allowing for ease of access and hence maintenance. This is particularly advantageous when a fault occurs with any one of the component parts since repair or replacement of the faulty part may be easily and quickly achieved such that, in turn, the downtime for the shredding machine can be minimised. Also, because the drum 1, outer spinner 16 and centre spinner 19 are independently driven it will be apparent that, for example, if a fault means that the drum 1 cannot be rotated nevertheless the independence of the drive trains between the remaining rotational parts

means that they can continue to operate until the fault has been rectified, even if the efficiency of the shredding operation is reduced.

Similarly, because the first, second and third electric motors 15, 23 and 27 and their attendant gear boxes 14, 22 and 26 are only required to drive one component of the machine it will be apparent that they may each be of relatively simple construction and, conveniently, they may be identical so as to allow for interchangeability of parts and economies of scale resulting therefrom.

CLAIMS

1. A meat shredding machine comprising a rotatable drum within which is disposed a rotatable centre spinner for shredding or pulping meat and a rotatable outer spinner for picking meat up and returning it to the centre spinner for shredding or pulping, characterised in that the drum, the centre spinner and the outer spinner are each provided with independent motor and gear reduction means.

2. A meat shredding machine according to Claim 1 in which the drum is rotatably mounted on rollers at either end thereof and is driven by one or more drive wheels rotatably connected to a motor and gear reduction assembly mounted immediately beneath the drum.

3. A meat shredding machine according to Claim 2 in which the drive wheels comprise rubber tyres drivingly engagable with the drum.

4. A meat shredding machine according to any preceding Claim in which the motor and gear reduction means for driving the centre spinner and the outer spinner are adjacent to each other at the feed end of the drum, and depend downwardly from the meat input end such that substantially all three motor and gear reduction means occupy a common plane.

5. A meat shredding machine according to any preceding Claim in which the

drum, centre spinner and outer spinner, together with their attendant motors and gear reduction means, are supported on a pivotable frame or cradle which may be selectively inclined from the horizontal to allow for shredding meat to progressively advance towards the output end of the drum and that end of the drum incorporates a lockable door through which shredded or pulped meat can be extracted after processing.

6 A meat shredding machine substantially as herein before described with reference to and as shown in the accompany drawings.

Application No: GB 9906225.9 **Examiner:** Jason Scott
Claims searched: 1-6 **Date of search:** 24 June 1999

Patents Act 1977
Search Report under Section 17

Databases searched:

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.Q): A4C (CUC, CUD)

Int Cl (Ed.6): B02C (18/00, 18/06, 18/14, 18/24, 18/28)

Other: ONLINE: WPI, JAPIO, EPODOC

Documents considered to be relevant:

Category	Identity of document and relevant passage	Relevant to claims
A	US 3879000 MULLER	

X	Document indicating lack of novelty or inventive step	A	Document indicating technological background and/or state of the art.
Y	Document indicating lack of inventive step if combined with one or more other documents of same category.	P	Document published on or after the declared priority date but before the filing date of this invention.
&	Member of the same patent family	E	Patent document published on or after, but with priority date earlier than, the filing date of this application.