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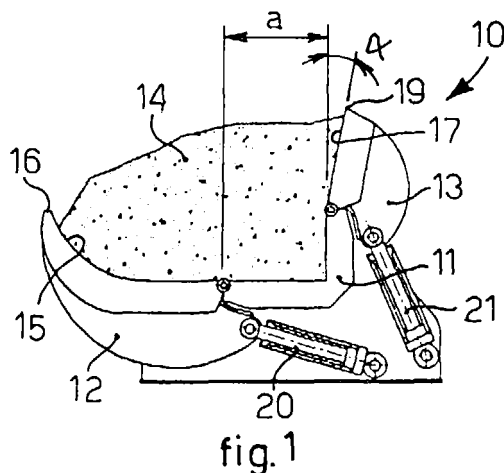
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(84) Designated Contracting States: AT BE BG CH CY CZ DE DK EE ES FI FR GB GR HU IE IS IT LI LT LU LV MC NL PL PT RO SE SI SK TR Designated Extension States: AL BA HR MK YU (30) Priority: 15.09.2005 IT UD20050143	(71) Applicant: C & G Costruzioni Meccaniche Srl 21020 Daverio (VA) (IT) (72) Inventor: Colombo, Claudio 21100, Varese (IT) (74) Representative: Petraz, Gilberto Luigi et al GLP S.r.l. Piazzale Cavedalis 6/2 33100 Udine (IT)
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(54) **Method and device for pressing scrap**

(57) Method and device (10) for pressing scrap comprising a first loading step, wherein a loose and incoherent mass (14) of scrap is loaded onto a pressing base (11), on a first pressing cover (12) and a second pressing cover (13), a second pressing step, wherein the first pressing cover (12) and the second pressing cover (13) cooperate with each other in order to press the mass (14) towards the base (11), and a third compacting step,

wherein the second pressing cover (13) cooperates with its top (19) with an inner surface (15) of the first pressing cover (12), in order to define a desired compact mass (24) of scrap. The first pressing cover (12) and the second pressing cover (13) are associated on opposite sides with the base (11). In the second pressing step, the first pressing cover (12) cooperates with its top (16) with an inner surface (17) of the second pressing cover (13).



Description

FIELD OF THE INVENTION

[0001] The present invention concerns a method and the relative device for pressing a loose mass of scrap, to reduce it to a compact mass of a desired section, which can be further compressed by a longitudinal thrust against a fixed wall disposed in front of one end of the device, or divided into parts, if the device is provided with shears mounted at the end and fed by a longitudinal thrust, so as to be able to send it to subsequent steps, for example recycling or melting. To be more exact, the present invention allows to reduce to a minimum the steps and movements of its oscillating covers during the compacting of the mass of scrap.

[0002] In the following description we shall refer specifically to the volumetric reduction by pressing a loose and incoherent mass of voluminous metal scrap, such as automobiles, cisterns, collection materials or other, but the present invention can equally be applied for pressing and compacting small-size metal and non-metal scrap.

BACKGROUND OF THE INVENTION

[0003] Various methods and devices are known, able to reduce the volume of loose masses of scrap into a compact mass of desired section, and then to compact it into packs and/or divide it into parts, so that it can then easily be sent to subsequent steps of recycling and/or melting.

[0004] One known method and device for pressing scrap is for example described in the Italian patent IT-B-1226197, in which two pressure means, or oscillating covers, reciprocally rotatable and pivoted with respect to a plane pressing base, interact with each other and with the base in order to compact a loose and incoherent mass of scrap so as to form a compact mass of polyhedral form.

[0005] Other solutions are known which provide a substantially L-shaped base on the ends of which are pivoted, respectively, on the horizontal side an arched cover, and on the vertical side a plane cover, the latter of smaller size than the arched cover.

[0006] These known solutions provide that the arched cover is of a size and at a distance from the plane cover such that the top of the arched cover overlaps, in the closed, compacting position, the top of the plane cover, so that the latter is obliged to cooperate, in all the steps of the pressing cycle, with the inner surface of the arched cover.

[0007] This solution, however, has the disadvantage that it is necessary to effect a high number - up to ten - of steps and cycles to alternately and reciprocally bring together and distance the two covers during the initial pressing steps, so as to prevent the scrap from escaping from above through the space defined initially between the tops of the two covers, that is to say, until the plane

cover is brought into contact with the inner surface of the arched cover.

[0008] In this way the time needed for compacting the scrap is lengthened, and the processing costs are also increased.

[0009] The Japanese patent application JP-A-63 212098 discloses a scrap press device for forming a compact mass from metal chips. The device comprises a higher zone of trimming, an intermediate zone of pre-pressing and a lower zone of pressing and forming the compact mass. In the intermediate zone of pre-pressing two lids are provided which serve, in their closed position, as a containing means for the orthogonal press positioned below. In their open position the lids allow the chips and the scrap to enter in the underlying press. Actually, the lids are not operative elements in the pressing and compacting action on the chips and the scrap, but they feed the material to the underlying press and contain it when the orthogonal press is made to operate.

[0010] One purpose of the present invention is to perfect a method and achieve an improved device for pressing scrap, which will reduce the times and costs necessary for compacting the initial mass of scrap while guaranteeing an optimum result of the compacting performed.

[0011] The Applicant has devised, tested and embodied the present invention to overcome the shortcomings of the state of the art and to obtain this and other purposes and advantages.

SUMMARY OF THE INVENTION

[0012] The present invention is set forth and characterized in the main claims, while the dependent claims describe other characteristics of the invention or variants to the main inventive idea.

[0013] In accordance with the above purpose, a method for pressing scrap according to the present invention comprises at least:

- a first loading step, wherein an incoherent and loose mass of scrap is loaded onto a pressing base, on first pressing means and on second pressing means, the first and the second pressing means being disposed on opposite sides with respect to the pressing base;
- a second pressing step, wherein the first pressing means and the second pressing means are alternately brought nearer to and distanced from each other in order to press the mass of scrap; and
- a third compacting step, wherein the second pressing means cooperates, with its top, with an inner surface of the first pressing means, in order to define a compact mass of scrap of desired shape and size.

[0014] According to a characteristic feature of the present invention, in the second pressing step, the first pressing means cooperates, with its top, with an inner surface of the second pressing means, in order to thrust

all the mass of scrap with great efficiency towards the pressing base.

[0015] In fact, with the present invention, in one operating pressing condition, the top of the first pressing means is at a lower height than the top of the second pressing means, and possibly comes into contact with it.

[0016] This type of geometric cooperation between the first pressing means and the second pressing means determines a trajectory of the top of the first pressing means that prevents the accidental upward escape of the mass of scrap between the two tops of the two pressing means when the latter are drawing near each other in the closing step.

[0017] Moreover, the reciprocal configuration assumed by the two pressing means in the position of reciprocal cooperation determines a compacting of the mass of scrap such that, with a single progressive movement of the second pressing means towards the pressing base, it is possible to make the desired compact mass of scrap.

[0018] With the present invention therefore, substantially with two movements, that is, an initial movement of the first pressing means until the top cooperates with the inner surface of the second pressing means, and a final movement of the second pressing means until the scrap is compacted in a defined and compact mass, we obtain the same result which in the state of the art was obtained with a plurality of progressive and alternate approaching movements of the two pressing means.

BRIEF DESCRIPTION OF THE DRAWINGS

[0019] These and other characteristics of the present invention will become apparent from the following description of a preferential form of embodiment, given as a non-restrictive example with reference to the attached drawings wherein:

- figs. 1 to 6 show relative steps of the method for pressing scrap according to the present invention, performed with a device for pressing scrap according to the present invention.

DESCRIPTION OF A PREFERENTIAL FORM OF EMBODIMENT

[0020] With reference to the attached drawings, a method for pressing scrap according to the present invention is actuated with a pressing device, or press, 10, also the object of the present application for a patent of industrial invention.

[0021] In this case, the method and the device 10 are intended to reduce the volume by pressing a loose and incoherent mass 14 of scrap, consisting for example of parts of motor vehicles, cisterns, metal girders, reinforcement or other metal scrap, to reduce it to a compact mass of desired section.

[0022] To be more exact, the device, or press, 10 ac-

cording to the invention comprises a pressing base 11 with a substantially L-shaped cross section, and two pressing covers, respectively an arched one 12 and a plane one 13.

[0023] The arched cover 12 and the plane cover 13 are both pivoted to the base 11, respectively the first to one end of the horizontal segment of the base 11, and longitudinally thereto, and the second to one end of the vertical segment of the base 11, longitudinally thereto. Thanks to this configuration, the two pivoting points of the covers 12, 13 are always positioned on different laying planes or levels, the amount of the difference in height depending from the length of the vertical segment of the base 11.

[0024] The arched cover 12 comprises an inner pressing surface 15 which follows the curvilinear development of the structure of the arched cover 12, and a top 16 disposed on the opposite side with respect to its pivoting point.

[0025] More particularly, the inner pressing surface 15 of the cover 12 has a first lower segment substantially straight in order to define a vertical wall of the press, in a step of the pressing process, and a second upper curvilinear segment which cooperates with the other cover 13 in another step of the pressing process.

[0026] The plane cover 13 comprises a substantially plane inner pressing surface 17, and a top 19, disposed on the side opposite its point of pivoting with the base 11.

[0027] To be more exact, the inner pressing surface 15 of the pressing cover 12 describes, in its higher portion, an arc of a circle having as its geometrical center the point of pivoting of the arched cover 12 with the base 11.

[0028] In the operating condition shown in fig. 2, the top 16 of the arched cover 12 is at a lower height than the top 19, and in a position such that it does not contact the inner pressing surface 17 of the cover 13, even if the angle α , defined by the inner pressing surface 17 and by a substantially vertical plane, is about equal to 0° .

[0029] In this case, the angle α defined by the plane cover 13 and a substantially vertical plane is comprised between about 0° and about 20° , on the opposite side with respect to the arched cover 12, so as to further facilitate the contact of the top 16 with the inner pressing surface 17.

[0030] In the same operating condition, the distance between the top 16 of the arched cover 12 and the inner pressing surface 17 of the plane cover 13 is variable between about 50% and about 5% of the distance between the respective points of pivoting of the two covers 12 and 13, that is, substantially corresponding to the horizontal segment of the base 11.

[0031] According to a preferential embodiment, the distance between the points of pivoting of the two covers 12 and 13 is variable from about 600 mm to about 1200 mm.

[0032] As shown in fig. 3, the arched cover 12 can effect a rotation of more than 90° , so as to be able to pos-

sibly come into contact with the surface 17 of the plane cover 13 when it provides a positioning in the direction of opening with an angle $\alpha \neq 0^\circ$.

[0033] Advantageously, the plane cover 13 can rotate for an amplitude of even $90^\circ + \alpha$, from its initial position shown in fig. 1.

[0034] In this way, the arched cover 12 performs a trajectory such that it effects a downward thrust on the mass of scrap 14 to be compacted, thus preventing the latter from escaping upwards through the open space between the two covers 12 and 13 at the beginning of the pressing procedure.

[0035] The pressing method according to the present invention provides the following steps:

- a first step (fig. 1), wherein the arched cover 12 is in a substantially horizontal position, the plane cover 13 is inclined by an angle α with respect to the vertical plane, and the mass of scrap 14 is loaded on the base 11, and on part of the inner pressing surface 15 of the arched cover 12 and the inner pressing surface 17 of the plane cover 13;
- a second step (figs. 2 and 3), wherein the first linear actuator 20 makes the arched cover 12 rotate, taking it towards the plane cover 13, until the top 16 is located in a position below the top 19 of the plane cover 13, possibly until contact with the pressing surface 17 of the latter. In this step, due to the characteristic conformation of the two covers 12 and 13, the mass of scrap 14 is thrust, as indicated by the arrows, towards the base 11, without being able to escape from the two tops 16 and 19;
- a third step (fig. 4), wherein the arched cover 12 is rotated in the opposite direction by the first actuator 20, until it is disposed in a substantially vertical position; and
- a fourth step (figs. 5 and 6), wherein the plane cover 13 is made to rotate by the second linear actuator 21 towards the arched cover 12, so that its top 19 cooperates with the inner pressing surface 15, in order to compact the mass of scrap 14 so as to define a compact mass of scrap 24 of substantially polyhedral shape.

[0036] It is clear, however, that modifications and/or additions of parts or steps may be made to the method and device 10 as described heretofore, without departing from the scope of the present invention.

[0037] It is also clear that, although the present invention has been described with reference to specific examples, a person of skill in the art shall certainly be able to achieve many other equivalent forms of method and device for pressing scrap, having the characteristics as set forth in the claims and hence all coming within the field of protection defined thereby.

Claims

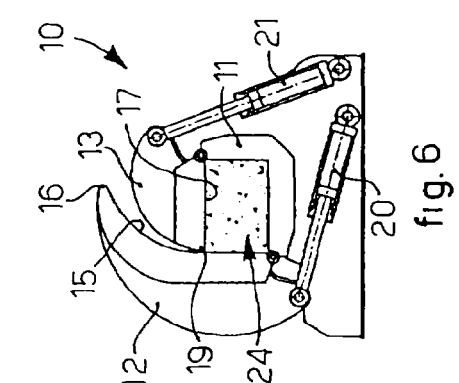
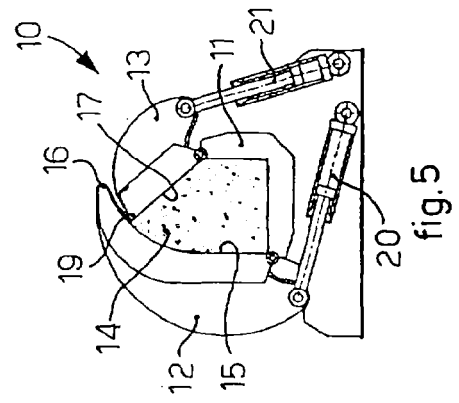
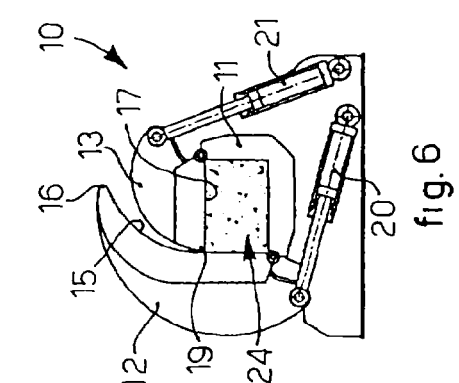
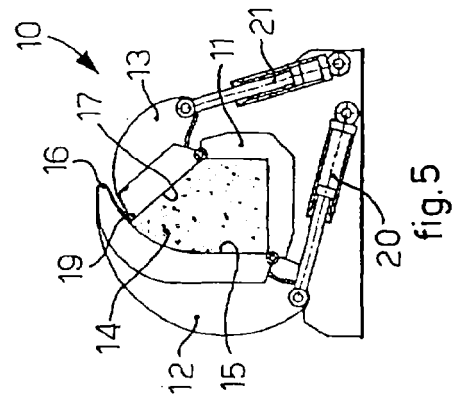
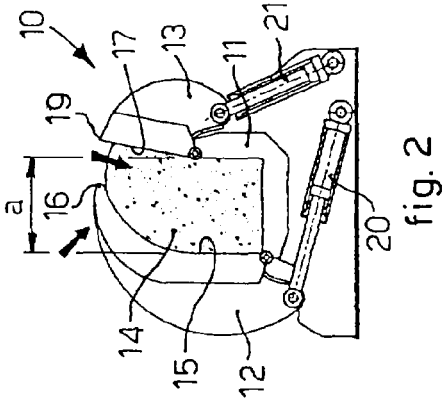
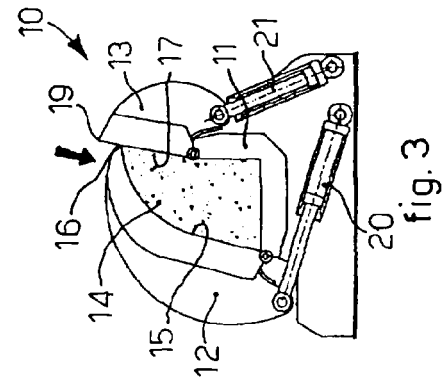
1. Method for pressing scrap comprising at least a first loading step, wherein a loose and incoherent mass (14) of said scrap is loaded onto a pressing base (11), on first pressing means (12) and on second pressing means (13), said first pressing means (12) and said second pressing means (13) being associated on opposite sides with said base (11), said base (11) having a substantially L-shaped cross section, a second pressing step, wherein said first pressing means (12) and said second pressing means (13) cooperate with each other in order to press said mass (14) towards said base (11), and a third compacting step, wherein said second pressing means (13) cooperates with its top (19) with an inner surface (15) of said first pressing means (12), in order to define a desired compact mass (24) of scrap, **characterized in that** in said second pressing step, said first pressing means (12) cooperates with its top (16) with an inner surface (17) of said second pressing means (13).
2. Method as in claim 1, **characterized in that** in said second pressing step, the top (16) of said first pressing means (12) is at a lower height than the top (19) of said second pressing means (13).
3. Method as in claim 1 or 2, **characterized in that** between said second pressing step and said third compacting step at least an intermediate return step is provided, wherein said first pressing means (12) is retracted to a substantially vertical position in order to allow said top (19) of said second pressing means (13) to cooperate with said inner surface (15) of said first pressing means (12) in said third compacting step.
4. Method as in any claim hereinbefore, **characterized in that** until the start of said third compacting step, said second pressing means (13) is kept inclined on the opposite side to said first pressing means (12) by a determinate angle (α) comprised between about 0° and about 20° , with respect to a substantially vertical plane.
5. Device for pressing scrap comprising a pressing base (11), first pressing means (12) and second pressing means (13), said first pressing means (12) and said second pressing means (13) being associated on opposite sides with said base (11), and being able to cooperate with each other so as to press a mass (14) of said scrap until it is reduced to a compact mass (24) of scrap of desired size and shape, **characterized in that** said base (11) has a substantially L-shaped cross section, **in that** said first (12) and second (13) pressing means are associated to respective opposite ends of said base (11) and **in**

that said first pressing means (12) comprises a top (16) able to cooperate, in at least one step of the pressing of said mass (14) of scrap, with an inner surface (17) of said second pressing means (13), in order to thrust all said mass (14) of scrap towards said base (11).

6. Device as in claim 5, **characterized in that** said first pressing means (12) includes a position of pressing said mass, wherein the top (16) is located at a lower height than a top (19) of said second pressing means (13).
7. Device as in claim 5 or 6, **characterized in that** said first pressing means (12) is pivoted to said base (11) in correspondence with one end of a substantially horizontal segment thereof, whereas said second pressing means (13) is pivoted thereto in correspondence with one end of a substantially vertical segment thereof.
8. Device as in any claim from 5 to 7, **characterized in that** said first pressing means comprises an arched cover (12), whereas said second pressing means comprises a plane cover (13), and **in that** the arched section of the surface (15) of the pressing cover (12) describes the arc of a circle having as its geometrical center the pivoting point of said plane cover (13) with said base (11).
9. Device as in any claim from 5 to 8, **characterized in that** said second pressing means (13) can be selectively rotated in the direction of opening by an angle α , with respect to a substantially vertical plane.
10. Device as in claim 9, **characterized in that** said angle α is comprised between about 0° and about 20°.
11. Device as in claim 9 or 10, **characterized in that** said second pressing means (13) is able to be selectively rotated between a first substantially horizontal position and a second position inclined with respect to said first position by an angle equal to about 90° + the value of said angle α .
12. Device as in any claim from 5 to 11, **characterized in that** in a substantially vertical operating position of both said first and second pressing means (12, 13), the distance (a) between said top (16) of said first pressing means (12) and said inner surface (17) of said second pressing means (13) is variable between about 50% and about 5% of the distance between the respective pivoting points of said first and second pressing means (12, 13).
13. Device as in claim 12, **characterized in that** said distance (a) between the respective pivoting points of said first and second pressing means (12, 13) is

variable between about 600 mm and about 1200 mm.

14. Device as in any claim from 5 to 13, **characterized in that** the distance between the point of association of said first pressing means (12) with said base (11) and the point of association of said second pressing means (13) with said base (11), substantially corresponding to the horizontal segment of said base (11), is variable between about 600 mm and about 1200 mm.



REFERENCES CITED IN THE DESCRIPTION

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Patent documents cited in the description

- IT 1226197 B [0004]
- JP 63212098 A [0009]