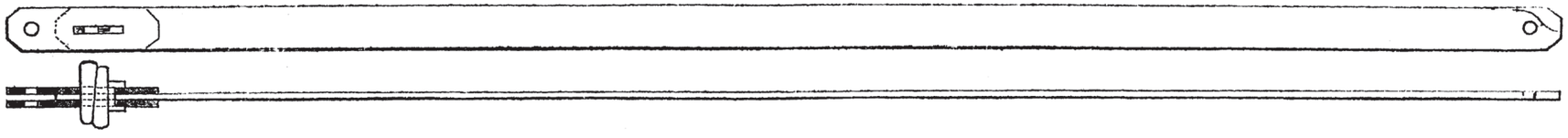
RESULTS of EXPERIMENTS to ascertain the RESISTANCE to EXTENSION and RUPTURE, under a gradually increased PULLING STRESS of THREE IRON TIE-BARS having COUPLING-LINKS attached with COLLARS, received per HENRY LAW, Esq., C.E.

| Test No. | Link Number. | Original Dimensions. | Sectional Area. | Length between Cotter and Bolt-hole. | Total Stress on Link in Pounds—Extension Inch. | | | | | | | | | | | | | | | | | | | | | | | | | | Ultimate Extension. | Ultimate Stress. | | Position of Fracture. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 10,000. | 12,000. | 14,000. | 16,000. | 18,000. | 20,000. | 22,000. | 24,000. | 26,000. | 28,000. | 30,000. | 32,000. | 34,000. | 36,000. | 38,000. | 40,000. | 42,000. | 44,000. | 46,000. | 48,000. | 50,000. | 52,000. | 54,000. | 56,000. | 58,000. | 60,000. | | Total. | Per sq. in. | |
| O | | inches. | sq. in. | in. | | | | | | | | | | | | | | | | | | | | | | | | | | | inch. | lbs. | lbs. | |
| 1415 | Unmarked | 4·47 × ·51 | 2·279 | 135·7 | ·070 | ·090 | ·109 | ·128 | ·150 | ·171 | ·190 | ·210 | ·230 | ·255 | ·280 | ·300 | ·326 | ·355 | ·378 | ·408 | ·430 | ·460 | ·486 | ·525 | ·570 | ·620 | ·680 | ·738 | — | — | 0·76 | 56,692 | 24,875 | |
| 1417 | ,, | 4·47 × ·51 | 2·279 | 125·3 | ·112 | ·148 | ·177 | ·188 | ·211 | ·229 | ·248 | ·260 | ·280 | ·300 | ·320 | ·338 | ·360 | ·380 | ·400 | ·420 | ·450 | ·485 | ·525 | ·570 | ·625 | ·688 | ·810 | ·900 | ·992 | — | 1·12 | 59,524 | 26,118 | |
| 1419 | ,, | 4·50 × ·49 | 2·205 | 125·2 | ·109 | ·149 | ·218 | ·246 | ·270 | ·290 | ·320 | ·342 | ·370 | ·396 | ·428 | ·460 | ·498 | ·525 | ·560 | ·598 | ·638 | ·680 | ·738 | ·788 | ·850 | ·911 | ·972 | 1·07 | — | — | 1·16 | 56,488 | 25,618 | |



SUMMARY of RESULTS of SECOND EXPERIMENTS to ASCERTAIN the QUALITY of the IRON.

| Test No. 1st Experiment. | Test No. 2nd Experiment. | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 0·1415 | 0·1416 | Bar broke with 99,810 lbs. = 43,795 lbs. or 19·55 tons per square inch, | contraction of area at fracture | 10·53 | per cent., | extension | 6·6 | per cent., | fracture | 70 | per cent. | fibrous, | 30 | per cent. crystalline. |
| 0·1417 | 0·1418 | ,, 107,680 lbs. = 47,249 lbs. or 21·09 | ,, | ,, | | 17·37 | ,, | | 12·3 | ,, | | 75 | ,, | | 25 | ,, |
| 0·1419 | 0·1420 | ,, 95,420 lbs. = 43,274 lbs. or 19·31 | ,, | ,, | | 15·55 | ,, | | 7·2 | ,, | | 85 | ,, | | 15 | ,, |

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22nd April 1880.

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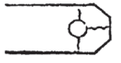
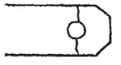
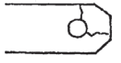
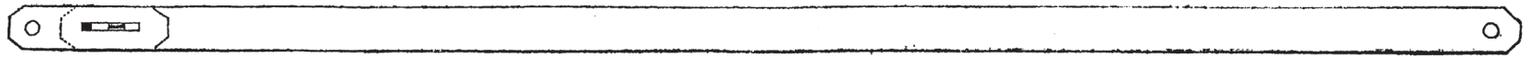
RESULTS of EXPERIMENTS to ascertain the RESISTANCE to EXTENSION and RUPTURE, under a GRADUALLY INCREASED PULLING STRESS of THREE IRON TIE-BARS having COUPLING-LINKS attached with COTTERS, received per HENRY LAW, Esq., C.E.

| Test No. | Link Number. | Original Dimensions. | Sectional Area. | Length between Cotter and Bolt-holes. | Total Stress on Link in pounds.—Extension inch. | | | | | | | | | | | | | | | | | | | | | | | | | Ultimate Extension. | Ultimate Stress. | | Position of Fracture. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | 10,000 | 12,000 | 14,000 | 16,000 | 18,000 | 20,000 | 22,000 | 24,000 | 26,000 | 28,000 | 30,000 | 32,000 | 34,000 | 36,000 | 38,000 | 40,000 | 42,000 | 44,000 | 46,000 | 48,000 | 50,000 | 52,000 | 54,000 | 56,000 | 58,000 | 60,000 | | Total. | Per sq. in. | |
| O | | inches. | sq. ins. | inches. | | | | | | | | | | | | | | | | | | | | | | | | | | inch. | lbs. | lbs. | |
| 1425 | Unmarked | 4·47 × ·51 | 2·279 | 126·1 | ·091 | ·115 | ·140 | ·168 | ·192 | ·206 | ·232 | ·261 | ·284 | ·300 | ·326 | ·358 | ·389 | ·414 | ·455 | ·481 | ·516 | ·543 | ·575 | ·594 | ·627 | ·662 | ·710 | ·778 | ·846 | ·972 | 1·21 | 60,056 | 26,351 |  |
| 1427 | do. | 4·47 × ·51 | 2·279 | 153·7 | ·072 | ·098 | ·112 | ·129 | ·150 | ·167 | ·188 | ·217 | ·239 | ·268 | ·300 | ·338 | ·365 | ·400 | ·446 | ·482 | ·542 | ·588 | ·644 | ·711 | ·777 | ·870 | — | — | — | — | 1·02 | 53,924 | 23,661 |  |
| 1429 | do. | 4·47 × ·50 | 2·235 | 153·7 | ·060 | ·090 | ·111 | ·135 | ·160 | ·176 | ·200 | ·230 | ·250 | ·280 | ·311 | ·354 | ·390 | ·428 | ·460 | ·501 | ·544 | ·580 | ·621 | ·672 | ·740 | ·808 | ·877 | ·980 | — | — | 1·14 | 57,688 | 25,811 |  |

Continued from Report dated 22nd April 1880.



SUMMARY of RESULTS of SECOND EXPERIMENTS to ascertain the QUALITY of the IRON.

| Test No. 1st Experiment. | Test No. 2nd Experiment. | | | | Per cent. | | Per cent. | | Per cent. | | Per cent. | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| O. 1425 | O. 1426 | - | Bar broke with 105,330 lbs. = 46,217 lbs. or 20·63 tons per square inch, | Contraction of area at Fracture | 15·70 | Extension | 11·7 | Fracture | 100 | Fibrous, | 0 | Crystalline. |
| O. 1427 | O. 1428 | - | do. do. 91,820 lbs. = 40,289 lbs. or 17·98 tons | do. | do. | do. | 13·42 | do. | 6·6 | do. | 98 | do. | 2 | do. |
| O. 1429 | O. 1430 | - | do. do. 102,130 lbs. = 45,695 lbs. or 20·39 tons | do. | do. | do. | 13·02 | do. | 9·4 | do. | 70 | do. | 30 | do. |
| O. 1421 used in testing column lugs. | O. 1422 | - | do. do. 100,170 lbs. = 43,102 lbs. or 19·24 tons | do. | do. | do. | 10·15 | do. | 7·8 | do. | 85 | do. | 15 | do. |
| O. 1423 Report 30th April | O. 1424 | - | do. do. 111,410 lbs. = 47,028 lbs. or 20·99 tons | do. | do. | do. | 8·18 | do. | 7·6 | do. | 5 | do. | 95 | do. |
| Half tie-bar labelled No. 7 | O. 1448 | - | do. do. 112,520 lbs. = 48,416 lbs. or 21·61 tons | do. | do. | do. | 12·43 | do. | 10·1 | do. | 75 | do. | 25 | do. |
| | | Mean | - 103,897 lbs. = 45,124 lbs. or 20·14 tons | do. | do. | do. | 12·15 | do. | 8·9 | do. | 72 | do. | 28 | do. |
| Brought from Report dated 22nd April. | | Mean | - 100,970 lbs. = 44,772 lbs. or 19·98 tons | do. | do. | do. | 14·48 | do. | 8·7 | do. | 77 | do. | 23 | do. |
| | | Total Mean | - 102,433 lbs. = 44,948 lbs. or 20·06 tons | do. | do. | do. | 13·31 | do. | 8·8 | do. | 74 | do. | 26 | do. |

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4th May 1880.



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