LIGHT RAILS
AND
FASTENINGS

STEEL CROSS TIES
FOR
MINES, QUARRIES, PLANTATIONS
AND
PORTABLE TRACK

CARNEGIE STEEL COMPANY
SUBSIDIARY OF UNITED STATES STEEL CORPORATION
PITTSBURGH, PA.
LIGHT RAILS AND FASTENINGS

The RAIL SECTIONS herein enumerated are designed on the lines of those recommended as standard by the American Society of Civil Engineers. For sections 12 to 25 lbs., inclusive, fish bars will be furnished, and angle splice bars for sections 30 to 45 lbs., inclusive.

The adaptability of these light rails and their corresponding accessories is practically unlimited. They are used extensively in all Mining Industries, Quarries, Rolling Mills, Logging Plants, Saw Mills, Docks and Warehouses, as well as for Light Portable Railways. Also for Cotton, Coffee and Sugar Plantations and Tram Roads for various purposes.

These rails are kept in stock in considerable quantities, of a standard length of 30 feet, 9.14 meters, with 10% of shorts, in lengths down to 20 feet, 6.1 meters; standard bolt holes as shown on following pages.

To facilitate quick deliveries, standard lengths and accessories should be specified. Special lengths and special drilling or punching can be furnished when desired. Weights given are only approximate, shipping weights to govern in all cases. The numbers and weights for splice bars, bolts and nuts and spikes, given on the following pages, allow for no excess. All metric dimensions shown on drawings are given in millimeters and weights in kilograms or tonnes.

Standard A. S. C. E. sections from 50 lbs. to 100 lbs. per yard are illustrated on pages 22 and 23 where sections over 45 lbs. per yard are required.
STANDARD RAIL DRILLING

Dia. of Holes \( \frac{8}{16} " \) - 15.88

For Rails 1240, 1640, 2040 and 2540

Dia. of Holes \( \frac{7}{16} " \) - 19.05

For Rails 3040 and 3540

Dia. of Holes \( \frac{5}{8} " \) - 22.23

For Rails 4040 and 4540
STANDARD SPLICE BAR PUNCHING AND NOTCHING

Elliptical Holes $\frac{9}{16}'' \times \frac{3}{16}'' - 14.29 \times 19.05$

For Bars S 1240 and S 1640

Elliptical Holes $\frac{9}{16}'' \times \frac{3}{16}'' - 14.29 \times 19.05$

For Bars S 2040 and S 2540

Elliptical Holes $\frac{11}{16}'' \times \frac{31}{32}'' - 17.46 \times 24.61$

For Bars S 3040 and S 3540

Elliptical Holes $\frac{13}{16}'' \times 1\frac{3}{16}'' - 20.54 \times 28.53$

For Bars S 4040 and S 4540
RAIL SECTION 1240

12 lbs. per yard—5.95 kilograms per meter.
18.86 gross tons per mile of single track.
11.90 tonnes per kilometer of single track.
280 ft. of single track per gross ton.
84.03 meters of single track per tonne.
Weigh of one Bar 1.36 lbs. per ft. 2.00 kg. per meter.

Weight of 161/2"-409.58 mm. Bars per pair 3.44 lbs.—1.56 kg.

Weight of four bolts per joint 0.80 lbs. 0.36 kg.

Total weight of each joint 4.24 lbs. 1.92 kg.
16 lbs. per yard—7.94 kilograms per meter.
25.14 gross tons per mile of single track.
15.88 tonnes per kilometer of single track.
210 ft. of single track per gross ton.
62.97 meters of single track per tonne.
Weight of one bar 1.70 lbs. per ft. 2.52 kg. per meter.
Weight of 16½"-409.58 mm. Bars per pair 4.36 lbs.—1.98 kg.
Weight of four bolts per joint 0.80 lbs. 0.36 kg.
Total weight of each joint 5.16 lbs. 2.34 kg.
20 lbs. per yard — 9.92 kilograms per meter.
31.43 gross tons per mile of single track.
19.84 tonnes per kilometer of single track.
168.0 ft. of single track per gross ton.
50.4 meters of single track per tonne.
Weight of one bar 1.87 lbs. per ft. 2.78 kg. per meter.
Weight of 16⅛"-409.58 mm. Bars per pair 4.86 lbs.—2.20 kg
Weight of four bolts per joint 0.83 lbs. 0.38 kg.
Total weight of each joint 5.60 lbs. 2.58 kg.
25 lbs. per yard—12.40 kilograms per meter.
39.29 gross tons per mile of single track.
24.80 tonnes per kilometer of single track.
134.40 ft. of single track per gross ton.
40.32 meters of single track per tonne.
SPLICE BAR SECTION S2540

Weight of one Bar 2.20 lbs. per ft. 3.30 kg. per meter.
Weight of 16\(\frac{1}{8}\)"-409.58 mm. Bars per pair 5.70 lbs.—2.58 kg.
Weight of four bolts per joint 0.86 lbs. 0.39 kg.
Total weight of each joint 6.56 lbs. 2.97 kg.
RAIL SECTION 3040

30 lbs. per yard—14.88 kilograms per meter.
47.14 gross tons per mile of single track.
29.76 tonnes per kilometer of single track.
112 ft. of single track per gross ton.
33.60 meters of single track per tonne.
Weight of one Bar 3.97 lbs. per ft. 5.90 kg. per meter.
Weight of 16\(\frac{1}{4}\)"-409.58 mm. Bars per pair 10.45 lbs.—4.74 kg.
Weight of four bolts per joint 1.60 lbs. 0.73 kg.
Total weight of each joint 12.05 lbs. 5.47 kg.
35 lbs. per yard—17.36 kilograms per meter.
55.00 gross tons per mile of single track.
34.72 tonnes per kilometer of single track.
96.00 ft. of single track per gross ton.
28.8 meters of single track per tonne.
SPLICE BAR SECTION S3540

Weight of one Bar 4.58 lbs. per ft. 6.82 kg. per meter.

Weight of 16\frac{1}{2}\text{"} - 409.58 \text{ mm. Bars per pair 12.10 lbs.} - 5.50 \text{ kg.}

Weight of four bolts per joint 1.60 lbs. 0.73 kg.

Total weight of each joint 13.70 lbs. 6.23 kg.
RAIL SECTION 4040

40 lbs. per yard—19.84 kilograms per meter.
62.86 gross tons per mile of single track.
39.58 tonnes per kilometer of single track.
84.00 ft. of single track per gross ton.
25.20 meters of single track per tonne.
Weight of one Bar 5.00 lbs. per ft. 7.40 kg. per meter.
Weight of 20"-508.00 mm. Bars per pair 16.10 lbs. —7.30 kg.
Weight of four bolts per joint 2.66 lbs. 1.21 kg.
Total weight of each joint 18.76 lbs. 8.51 kg.
RAIL SECTION 4540

45 lbs. per yard—22.32 kilograms per meter.
70.71 gross tons per mile of single track.
44.64 tonnes per kilometer of single track.
74.67 ft. of single track per gross ton.
22.40 meters of single track per tonne.
Weight of one Bar 5.80 lbs. per ft. 8.60 kg. per meter.
Weight of 20"-508.00 mm. Bars per pair 18.75 lbs.—8.50 kg.
Weight of four bolts per joint 2.72 lbs. 1.23 kg.
Total weight of each joint 21.47 lbs. 9.73 kg.
A. S. C. E. RAILS

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<thead>
<tr>
<th>Section Index</th>
<th>Depth, Inches</th>
<th>Width Base, Inches</th>
<th>Head, Inches</th>
<th>Weight per Yard, Pounds</th>
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23
# TABLE OF RAILS AND ACCESSORIES

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<th>RAIL SECTION</th>
<th>Weight per Yard</th>
<th>Height of Rail</th>
<th>Width of Base</th>
<th>Length of Splice Bar</th>
<th>Size of Spike</th>
<th>FOR ONE JOINT</th>
<th>FOR 1000 TONS OF RAILS</th>
<th>FOR ONE MILE OF SINGLE TRACK</th>
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Above based on 90% furnace 30 ft. and 10% not less than 20 ft. Ties 24 inch centers. 2640 ties per mile. No excess has been allowed.

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<th>Weight per Meter</th>
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<th>Length of Splice Bar</th>
<th>Size of Spike</th>
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<td>1.17</td>
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Above table based on furnishing rails 5 meters long. Ties 600 millimeters to centers; 1667 ties per kilometer. No excess has been allowed.
CARNEGIE STEEL CROSS TIES
FOR
MINES, QUARRIES, PLANTATIONS
AND
PORTABLE TRACK
CARNEGIE STEEL MINE TIES

Carnegie Steel Company offers six standard sections of Steel Ties, with the various types of fastenings illustrated, for mine and industrial use. The widespread and increased demand for Steel Ties confirms their many advantages, all of which give substantial economies to the operator. The fastenings shown on the various sections are best suited for average conditions. Suggestions or recommendations regarding particular designs to meet exceptional conditions, will be furnished upon receipt of essential information.

ADVANTAGES OF STEEL MINE TIES

Saves Headroom. In shallow seams of coal, where headroom is of vital importance, Carnegie Steel Mine Ties offer an effective solution.

Carnegie sections M-19-A and M-26-A are recommended for room-work. Not only is headroom saved, but much time and labor to the miner is saved by their lightness, one-piece construction and simplicity of design. For haulage in the mine and in main entries, where a heavier tie is required, Carnegie sections M-18, M-20, M-27 or M-27-A depending upon the service required, are recommended.

Saves Time and Labor. The one-piece construction of Carnegie Ties assures the quickest track laying possible. The rail is securely locked by a clip attached to the tie. There are no loose bolts or nuts to lose, and no special tools are required. Carnegie Ties, with square head rivets used to fasten the inside clips, permit the use of a jumper or extension rail, by which the track can be brought up to the face of the coal.

Saves Money. It has been found that Copper added to the steel greatly increases its life by retarding corrosion. Carnegie Steel Company has been furnishing Mine Ties, manufactured from copper-bearing steel. The ordinary Steel Mine Tie outwears wooden ties several times, as the
latter soon become useless through decay and repeated spikings. With the addition of copper, Carnegie Ties are giving a much longer period of usefulness.

Aside from their economy in actual cost, the ease with which Carnegie Ties are handled, has proven to be a decided time and money-saving factor. Good ties are not apt to be left behind or wasted when they can be moved so easily. Steel Ties have a scrap value when they are no longer serviceable as ties. The miners themselves prefer steel ties as an aid in securing increased output.

**Design.** Due to sectional design and an improved distribution of metal, Carnegie Ties will not buckle under proper service. The type of fastenings used makes it improbable that the track gauge will spread. The channel and groove effect, with wide bearing surface, prevents the ties from sinking into soft bottoms, and resists crushing on hard bottoms. Riveted clips make the tie entirely one piece, eliminating loose parts and the necessity of special tools.

*Carnegie Ties are easily handled.* The lighter sections are shipped from the mill in bundles of five. This facilitates storage and saves time, only one man being needed to place the ties in position. The rail is securely locked to the proper gauge by turning the two inside clips into position, and indentations in the tie prevent these clips from slipping.

The design of the larger channel sections makes them suited for industrial, plantation and standard-gauge track. Variations, such as crimping the ends, or the use of special clips, are resorted to when special conditions are to be met.

The heavier channel sections, M-18, M-20, M-27 and M-27-A with drop-forged clips, are used for main entry and main track, with 25-lb. to 75-lb. rail sections. With the ends bent down as illustrated, these sections are extensively used for laying permanent track in foreign countries.
CROSS TIE SECTIONS

<table>
<thead>
<tr>
<th>Section Index</th>
<th>Depth</th>
<th>Width</th>
<th>Web Thickness</th>
<th>Weight per Foot</th>
<th>Area</th>
<th>Moment of Inertia</th>
<th>Section Modulus</th>
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# Rail Clips

**No. 120**

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**Plan for No. 26 AA Clips**

- **No. 26 AA1 and No. 26 A1**
- **No. 26 AA2 and No. 26 A2**
- **No. 26 AA3 and No. 26 A3**
- **No. 26 AA4 and No. 26 A4**

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**Plan for No. 26 A Clips**

---

<table>
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<tr>
<th>Clip Number</th>
<th>Weight per Foot, Pounds</th>
<th>Finished Weight, Pounds</th>
<th>Fastening for</th>
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<td>M 19 A, M 26 A</td>
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The finished weights for Clips 26 A 1, 2, 3, and 4 are 0.29, 0.21, 0.22 and 0.23 lb., respectively.
END VIEW OF M19A TIE
SHOWING DOUBLE-RIVETED No. 26 AA CLIP
GENERAL ARRANGEMENT M19A WITH NO. 26 K AND NO. 26 AA CLIPS

FULL LENGTH TIE
GENERAL ARRANGEMENT MPA WITH NO. 26 AA-3 CLIP AND TWO NO. 26 K CLIPS AFTER ATTACHING THE RAIL.
GENERAL ARRANGEMENT OF ROOM TIE COMPLETE WITH SPECIAL CLIPS FOR USE WITH SLIDE RAIL
GENERAL ARRANGEMENT M19A WITH No. 26 CLIP EQUIPPED WITH SQUARE HEAD RIVET FOR BALLING THE RAIL

GENERAL ARRANGEMENT M26A TIE WITH No. 26 J JOINT CLIP
GENERAL ARRANGEMENT M 27 TIE WITH 60 L.B. A. S. C. E. RAIL AND No. 23 CLIPS AND BOLTS.
GENERAL ARRANGEMENT M 27 TIE WITH NO. 23 CLIPS AND BOLTS
INFORMATION REQUIRED ON STEEL TIE ORDERS

To save delay and facilitate the execution of steel tie orders, the following information must be supplied:

1. Section of Tie.
2. Type of Fastenings.
3. Track Gauge.
4. Section of Rail (weight and type).

The lengths of Mine Tie sections M-19-A and M-26-A are standardized, depending on the track gauge and rail section, and may be determined by adding to the gauge, the width of the head of the rail, plus the width of the base, plus 4½ inches. When ordering it is only necessary to give the track gauge and rail section; suitable lengths will be furnished.

Table of lengths and weights of Mine Tie sections M-19-A and M-26-A, for various rail sections and track gauges, are given on following pages.
### TABLE 1

**Table of Lengths and Weights of M-19-A Under A. S. C. E. Rails**

*Exclusive of Fastenings*

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<th>Length, In.</th>
<th>Weight, Lbs.</th>
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<td></td>
<td>Weight</td>
<td>6.19</td>
<td>7.02</td>
</tr>
<tr>
<td></td>
<td>Weight</td>
<td>6.25</td>
<td>7.08</td>
</tr>
<tr>
<td></td>
<td>Weight</td>
<td>6.32</td>
<td>7.15</td>
</tr>
</tbody>
</table>

Weight per Tie of 2-No. 26 and 2-No. 26 AA-1 clips and 6 rivets = 3.08 lbs.

26 AA-2 = 3.10

26 AA-3 = 3.12
<table>
<thead>
<tr>
<th>Rail Section</th>
<th>Length, In.</th>
<th>Weight, Lbs.</th>
<th>20</th>
<th>24</th>
<th>30</th>
<th>32</th>
<th>36</th>
<th>40</th>
<th>42</th>
<th>44</th>
<th>48</th>
<th>56 1/2</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Weight</td>
<td>7.48</td>
<td>8.56</td>
<td>10.19</td>
<td>10.73</td>
<td>11.81</td>
<td>12.89</td>
<td>13.43</td>
<td>13.97</td>
<td>15.05</td>
<td>17.36</td>
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<tr>
<td></td>
<td>Weight</td>
<td>7.00</td>
<td>8.08</td>
<td>10.30</td>
<td>10.84</td>
<td>11.92</td>
<td>13.00</td>
<td>13.54</td>
<td>14.08</td>
<td>15.16</td>
<td>17.46</td>
<td></td>
</tr>
<tr>
<td>2040</td>
<td>Length</td>
<td>28 3/4 1/2</td>
<td>32 3/4 1/2</td>
<td>38 3/4 1/2</td>
<td>40 3/4 1/2</td>
<td>44 3/4 1/2</td>
<td>48 3/4 1/2</td>
<td>50 3/4 1/2</td>
<td>52 3/4 1/2</td>
<td>56 3/4 1/2</td>
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</tr>
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<td>Weight</td>
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<td>8.80</td>
<td>10.42</td>
<td>10.95</td>
<td>12.03</td>
<td>13.11</td>
<td>13.65</td>
<td>14.19</td>
<td>15.27</td>
<td>17.57</td>
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<tr>
<td>2540</td>
<td>Length</td>
<td>28 1/8 1/2</td>
<td>32 1/8 1/2</td>
<td>38 1/8 1/2</td>
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<td>44 1/8 1/2</td>
<td>48 1/8 1/2</td>
<td>50 1/8 1/2</td>
<td>52 1/8 1/2</td>
<td>56 1/8 1/2</td>
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<td>8.90</td>
<td>10.52</td>
<td>11.06</td>
<td>12.14</td>
<td>13.23</td>
<td>13.78</td>
<td>14.32</td>
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<tr>
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<td>39 1/4 1/4</td>
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<td>51 1/4 1/4</td>
<td>53 1/4 1/4</td>
<td>57 1/4 1/4</td>
<td>65 1/4 1/4</td>
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</tr>
<tr>
<td>3540</td>
<td>Length</td>
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<td>33 1/4 1/4</td>
<td>39 1/4 1/4</td>
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<td>53 1/4 1/4</td>
<td>57 1/4 1/4</td>
<td>66 1/4 1/4</td>
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<tr>
<td>4040</td>
<td>Length</td>
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<td>34</td>
<td>40</td>
<td>42</td>
<td>46</td>
<td>50</td>
<td>52</td>
<td>54</td>
<td>58</td>
<td>66 1/2</td>
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</tr>
<tr>
<td>4540</td>
<td>Length</td>
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<td>34 1/8</td>
<td>40 1/8</td>
<td>42 1/8</td>
<td>46 1/8</td>
<td>50 1/8</td>
<td>52 1/8</td>
<td>54 1/8</td>
<td>58 1/8</td>
<td>66 1/8</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Weight</td>
<td>8.21</td>
<td>9.29</td>
<td>10.91</td>
<td>11.45</td>
<td>12.53</td>
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<td>14.69</td>
<td>15.77</td>
<td>18.09</td>
<td></td>
</tr>
</tbody>
</table>

For weights of standard fastenings, see Table 1.
Weight per Tie of 2-No. 26 J and 2-No. 26 AA-1 clips and 6 rivets = 3.88 lbs.
- " " " " " " " " " 26 AA-2 " " " " " = 3.90 " " " " " " " " " 26 AA-3 " " " " " = 3.92 "
## TABLE 3

**TABLE OF LENGTHS AND WEIGHTS OF M-19-A UNDER A. R. A. RAILS**

Excluding of Fastenings

<table>
<thead>
<tr>
<th>Rail Section</th>
<th>Length, In.</th>
<th>Weight, Lbs.</th>
<th>Gauge, Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20</td>
<td>24</td>
<td>30</td>
</tr>
<tr>
<td></td>
<td>5.68</td>
<td>6.51</td>
<td>7.76</td>
</tr>
<tr>
<td></td>
<td>5.77</td>
<td>6.60</td>
<td>7.85</td>
</tr>
<tr>
<td></td>
<td>5.85</td>
<td>6.68</td>
<td>7.93</td>
</tr>
<tr>
<td>2530</td>
<td>28 1/2</td>
<td>32 1/2</td>
<td>38 1/2</td>
</tr>
<tr>
<td></td>
<td>5.95</td>
<td>6.78</td>
<td>8.03</td>
</tr>
<tr>
<td>3030</td>
<td>28 3/2</td>
<td>32 3/2</td>
<td>38 3/2</td>
</tr>
<tr>
<td></td>
<td>6.02</td>
<td>6.85</td>
<td>8.10</td>
</tr>
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<td>29 1/2</td>
<td>33 1/2</td>
<td>39 1/2</td>
</tr>
<tr>
<td></td>
<td>6.10</td>
<td>6.93</td>
<td>8.18</td>
</tr>
<tr>
<td>4030</td>
<td>29 1/8</td>
<td>33 1/8</td>
<td>39 1/8</td>
</tr>
<tr>
<td>4530</td>
<td>29 1/4</td>
<td>33 1/4</td>
<td>39 1/4</td>
</tr>
<tr>
<td></td>
<td>6.24</td>
<td>7.07</td>
<td>8.32</td>
</tr>
</tbody>
</table>

Weight per Tie of 2-No. 26 and 2-No. 26 AA-3 clips and 6 rivets = 3.12 lbs.

- "  = 26 AA-4
- "  = 26 AA-3
- "  = 26 AA-4
- "  = 3.96
TABLE 4

TABLE OF LENGTHS AND WEIGHTS OF M-26-A UNDER A. R. A. RAILS
Exclusive of Fastenings

<table>
<thead>
<tr>
<th>Rail Section</th>
<th>Length, In.</th>
<th>Weight, Lbs</th>
<th>Gauge, Inches</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>20</td>
<td>24</td>
<td>30</td>
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<td>1230</td>
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</tr>
<tr>
<td></td>
<td>7.39</td>
<td>8.46</td>
<td>10.06</td>
</tr>
<tr>
<td>1630</td>
<td>27 1/4</td>
<td>31 1/4</td>
<td>37 1/4</td>
</tr>
<tr>
<td></td>
<td>7.50</td>
<td>8.58</td>
<td>10.20</td>
</tr>
<tr>
<td>2030</td>
<td>28 1/2</td>
<td>32 1/2</td>
<td>38 1/2</td>
</tr>
<tr>
<td></td>
<td>7.60</td>
<td>8.68</td>
<td>10.30</td>
</tr>
<tr>
<td>2530</td>
<td>28 1/4</td>
<td>32 1/4</td>
<td>38 1/4</td>
</tr>
<tr>
<td></td>
<td>7.73</td>
<td>8.82</td>
<td>10.44</td>
</tr>
<tr>
<td>3030</td>
<td>28 1/2</td>
<td>32 1/2</td>
<td>38 1/2</td>
</tr>
<tr>
<td></td>
<td>7.82</td>
<td>8.91</td>
<td>10.53</td>
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<tr>
<td>3530</td>
<td>29 1/2</td>
<td>33 1/2</td>
<td>39 1/2</td>
</tr>
<tr>
<td>4030</td>
<td>29 1/4</td>
<td>33 1/4</td>
<td>39 1/4</td>
</tr>
<tr>
<td></td>
<td>8.00</td>
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<td>10.71</td>
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<tr>
<td>4530</td>
<td>29 1/2</td>
<td>33 1/2</td>
<td>39 1/2</td>
</tr>
</tbody>
</table>

For weights of fastenings, see Table 3
# Drop Forged Rail Clips

## Bolt for No. 7 Clip

[Diagram of Bolt for No. 7 Clip]

## Bolt for No. 10 Clip

[Diagram of Bolt for No. 10 Clip]

## Bolt for No. 18 Clip

[Diagram of Bolt for No. 18 Clip]

## Rail Clip No. 18

[Diagram of Rail Clip No. 18]

<table>
<thead>
<tr>
<th>Clip Number</th>
<th>Finished Weight, Pounds</th>
<th>Fastenings for</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Clip Only</td>
<td>Clip Bolt Nut</td>
</tr>
<tr>
<td>7</td>
<td>0.10</td>
<td>0.21</td>
</tr>
<tr>
<td>10</td>
<td>0.13</td>
<td>0.48</td>
</tr>
<tr>
<td>18</td>
<td>0.21</td>
<td>0.58</td>
</tr>
</tbody>
</table>
DROP FORGED RAIL CLIPS

**RAIL CLIP No. 23B**

**RAIL CLIP No. 18 A**

**RAIL CLIP No. 23**

**BOLT FOR No. 23 CLIP**

<table>
<thead>
<tr>
<th>Clip Number</th>
<th>Finished Weight, Pounds</th>
<th>Fastenings for</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Clip Only</td>
<td>Clip Bolt Nut</td>
</tr>
<tr>
<td>18 A</td>
<td>0.31</td>
<td>0.68</td>
</tr>
<tr>
<td>23</td>
<td>0.70</td>
<td>1.26</td>
</tr>
<tr>
<td>23 B</td>
<td>0.80</td>
<td>1.36</td>
</tr>
</tbody>
</table>

**NOTE:** Ties punched for Clip No. 23 B outside and No. 23 inside, or punched for Clip No. 18 A outside and No. 18 inside will make a variation of $\frac{1}{2}''$ in gage by reversing the clips on both rails.

49
MAIN ENTRIES

COMPARISON OF COSTS BETWEEN STEEL TIES AND WOOD TIES

In some mines having dry roadways, the average life of the wood tie on main haulage is 24 months. The life of a steel tie has not been definitely determined but may last from 13 to 15 years. The following calculations have been based on only a ten-year life. It has been found necessary to place wood ties 18" center to center. Steel Ties have been tried on 24", 30" and 36" centers, and 30" center to center has been found the most satisfactory. Estimate below is for 100 feet of track, 38" gauge:

\[
\begin{align*}
67 & \quad 5'' \times 6'' \times 5\frac{1}{2}-ft. \text{ Wood Ties @ } 28c. \quad \$18.76 \\
4 & \quad \text{Renewals within ten-year period.} \quad \$75.04 \\
& \quad \text{Cost of laying original track.} \quad \$25.00 \\
& \quad \text{Cost of labor replacing ties four times @} \quad \$50.00 \text{ per replacement.} \quad \$200.00 \\
& \quad \text{Spikes.} \quad \$16.14 \\
& \quad \text{Total.} \quad \$334.94 \\
40 & \quad \text{M-27 Steel Ties with No. 23 clips and bolts,} \quad \$65.60 \\
& \quad \text{(life ten years) @ } 1.64. \quad \$25.00 \quad 90.60 \\
& \quad \text{Cost of laying.} \quad \text{Net saving per 100-ft. of entry in ten years...} \quad \$244.34
\end{align*}
\]

The above figures are subject to local and market conditions.
<table>
<thead>
<tr>
<th>Clip No.</th>
<th>Weight per Clip Finished Pounds</th>
<th>Weight per Foot of Bolt and Nut Required</th>
<th>Size of Bolt in Inches</th>
<th>Size of Bolt Hole in the Ties</th>
<th>Total Wt. of One Second of Securing Pounds</th>
<th>Size of One Section of Fastenings Required</th>
<th>Rails to Which They Apply</th>
</tr>
</thead>
<tbody>
<tr>
<td>7</td>
<td>0.10</td>
<td>1/8 x 1/8</td>
<td>0.48</td>
<td>0.31</td>
<td>0.21</td>
<td>M-19 A, M-26 A</td>
<td>12 lb. A. S. C. E.</td>
</tr>
<tr>
<td>10</td>
<td>0.33</td>
<td>3/16 x 3/16</td>
<td>0.58</td>
<td>0.68</td>
<td>0.68</td>
<td>M-26 A, M-26 A</td>
<td>12 lb. A. S. C. E.</td>
</tr>
<tr>
<td>18</td>
<td>0.21</td>
<td>1/4 x 1/4</td>
<td>1.22</td>
<td>1.22</td>
<td>1.22</td>
<td>M-19 A, M-26 A</td>
<td>12 lb. A. R. A.</td>
</tr>
<tr>
<td>23</td>
<td>0.70</td>
<td>5/32 x 5/32</td>
<td>1.36</td>
<td>1.36</td>
<td>1.36</td>
<td>M-19 A, M-29 A</td>
<td>12 lb. A. R. A.</td>
</tr>
<tr>
<td>25</td>
<td>0.40</td>
<td>1/8 x 1/8</td>
<td>0.52</td>
<td>0.52</td>
<td>0.52</td>
<td>M-19 A, M-26 A</td>
<td>12 lb. A. S. C. E.</td>
</tr>
<tr>
<td>26-K</td>
<td>1.00</td>
<td>1/8 x 1/8</td>
<td>0.72</td>
<td>0.72</td>
<td>0.72</td>
<td>M-19 A, M-26 A</td>
<td>12 lb. A. S. C. E.</td>
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<td>29-AA-1</td>
<td>1.75</td>
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<td>0.48</td>
<td>0.48</td>
<td>0.48</td>
<td>M-19 A, M-26 A</td>
<td>25 to 30 lb. A. S. C. E.</td>
</tr>
<tr>
<td>29-AA-2</td>
<td>1.80</td>
<td>1/8 x 1/8</td>
<td>0.40</td>
<td>0.40</td>
<td>0.40</td>
<td>M-19 A, M-26 A</td>
<td>25 to 30 lb. A. S. C. E.</td>
</tr>
<tr>
<td>29-AA-3</td>
<td>1.95</td>
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<td>0.50</td>
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<td>25 to 30 lb. A. S. C. E.</td>
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<td>29-AA-4</td>
<td>2.00</td>
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<td>0.52</td>
<td>0.52</td>
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<td>25 to 30 lb. A. S. C. E.</td>
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<tr>
<td>120</td>
<td>5.6</td>
<td>3/8 x 3/8</td>
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<td>0.81</td>
<td>0.81</td>
<td>M-19 A, M-26, M-27</td>
<td>25 to 59 lb. A. R. A.</td>
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</table>
CARNEGIE STEEL COMPANY

PRODUCTS

BLAST FURNACE PRODUCTS

Basic Pig Iron
Bessemer Pig Iron
Ferro-Manganese
Ballast Slag
Bank Slag
Concrete Slag
Crushed Slag
Granulated Slag
Sand Slag

ROLLING MILL PRODUCTS

Structural Products
C B Sections
Standard Beams
H Beams
Channels
Ship Building Channels
Car Building Sections
Bulb Angles
Angles
Tees
Elevator Tees
Conductor Tees
Zeens
Cross Tie Sections
Carnegie Steel Sheet Piling
Miscellaneous Sections

Semi-Finished Products
Ingots
Blooms
Billets
Slabs
Sheet Bars

Plate Products
Sheared Plates—
Rectangular
Circular
Sketch
Universal—Mill Plates
Base Plates for Columns and
Machinery
Floor Plates
Skelp

Bar Products
Agricultural Sections
Angles
Automobile Body Sections
Automobile Bumper Sections
Automobile Rim Sections
Barrel Sections
Bevel Sections
Cam Sections
Can Ring Sections
Casement Sections
Channels
Concrete Reinforcement Bars
Coperage Steel
Crescents
Flat Discs for Automobile Parts
Flat Rolled Steel
Flats under ¼"
Grooved Flats
Half Ovals
Half Rounds
Hame Sections
Hexagons

Hoop and Band Steel
Key Sections
Locking Bar Sections
Magneto Sections
Neck Yoke Sections
Nut Sections
Ovals
Pipe Coupling Sections
Pole Cap Sections
Pole Sections
Round Cornered Squares
Round Edge Flats
Rounds
Scarfied Skelp
Skelp
Special Sections of Various Kinds
Spring Steel Sections
Square Edge Flats
Squares
Tees
Window Sash Sections
Zeens
# CARNEGIE STEEL COMPANY

## PRODUCTS

### ROLLING MILL PRODUCTS—Concluded

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<thead>
<tr>
<th>Wrought and Forged Steel Products</th>
<th>Railroad Track Products</th>
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<tr>
<td>Axles—</td>
<td>Standard Rails</td>
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<tr>
<td>Untreated</td>
<td>Heavy Rails, 50 pounds and over</td>
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<tr>
<td>Annealed</td>
<td>Light Rails, under 50 pounds</td>
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<tr>
<td>Quenched and Tempered</td>
<td>Miscellaneous Rails</td>
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<tr>
<td>Electric Railway Car</td>
<td>G E O Track Material</td>
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<tr>
<td>Steam Railroad Car</td>
<td>Angle Splice Bars</td>
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<td>Fish Plates</td>
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<td>Locomotive Trailing</td>
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<td>Rim Toughened</td>
<td>Track Bolts</td>
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<td>Solid Wrought, Carbon Steel</td>
<td>Cross Ties for Railroads</td>
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<tr>
<td>Electric Railway</td>
<td>Cross Ties for Mine Track</td>
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<td>Steam Railroad</td>
<td>Cross Ties for Portable Track</td>
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<td>Brake Drums for Trucks</td>
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### GRADES

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<th>Open-Hearth Alloy</th>
<th>USS Stainless and Heat Resisting Steels</th>
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<tbody>
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<td>Blast Furnace Coke</td>
<td>Domestic or Nut Coke</td>
<td>Coke Breeze</td>
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<tr>
<td>Benzol—</td>
<td>Ammoniacal Liquor</td>
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<tr>
<td>Industrial Pure</td>
<td>Ammonium Sulphate</td>
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<tr>
<td>Industrial 90%</td>
<td>Crude Naphthalene</td>
<td></td>
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<tr>
<td>Motor</td>
<td>Tar</td>
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<tr>
<td>Toluol, Industrial</td>
<td>Creosote Oil</td>
<td></td>
<td></td>
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<tr>
<td>Xylol, Industrial</td>
<td>Cresylic Acid</td>
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<tr>
<td>Naphtha—</td>
<td>Phenol</td>
<td></td>
<td></td>
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<tr>
<td>Industrial Refined Light</td>
<td>Ccreol</td>
<td></td>
<td></td>
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<tr>
<td>Industrial Crude Heavy</td>
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<tr>
<td>Industrial High Test</td>
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</tbody>
</table>

### COKE AND COKE BY-PRODUCTS

| Blast Furnace Coke           | Domestic or Nut Coke              | Coke Breeze                                |                                        |
| Foundry Coke                 |                                   |                                            |                                        |
| Benzol—                      | Ammoniacal Liquor                 |                                            |                                        |
| Industrial Pure              | Ammonium Sulphate                 |                                            |                                        |
| Industrial 90%               | Crude Naphthalene                 |                                            |                                        |
| Motor                        | Tar                               |                                            |                                        |
| Toluol, Industrial           | Creosote Oil                      |                                            |                                        |
| Xylol, Industrial            | Cresylic Acid                     |                                            |                                        |
| Naphtha—                     | Phenol                            |                                            |                                        |
| Industrial Refined Light     | Ccreol                            |                                            |                                        |
| Industrial Crude Heavy       |                                   |                                            |                                        |
| Industrial High Test         |                                   |                                            |                                        |
PRINCIPAL SUBSIDIARY MANUFACTURING COMPANIES OF UNITED STATES STEEL CORPORATION

AMERICAN BRIDGE COMPANY
General Offices: 71 Broadway, New York, N. Y.

STEEL STRUCTURES OF ALL CLASSES

Bridges
Buildings
Columns
Girders
Roof Trusses
Barges

Poles
Towers
Turntables
Sub-Stations
Heroult Electric Furnaces

AMERICAN SHEET AND TIN PLATE COMPANY
General Offices: Frick Building, Pittsburgh, Pa.

SHEET AND TIN MILL PRODUCTS FOR ALL PURPOSES

Black Sheets—
Box Annealed
Blue Annealed
Metal Furniture
Vitreous Enameling
Special
Electrical Sheets
Automobile Sheets
Full Finished Sheets
U S S Stainless and Heat Resisting Steel Sheets
Blued Sheets—
Keystone-Wellsville Polished
Blued Stove Pipe Stock
Long Terne Sheets
American Galvannealed Sheets

Galvanized Sheets—
American Zinc Coated
Apollo Best Bloom
Apollo-Keystone
Corrugated
Formed Roofing and Siding Products
Bright Tin Plates—
American Cokes
American Charcoals
Terne Plates—
American Ternes
American Old Style Ternes
U. S. Eagle Ternes
Fire Door Ternes
Keystone Long and Short Ternes
Tin Mill Black
PRINCIPAL SUBSIDIARY MANUFACTURING COMPANIES OF UNITED STATES STEEL CORPORATION

AMERICAN STEEL AND WIRE COMPANY
General Offices: 208 South La Salle Street, Chicago, Ill.

WIRE AND WIRE PRODUCTS

Aerial Tramways
Bale Ties
Barbed Wire
Cold Rolled Strip Steel
Concrete Reinforcement
Electrical Wire
Flat Wire
Hoops
Nails
Netting
Odd-Shaped Wire
Piano Wire
Plain Wire
Rail Bonds
Screw Stock
Spikes
Springs
Steel Gates
Steel Posts
Telegram Wire
 Telephone Wire
 Trolley Wire
 Welding Wire
 Wire Fence
 Wire Rope
 Wire for Manufacturing
 U S S Stainless and
 Heat Resisting Steels

THE CANADIAN BRIDGE COMPANY, LTD.
General Offices: Walkerville, Ontario, Canada

STEEL STRUCTURES OF ALL CLASSES

Railway Bridges
Highway Bridges
Ferry Aprons
Mill Buildings
Office Buildings
Oil Storage Tanks
Poles, Galvanized
Radio Masts, Galvanized
Towers, Galvanized
Turntables

CANADIAN STEEL CORPORATION, LTD.
General Offices: Ojibway, Ontario, Canada

WIRE AND WIRE PRODUCTS

Bale Ties
Barbed Wire
Galvanized Wire
Plain Wire
Spring Wire
Welding Wire
Wire Fence
Wire Hoops
Wire for Various Purposes
Chain Link Protective Fence
Chain Link Protective Gates
Steel Gates and Posts
Concrete Reinforcement
Staples
Sheets, Galvanized—
Apollo
Apollo-Keystone
Tin Plates—
Coke
Charcoal
PRINCIPAL SUBSIDIARY MANUFACTURING COMPANIES OF UNITED STATES STEEL CORPORATION

CYCLONE FENCE COMPANY
General Offices: Waukegan, Ill.

ORNAMENTAL AND PROTECTIVE FENCE
Chain Link Protective Fence
Chain Link Road Guard
Ornamental Iron Fence
Ornamental Lawn Fence

Chain Link Conveyor Belting
Screen Cloth
Woven Wire Partitions

FEDERAL SHIPBUILDING AND DRY DOCK COMPANY
General Offices: Lincoln Highway, Kearny, N. J.

SHIPS AND STEEL FABRICATION
Builders and Repairers of—
Merchant Ships
Barges, Dredges, Lighters

Heavy Machine Work
Steel Fabrication

ILLINOIS STEEL COMPANY
General Offices: 208 South La Salle Street, Chicago, Ill.

ROLLED STEEL AND FORGED STEEL PRODUCTS
CB Sections
Structural Shapes
Special Light Beams
Plates
Bars
Shapes
Plates

Flats under 3/4"
Billets
Rails
Splice Bars
Tie Plates
Bars

Spikes
Screw Spikes
Bolts
Axles
Wheels
U S S Stainless and Heat Resisting Steels

Semi-Finished Products

THE LORAIN STEEL COMPANY
General Offices: 545 Central Ave., Johnstown, Pa.

MINING COMPANY SPECIALTIES
Steel and Composite Mine Cars
Sectional Coal Conveyors
Portable Face Conveyors
Collapsible Mine Post Jacks
Frogs—
Cast Manganese Steel
Cast Iron
Riveted Plate or
Built-up Construction

Switches
Switch Stands
Track Layouts for Tipples
Steel and Iron Castings
Drop Forgings
Carriage Bolts
Machine Bolts
Track Bolts
PRINCIPAL SUBSIDIARY MANUFACTURING COMPANIES OF UNITED STATES STEEL CORPORATION

NATIONAL TUBE COMPANY
General Offices: Frick Building, Pittsburgh, Pa.

NATIONAL WELDED AND NATIONAL-SHELBY
Seamless Steel Tubular Products, Sizes From 1/8" to 96" Diameter
Standard Pipe
Copper Steel Pipe
Line Pipe, Casing, Tubing
Drive Pipe
Rotary Drill Pipe
Hammer-weld Pipe
Boiler Tubes
Seamless Mechanical Tubing
Special Dipped and Coated Pipe
Talbot Lined Pipe
Cement Lined Pipe
Trolley Poles, Line Poles
Cylinders, Seamless Couplings
Rotary Rolled Pipe
Electric Welded Pipe
U S S Stainless and Heat Resisting Steels—Pipes and Tubes

OIL WELL SUPPLY COMPANY
General Offices: Clark Building, Pittsburgh, Pa.

OIL FIELD DRILLING AND PUMPING EQUIPMENT
"Oilwell", "Imperial", "Wilson-Snyder" and "Erie Ball" Products
Drop Forgings
Steel and Iron Castings
Erie Ball Steam Engines
Swaged Nipples and Bull Plugs
Special Fittings
Wilson-Snyder Pumping Machinery

TENNESSEE COAL, IRON AND RAILROAD COMPANY
Rolled Steel, Cast and Heavy Forged Steel Products
Structural Shapes
Plates
Bars
Flats
Cotton Ties
Steel Castings
Rails
Rail Accessories
Axles
Forgings
Pig Iron
Sheets—Black
Blue Annealed
Galvanized

UNIVERSAL ATLAS CEMENT COMPANY
General Offices: 208 South La Salle St., Chicago, Ill.
Atlas Portland Cement
Universal Portland Cement
Atlas Lumnite Cement
Atlas White Portland Cement
Atlas Waterproofed White Portland Cement
CARNegie STEEL COMPANY

PUBLICATIONS

Pocket Companion
Carnegie Shape Book
Rails and Angle Bars
Railway Steel Cross Ties
Light Rails—Mine and Industrial Steel Cross Ties
G E O Track Construction
Wrought Steel Wheels and other Circular Sections
Forged Steel Axles
Standard Specifications
Carnegie Steel Sheet Piling
Steel Weights and Measures
The Making, Shaping and Treating of Steel
Methods of Chemical Analysis of Various Products, etc.
U S S Stainless and Heat Resisting Alloy Steels
CARNEGIE STEEL COMPANY
SUBSIDIARY OF UNITED STATES STEEL CORPORATION

OFFICES

GENERAL OFFICES:
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DISTRICT OFFICES:

Birmingham, Brown-Marx Building, 2000 First Avenue, North,
Boston, Statler Office Building, 20 Providence Street,
Buffalo, The Marine Trust Co. Building, 233-239 Main Street,
Chicago, 208 South La Salle Street,
Cincinnati, Union Trust Building, Fourth and Walnut Streets,
Cleveland, Rockefeller Building, 614 Superior Avenue, N. W.,
Denver, First National Bank Building, 17th and Stout Streets,
Detroit, Buhl Building, 535 Griswold Street,
New Orleans, Maison Blanche, 921 Canal Street,
New York, Empire Building, 71 Broadway,
Philadelphia, Widener Building, Chestnut and Juniper Streets,
Pittsburgh, Carnegie Building, 434 Fifth Avenue,
St. Louis, Mississippi Valley Trust Building, 506 Olive Street,
St. Paul, Merchants National Bank Building, Fourth & Robert Sts.,
Washington, Wilkins Building, 1512 H Street, N. W.

EXPORT DISTRIBUTORS:

UNITED STATES STEEL PRODUCTS CO.

New York, Hudson Terminal Building, 30 Church Street.

PACIFIC COAST DISTRIBUTORS:

COLUMBIA STEEL CO.

San Francisco, Russ Building, 235 Montgomery Street,
Los Angeles, 2087 East Slauson Avenue,
Portland, 777 Nicolai Street,
Seattle, Fourth Avenue South and Connecticut Street,
Honolulu, T. H., Castle and Cook Building.