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1 "ASSEMBLY TO SHEAR ROLLED SECTIONS"

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3 This invention concerns an assembly to shear rolled
4 sections, as set forth in the main claim.

5 The shearing assembly according to the invention is
6 applied to the field of iron and steel production downstream
7 of rolling plants comprising two parallel rolling lines, the
8 rolled sections being round bars, wire rod, bars, etc.
9 possibly upstream of the cooling plate.

10 The shearing assembly according to the invention is
11 employed to shear for scrap the leading and trailing end
12 segments of rolled sections leaving the last rolling mill
13 stand and also to shear those rolled sections to size.

14 The shearing assembly is suitable to shear rolled sections
15 at speeds up to 40 mts/sec. and with equivalent diameters up
16 to 20 mm. + 20 mm. in the simultaneous shearing of two
17 rolled sections.

18 The state of the art covers rolling plants having at their
19 outlet two parallel rolled sections the leading and trailing
20 ends of which include faults such as geometric deformations,
21 a lack of cooling or unacceptable inclusions; these faults
22 have to be eliminated.

23 The rolled sections often have also to be sheared to size
24 for further processes or for subsequent cooling on the
25 cooling plate positioned downstream.

26 The plants of the state of the art include a shearing
27 assembly comprising two shears for shearing to size and a
28 scrap shears which, due to its conformation (see DE-A-
29 1427225) has considerable maintenance problems, setting
30 problems, and requires intervention when there is a blockage
31 of material.

32 Moreover, the resulting arrangement in these plants of the
33 state of the art entails problems of occupation of spaces.



1 which are more and more valuable in view of the overall bulk
2 of the plant; this arrangement also causes problems of
3 access, and difficulties in carrying out quick day to day
4 maintenance.

5 Moreover, in the plants of the state of the art the
6 discards resulting from the scrap-shearing of the leading
7 and trailing end segments generated by scrap shears are
8 collected in two separate zones, each of which is on the
9 axis of its own rolling line, with resulting problems for
10 collection and subsequent removal of the discards.

11 The present applicants have designed, tested and embodied
12 this invention to overcome the shortcomings of the state of
13 the art and to achieve further advantages.

14 This invention is set forth and characterised in the main
15 claim, while the dependent claims describe variants of the
16 idea of the main embodiment.

17 The purpose of this invention is to provide a shearing
18 assembly which is associated downstream of a rolling plant
19 and which delivers at its outlet two parallel rolled
20 sections, the shearing assembly having a small overall bulk
21 and a lower consumption of energy than those of the state of
22 the art and being financially advantageous as regards
23 maintenance and the management of spare parts.

24 The shearing assembly according to the invention comprises
25 two shears for shearing to size, each of which is associated
26 with its own respective feeding assembly, these shears being
27 positioned parallel with a distance between centres equal to
28 the distance between centres of the two advancing rolled
29 sections and being offset from each other in the
30 longitudinal direction.

31 The shearing assembly according to the invention comprises
32 one single scrap shears with two pairs of shearing elements,
33 each of which pairs being arranged on one side of the shears



1 and with the shearing elements arranged in coordination with
2 the lines feeding the rolled sections.

3 According to a variant the scrap shears can be employed to
4 shear one single rolled section; in this case the shearing
5 elements present on the inoperative side of the scrap shears
6 will be protected for safety reasons.

7 In this case, the scrap shears will include on the other
8 side an advantageously removable element to cover and
9 protect the rotary shafts.

10 According to the invention, the feeding units, the shears
11 for shearing to size and the scrap shears have their
12 relative motors all arranged on the same side, which
13 facilitates maintenance operations on the shearing assembly
14 and intervention in the case of blockages of the material.

15 According to a first embodiment the scrap shears has the
16 blades shearing one rolled section in time with the blades
17 shearing the other rolled section, but with the blades
18 shearing one rolled section advantageously offset by 45° or
19 by 90° in relation to the blades shearing the other rolled
20 section so as to reduce the installed power inasmuch as the
21 scrap-shearing of the two rolled sections does not take
22 place at the same time.

23 According to the invention the scrap shears is associated
24 with one single motor, which can be installed below the
25 lower blade-holder element or else can be on the same axis
26 as one of the two blade-holder elements.

27 The shearing assembly downstream of the scrap shears
28 comprises means for the reception and discharge of discards,
29 these means being able to discharge simultaneously the
30 discards coming from the scrap-shearing of the leading and
31 trailing end segments of the two rolled sections delivered
32 to the scrap shears; these discards are discharged and
33 collected in one single collection means positioned below.



1 The invention also makes possible the reduction of the
2 longitudinal distance between the two shears and also the
3 distance between centres of the rolled sections, thus
4 reducing the overall bulk of the shearing assembly.

5 Moreover, with the shearing assembly according to the
6 invention, maintenance operations are simplified, as are
7 setting operations and resetting after any blockages.

8 By means of the invention the rolled sections sheared in
9 the two lines have the same braking and deceleration spaces
10 and maintain substantially the same position of outlet onto
11 the cooling plate positioned downstream as compared to
12 rolling lines which comprise shearing assemblies of the
13 state of the art.

14 Moreover, the invention makes possible a reduction of the
15 minimum length of the rolled section which can be discharged
16 onto the cooling plate.

17 The shearing assembly according to the invention comprises
18 a first lateral switch at the inlet of each shears shearing
19 to size, so as to direct, when necessary, the rolled section
20 into the channel leading to the scrap-shearing or into the
21 channel leading to the cooling plate or to subsequent
22 processings.

23 The shearing assembly also includes two second lateral
24 switches positioned downstream of the scrap shears so as to
25 feed alternately the double channel included downstream, so
26 that at least two plus two lines feeding the rolled section
27 passing through are available at the outlet of the shearing
28 assembly.

29 The attached figures are given as a non-restrictive
30 example and show some preferred embodiments of the invention
31 as follows:-

32 Fig.1 is a partly cutaway side view of the shearing
33 assembly according to the invention;



1 Fig.2 is a plan view of the shearing assembly of Fig.1;
2 Fig.3 shows in an enlarged scale a side view of the scrap
3 shears of the shearing assembly of Fig.1;
4 Fig.4a shows a front view of the scrap shears of Fig.3;
5 Fig.4b shows a variant of the scrap shears of Fig.4a;
6 Fig.5a shows a first form of embodiment of the blade-holder
7 elements of the scrap shears of Fig.3;
8 Fig.5b shows a second form of embodiment of the blade-
9 holder elements of the scrap shears of Fig.3;
10 Fig.6 shows the scrap shears of Fig.4a as employed in the
11 shearing of one single rolled section.

12 The reference number 10 in the figures denotes generally a
13 shearing assembly associated with two rolling lines whence
14 there emerge two parallel rolled sections 11a, 11b.

15 The shearing assembly 10 according to the invention
16 comprises for each rolled section 11a, 11b a shears 12a, 12b
17 for shearing to size and a feeding unit 13a, 13b positioned
18 in series and offset laterally from each other by a distance
19 between centres equal to the distance between centres of the
20 two rolled sections 11a, 11b being fed.

21 In the shearing assembly 10 according to the invention the
22 longitudinal distance "L" between the two shears 12a, 12b
23 performing shearing to size is about 2500 to 3500 mm.,
24 whereas the distance between centres "I" of the two rolled
25 sections 11a, 11b is about 600 to 900 mm, advantageously
26 between 700 and 800 mm.

27 The shearing assembly 10 comprises a scrap shears 14,
28 which is installed downstream of the more downstream shears
29 12b performing shearing to size and is located in an
30 intermediate position between the two rolled sections 11a,
31 11b.

32 The scrap shears 14 includes a blade-holder body 28 the
33 two sides 29a, 29b of which each have two pairs of



1 contrarotating blade-holder elements 15a, 15b respectively,
2 which are arranged on both sides so as to cause the first
3 rolled section 11a to cooperate, when so required, with the
4 blade-holder elements 15a and the second rolled section 11b
5 to cooperate, when so required, with the blade-holder
6 elements 15b.

7 The distance between centres of the blade-holder elements
8 15a positioned on one side and the blade-holder elements 15b
9 positioned on the opposite side of the scrap shears 14 is
10 slightly less than the distance between centres "I" existing
11 between the two rolled sections 11a, 11b so as to prevent
12 contact between the same.

13 According to one first form of embodiment the scrap shears
14 14 has first and second blade-holder elements 15a, 15b with
15 their blades 16 shearing at the same time, thus entailing
16 simultaneous shearing of the two rolled sections 11a, 11b
17 (see Fig.5a).

18 According to another embodiment of the invention the
19 blades 16 of the first blade-holder elements 15a are offset
20 at an angle to the blades 16 of the second blade-holder
21 elements 15b, thus entailing alternate shearing of the two
22 rolled sections 11a, 11b.

23 In the forms of embodiment shown in Figs.3 and 4a a drive
24 pinion 18 of the scrap shears 14 in association with a motor
25 25 is positioned lower than the lower blade-holder element
26 of each pair of first and second blade-holder elements 15a,
27 15b.

28 In the form of embodiment shown in Fig.4b, the drive
29 pinion 18 is on the same axis as one of the rotary shafts
30 with which are associated the blade-holder elements 15, in
31 this case the lower shaft.

32 In this case the motor 25 is associated with its
33 respective drive pinion 18 by means of an adapter joint 26,



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1 which enables the motor 25 to be separated by the required
2 distance from the relative scrap shears 14.

3 Fig.6 shows a scrap shears 14 employed to shear one single
4 rolled section.

5 In this case, the blade-holder elements 15a are associated
6 with the rotary shafts only on the side on which the rolled
7 section 11 passes, whereas on the other side the scrap
8 shears 14 includes a covering and protective element 27 of a
9 removable type which covers the end part of the rotary
10 shafts.

11 In a successive step the covering and protective element
12 27 can be removed and replaced by two blade-holder elements
13 15b to enable two rolled sections 11a, 11b to be sheared at
14 the same time.

15 The shearing assembly 10 according to the invention
16 includes two first lateral switches 20a, 20b, each of which
17 cooperates with the intake of the corresponding shears 12a,
18 12b for shearing to size so as to switch the rolled sections
19 11a, 11b alternately into the rolling channels 22a, 22b or
20 into scrap-conveying channels 23a, 23b associated with the
21 scrap shears 14.

22 The shearing assembly 10 comprises, downstream of the
23 scrap shears 14, second switches 21a, 21b cooperating with
24 the respective rolled sections 11a, 11b so as to feed
25 alternately one double removal channel 24a, 24b installed
26 downstream.

27 The shearing assembly 10 according to the invention
28 provides, downstream of the scrap shears 14, a cyclone 17
29 for the discharge of discards, this cyclone 17 being able to
30 discharge the discards arriving from the two rolled sections
31 11a, 11b at the same time.

32 These discards are discharged and collected in one single
33 container 19 positioned below the discharge cyclone 17.



CLAIMS

- 1
2 1 - Assembly to shear rolled sections (11a, 11b) coming from
3 two parallel, adjacent rolling lines, the assembly
4 comprising for each rolling line a feeding unit (13a, 13b),
5 shears (12a, 12b) for shearing to size and a single scrap
6 shears (14) with two pairs of blade-holder elements (15a,
7 15b) in cooperation with the corresponding scrap-conveying
8 channels (23a, 23b), there being first switches (20a, 20b)
9 to guide the rolled sections (11a, 11b) alternately towards
10 the rolling channel (22a, 22b) and towards the scrap-
11 conveying channels (23a, 23b), the assembly being
12 characterised in that all the motors are arranged on the
13 same side, in that it comprises a cyclone (17) for discharge
14 of discards downstream of the scrap shears (14), and in that
15 it comprises, downstream from the scrap shears (14), second
16 switches (21a, 21b) cooperating with the rolled product
17 respectively (11a, 11b) to feed alternately a double removal
18 channel (24a, 24b) arranged downstream.
- 19 2 - Shearing assembly as in Claim 1, in which the scrap
20 shears (14) has two pairs of blade-holder elements (15),
21 each pair having four plus four blades (16), the first
22 blade-holder elements (15a) carrying the blades (16) at the
23 same time as the blades (16) associated with the second
24 blade-holder elements (15b) but angularly offset in relation
25 to them.
- 26 3 - Shearing assembly as in Claim 1 or 2, in which the scrap
27 shears (14) has a blade-holder body (28) from which the
28 blade-holder elements (15) have outlets respectively on one
29 side (29a) and on the other (29b), the motor (25) entrance
30 being placed under the rotary shafts on which the blade-
31 holder elements (15a, 15b) are mounted (Fig. 4a).
- 32 4 - Shearing assembly as in Claim 1 or 2, in which the scrap
33 shears (14) has a blade-holder body (28) from which the



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- 1 blade-holder elements (15) have outlets respectively on one
2 side (29a) and the other (29b), the motor (25) entrance
3 being placed directly on the same axis as the rotary shafts
4 on which the blade-holder elements (15a, 15b) are mounted
5 (Fig. 4b).
- 6 5 - Shearing assembly as in any claim hereinbefore, in
7 which, in the event of the shearing of one single rolled
8 section (11a, 11b), the scrap shears (14) includes a
9 covering and protective element (27) of a removable type to
10 cover the ends of the rotary shafts associated with the side
11 on which the rolled section (11a, 11b) does not pass.
- 12 6 - Shearing assembly as in any claim hereinbefore, in which
13 the distance "I" between the centres of the rolled products
14 (11a, 11b) is between 600 and 900 mm.
- 15 7 - Shearing assembly as in any claim hereinbefore, in which
16 the distance "I" between the centres of the rolled products
17 (11a, 11b) is between 700 and 800 mm.
- 18 8 - Shearing assembly as in any claim hereinbefore, in which
19 the longitudinal distance "L" between the two shears (12a,
20 12b) for shearing to size is between 2500 and 3500 mm.
- 21 9 - Shearing assembly as in any claim hereinbefore, in which
22 the longitudinal distance "L" between the two shears for
23 shearing to size (12a, 12b) is about 3000 mm.



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