July 2014

Draftsmen's Sketch Book for Parts for the Ford Motor Company

M. M.

Follow this and additional works at: https://digitalcommons.wpi.edu/ms077morgan-docs

Recommended Citation
https://digitalcommons.wpi.edu/ms077morgan-docs/297

This Article is brought to you for free and open access by the Morgan Construction Company records at Digital WPI. It has been accepted for inclusion in Morgan Documents by an authorized administrator of Digital WPI. For more information, please contact digitalwpi@wpi.edu.
<table>
<thead>
<tr>
<th>ORDER NO.</th>
<th>SUBJECT</th>
</tr>
</thead>
<tbody>
<tr>
<td>21109</td>
<td>32&quot; Billet Mill Drive</td>
</tr>
<tr>
<td>21109</td>
<td>32&quot; Roll Housing</td>
</tr>
<tr>
<td>21009</td>
<td>42&quot; Roll Housing</td>
</tr>
<tr>
<td>P 22</td>
<td>Weight 42&quot; Roll</td>
</tr>
<tr>
<td>P 29</td>
<td>Supporting Pins</td>
</tr>
<tr>
<td></td>
<td>Weight of 42&quot; + 32&quot; Drive</td>
</tr>
</tbody>
</table>

TO BE USED BY THE DRAFTSMAN FOR ALL SKETCHES, NOTES, CALCULATIONS AND DATA RELATING TO THE ABOVE COMPANY ONLY, UNDER NO CIRCUMSTANCES ARE LOOSE SHEETS OR PRIVATE NOTE BOOKS TO BE USED.

NO UNUSUAL EFFORT SHOULD BE MADE AT NICETY, BUT EACH ENTRY SHOULD INVARIBLY BE COMMENCE WITH THE SUBJECT AND DATE OF THE WORK, AND FULL NOTES MADE OF DATA ON WHICH CALCULATIONS ARE BASED AND THE RESULTS OBTAINED CLEARLY STATED.

BOOKS ARE TO BE ALWAYS QUICKLY AVAILABLE TO RECEIVE INSTRUCTIONS, SKETCHES AND DATA AS MAY BE GIVEN THE DRAFTSMAN AND HE WILL BE RESPONSIBLE FOR THEIR DELIVERY AT ANY TIME.
<table>
<thead>
<tr>
<th>COMPANY</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Approximate weight of 42" & 32" Mill**

<table>
<thead>
<tr>
<th>MILL</th>
<th>Weight of bed bearings</th>
<th>Weight of shafts</th>
<th>Weight of gears</th>
</tr>
</thead>
<tbody>
<tr>
<td>42&quot;</td>
<td>95</td>
<td>18</td>
<td>35</td>
</tr>
<tr>
<td>32&quot;</td>
<td>150</td>
<td>33</td>
<td>66</td>
</tr>
</tbody>
</table>
SUBJECT
COMPANY

I.2...3

O E (O, 717

n

32.283

32.283 3/8 in. 3.016

123

1

79.576

3.424

43 1/2

32 1/4

12 9/16

1/2

1/2

1/2

25/16

1/2

WORCESTER, MASS.

PROPERTY OF MORGAN CONSTRUCTION

19'-0" 6'-3/4

12'-2 1/2

31'-2 1/2 = Bolt Holes in Pan

12'-9 3/8 in. 3rd Pan

19'-1 1/2 5th Pan

30'-10 1/4"

30'-14 5/16

30'-10 6/16

2) 3.8925 = Combined bolt ends

1.90625

= 1 25/32

Overall length of Bolt Holes 1 8 2/3"

19'-0" 5'-0 1/2

10'-0 1/2

2.9'-0 1/4 Bolt to Bolt Pan

12'-9 3/8 in. 4th Pan
<table>
<thead>
<tr>
<th>SUBJECT</th>
<th>COMPANY</th>
<th>DATE</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>15</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>18</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>15</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>18</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>15</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>18</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>15</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>18</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>15</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>18</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>15</td>
<td>14</td>
<td>15</td>
</tr>
<tr>
<td>18</td>
<td>14</td>
<td>15</td>
</tr>
</tbody>
</table>

**SUBJECT:**

**COMPANY:**

**DATE:**
SUBJECT:

COMPANY:

DATE:

---

PROPERTY OF MORGAN CONSTRUCTION

WORCESTER, MASS.

<table>
<thead>
<tr>
<th>Width</th>
<th>Material</th>
</tr>
</thead>
<tbody>
<tr>
<td>10 ft</td>
<td>13</td>
</tr>
<tr>
<td>15 ft</td>
<td>13</td>
</tr>
<tr>
<td>20 ft</td>
<td>13</td>
</tr>
<tr>
<td>25 ft</td>
<td>13</td>
</tr>
<tr>
<td>30 ft</td>
<td>13</td>
</tr>
<tr>
<td>35 ft</td>
<td>13</td>
</tr>
<tr>
<td>40 ft</td>
<td>13</td>
</tr>
<tr>
<td>45 ft</td>
<td>13</td>
</tr>
<tr>
<td>50 ft</td>
<td>13</td>
</tr>
<tr>
<td>55 ft</td>
<td>13</td>
</tr>
<tr>
<td>60 ft</td>
<td>13</td>
</tr>
<tr>
<td>65 ft</td>
<td>13</td>
</tr>
<tr>
<td>70 ft</td>
<td>13</td>
</tr>
<tr>
<td>75 ft</td>
<td>13</td>
</tr>
<tr>
<td>80 ft</td>
<td>13</td>
</tr>
</tbody>
</table>

Length = 228"

\[
\text{Volume} = (28 \times 228 + 24 \times 228) \\times 0.25
\]

\[
22875 \text{ cubic ft}
\]

\[
22875 = 6375 \times \frac{3}{4}\text{ tons}
\]

20 \[\text{11.0875} \times 6.6428 = 5.0411\]

\[
198 \times 396 \times 1288000 = 41000
\]

390 396 1288000 1100

3030
SUBJECT: Weight of 77" Roll

COMPANY: Lea Eng B-31841

DATE: 2-4-807


Property of Morgan Construction

---

**Weight of A**: 2500 lbs

**Weight of B**: 15500 lbs

**Weight of C**: 3520 lbs

**Weight of D**: 2280 lbs

**Weight of E**: 917 lbs

---

**Total weight**: 24807 lbs

24807 - 12.03 = 23574 lbs

68 x 2590 + 68 x =

38 x 8957 + 27 x 2280 + 5 x 3520 =

527000 + 176100 + 68 x = 340500 + 61500

147600 - 340500 = 61500

527000 - 176100 = 35000

X = -283500

X = 4170 lbs
SUBJECT
Bill Loads

COMPANY
Morgan Co.

DATE 12/31/3

PROPERTY OF MORGAN CONSTRUCTION

WORCESTER, MASS.

Co.

---

SUBJECT
Adjusting Screw - Thread Motion

COMPANY
Morgan Co.

DATE 12/31/3

PROPERTY OF MORGAN CONSTRUCTION

WORCESTER, MASS.

Co.

---

1. IT

SUBJECT

COMPANY

DATE

---

PROPERTY OF MORGAN CONSTRUCTION

WORCESTER, MASS.

Co.

---

SUBJECT

COMPANY

DATE

---

PROPERTY OF MORGAN CONSTRUCTION

WORCESTER, MASS.

Co.

---

SUBJECT

COMPANY

DATE

---

PROPERTY OF MORGAN CONSTRUCTION

WORCESTER, MASS.

Co.

---
SUBJECT: Roll Loads


DATE: 12/24/33

---

**Weight of Nick Bearing**

\[
30 \times 27 \times 15 \times 36 = 3645
\]

\[
\text{Cylindrical} = 4,000
\]

\[
\begin{align*}
24,707 & \quad 4,707 \\
24,707 & \quad 8,170
\end{align*}
\]

\[
\text{Total Load} = 1,200,000
\]

\[
\frac{24,707}{3,645} = 6.75
\]

\[
2.35 \times 6.75 = 14,676
\]

**Pitch = 2**

\[
\begin{align*}
29.8 & \quad 29.8/1000 \\
2.21 & \quad 2.21
\end{align*}
\]

---

SUBJECT: Adjusting Screw


DATE: 12/24/33

---

**Mean Nandius = 4.75" Pitch = 1"**

**Assume 3/4" Min.**

**Mean Dia = 9 1/2" Circum = 29.8**

\[
29.8
\]

\[
\frac{29.8}{2} = 14.9
\]

\[
25.000 \times 3 = 75.000" \text{ Per Min.}
\]

\[
\frac{75.000}{12} = 6.250 \text{ FT LOS Per Min.}
\]

\[
\frac{6.250}{3} = 2.500
\]

\[
\frac{1875}{3} = 2500
\]

\[
\frac{25000}{3} = 8333.333
\]

\[
\frac{8333.333}{1.333} = 6285.714
\]

\[
\frac{18.5 \times 5,220 = 93,370 \text{ H.P. Per Min.}}{25,000}
\]

\[
25,000 \times \frac{1}{3} = 8,333.333
\]

\[
\text{K} = \frac{F}{F_2} = \frac{3.2}{1.41} = 2.26
\]

\[
37500 \times \frac{1}{3} = 12500
\]

\[
\frac{12500}{5} = 2500
\]

\[
\frac{9,330}{8.7500} = 130500
\]

\[
\frac{130500}{33000} = 4.18 \text{ H.P.}
\]

\[
4.18 \text{ HP Required to raise screw} 3" \text{ in 1 minute.}
\]

---

**Lee 10/27**
Subject: Adj. Screw Shat.  
Company:  

\[
\begin{align*}
\text{d} &= \sqrt[3]{\frac{221,400 \times 10}{3 \times 7,000}} \\
\text{d} &= \sqrt[3]{\frac{210,000}{2100}} = 15.3 \\
\text{d} &= 5.34''
\end{align*}
\]

130,800 ft. chip. per min.  
18.92 pl. per min.  
7,300 lbs. at end of 12'' lever arm.  
P x F = 15 x ZFp  
7,300 x 12 = 7,000 x 0.08 \text{ d}^3  
87,500 = 560 \text{ d}^3  
\text{d}^3 = \frac{87,500}{560} = 157  
\text{d} = 5.4'' = 0.137\text{ in sq shaft}

M = \frac{1}{2} F LD  
M = \frac{1}{2} (0.3) (24,707)(9)  
\frac{220,000 \times 0.3}{2} = 33,330

628,000 lbs. chip. per min.  
52,300 ft. chip. per min.  
33,000

1,587 H.P. absorbed by hemispherical P. W.
SUBJECT
COMPANY
DATE

See Page 31
\[
\frac{\frac{13}{40} \times \frac{14}{151} \times \frac{14}{151}}{2.550}
\]
\[
\frac{2.550}{912,000}
\]
\[ M = (3.25)(14176) = 46000 \text{"} \] 
\[ \frac{F}{C} = \frac{46000}{10000} = 4.6 \] 
\[ \frac{g}{C} = 4.6 \] 
\[ g = 27.6 \] 
\[ l = 6.9 \] 

\[ T = \frac{3D + 2}{20D + 1} \] 
\[ T = \frac{3 \times 5 + 2}{20 \times 5 + 1} = 4 \] 
\[ T = \frac{3 \times 5}{20 \times 5} = \frac{15}{100} = 0.15 \]