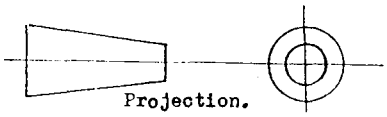
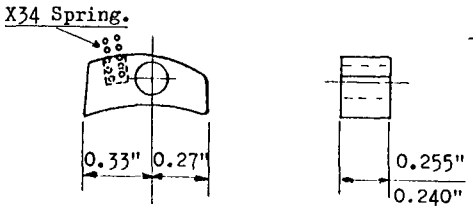
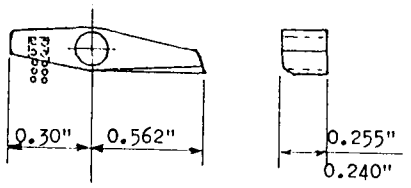
PAWLS.





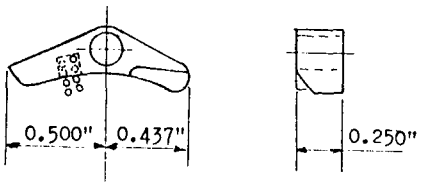
X.28. Low Gear Pawl. 1905 - 1937.
In L.H. Ball Cup of X, FX, A, & K range.
Also inner pawl of X & FX Sliding Carrier.

Also for BSA for same duties as X & FX.
BSA ref. 14-2208.



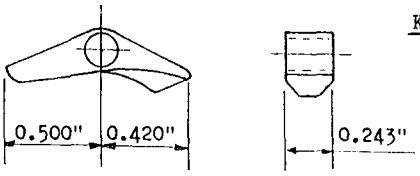
X.36.? Outer Pawl for Sliding Carrier of X & FX.

Also for BSA for same duties as X & FX.
BSA ref. 14-2207.

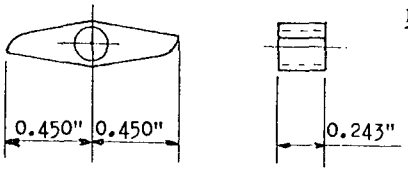


K.12. Gear Ring Pawls, 1922 - 33
With X34 spring.
K range.

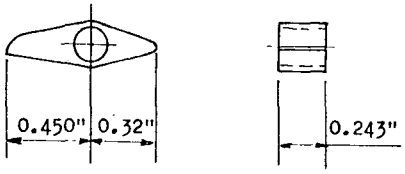
K.12A. Gear Ring Pawls. 1933 - 37
With K.64 springs.
K range.



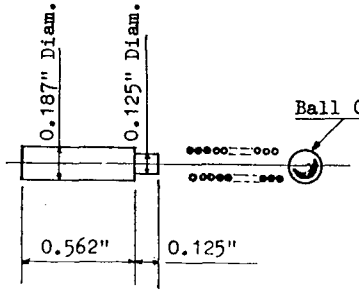
K.512. Gear Ring Pawls.
From 1937.
All hubs except ASC and S.



K.513. Low Gear Pawls. 1937 - 55.
Can be used either way.
All hubs except ASC, S range & FG.

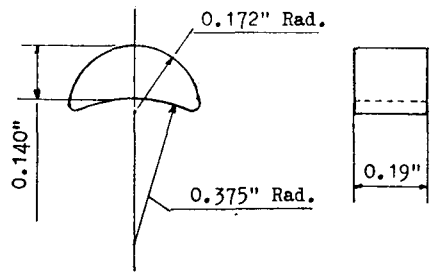


K.513. As above from 1955 - on.
Can be used only one way.
Same hubs.



K.413. Low Gear Pawls for FG hubs.

K.414. Spring. 29 coils,
d = 30swg,
O/D = 0.172"
Free = 0.875"



L.12. Pawls for S Range of Hubs.

Twice actual size.

One Inch.

All Pawls except "S" range are actual size.

JG. 1995.

DRIVERS.

E:\Hubs\Drivers.Sam

K7.	6 Prongs.	Screwed.	7/32" Balls.	'22 - '32	K,KB.
K.7C.	6 Prongs.	Screwed.	7/32" Balls. (As K.7 but to take lock ring K36.)		KC.
K.207.	6 Prongs.	Screwed,	7/32" Balls. NCCH.	'32 only.	KS.
K.61.	6 Prongs.	Screwed.	3/16" Balls.	'33 - '37	K range, not tandems.
K.361.	6 Prongs.	Screwed.	3/16" Balls. NCCH.	'33 - '37	KT,KB tandem.
K.225.	6 Prongs.	12 Splined.	3/16" Balls.	'33 - '37	KS,KSW.

TF.207.	4 Prongs.	12 Splined.	3/16" Balls.	'36 -	TC.

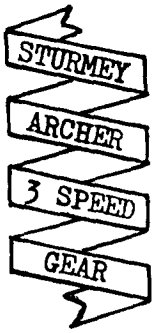
This was an "in-between" design. It used K type Cones and a K type Clutch but with only four arms. It is listed as being in production until 1942. I have no evidence that it was modified to suit the AW design after this was available.

K.507	4 Prongs.	Screwed.	3/16" Balls.	'37 - '51	AW etc.
K.657.	4 Prongs.	12 Splined.	3/16" Balls.	'38 - '51	Sports Hubs.
K.462.	4 Prongs.	3 Splined.	3/16" Balls.	'51 - on.	All Hubs, not S range.

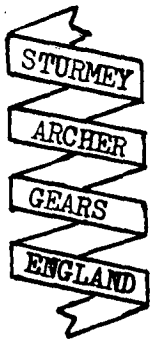
L.16.	3 Prongs.	3 Splined.	3/16" Balls.	'54 - '60	S range.

"WAVY" EMBLEM ON HUBS.

1907 - 1935



1935 - 1937



First hub "V" marked "GEARS",
otherwise as above.

Early model single speed coaster model C.C. for 1922 - 1924
shows following on wavy emblem. "STURMEY ARCHER COASTER PAT.27619."

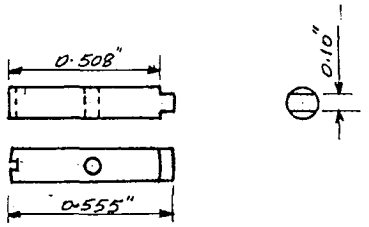
ITEMS made from NCCH steel.

E:\Hubs\NCCH.Sam

K.351.	Axle. 6.7/16" 20T Sun.	'34 - '39	KT.
K.351A.	Axle. 6.15/16" 20T Sun.	'34 - '39	KT.
K.651B.	Axle. 6.1/4" 15T Sun. Drilled half- way.	'38 only.	AM Tandem.
K.661B.	Axle. 6.1/4" 15T Sun. Drilled through.	'39 only.	AM Tandem.
K.751.	Axle. 6.1/4" to take K.754 Sun Pinion.	'38 - '39	AT.
K.751A.	Axle. 6.3/4" to take K.754 Sun Pinion.	'38 - '39.	AT.
K.754.	Sun Pinion. 20T riveted to Axle.	'38 - ?	AT, AW Tandem.
K.755.	Clutch. 4 Arms.	'38 - ?	AT, AW Tandem.?
K.207.	Driver. 6 Prongs, Screwed, 7/32" Balls.	'32 only.	KS.
K.209.	Clutch. 6 Arms.	'32 only.	KS.
K.16A.	20T Planet Pinions.		KT,AT,AW tandem.
K.361.	Driver. 6 Prongs, screwed, 3/16" balls.	'33 - '37	KT, K & KB tandem.
TF.205.	25T x 14T Planet Pinions.		TC, AM Tandem.

AXLE KEYS.

All keys 5/32" diam or square.



Models used.

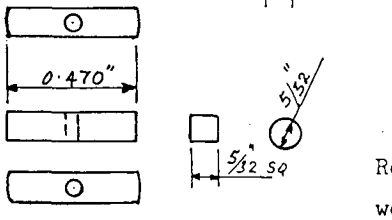
X32. *

X.

FX did not have flats.

N11. *

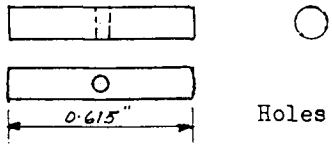
C. V.



N100.round.
N143.square.
*

N. FN. A.

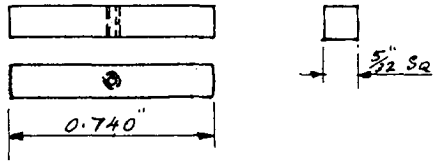
Round and square Keys were used with these axles.



K2. *

K. KB. KC. KS. KSW. TC.

Holes in the above Keys. Drill No. 44. (0.086")

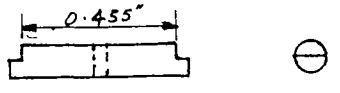


K502. *

AB. AM. AR. AT. AW.

K502A.*

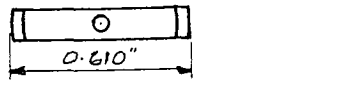
AM. AR. FM. AF.

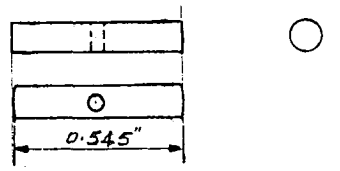


K802. *

Low Gear Key.

AF. FM.



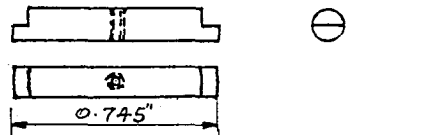


K402.
HSA139.

Low Gear Key.

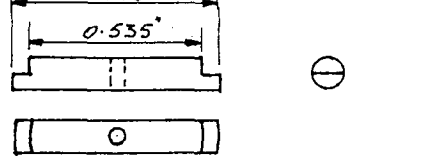
FC. FG. FM. FW.ASC.

For S5 use HSA268. Same as K402 but threaded.



K526.
HSA124.

AB. AT. AW. AG. TCW. S5. S3B.

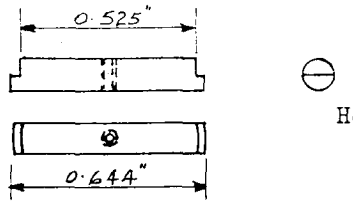


K526A.
HSA163.

AC. AM. ASC. FC. FM. FG. FW.

L8.
HSA203.

SW Early model.



L8A.
HSA204.

SW. Later model.

Holes in Keys from K.502.

o 3/32" clearance hole.

Tapped 3/32" x 48tpi.

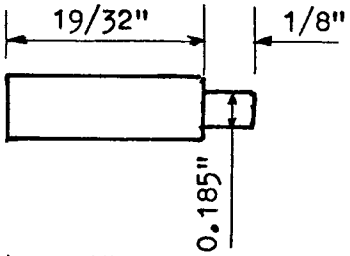
* Pre 1939.

J.G.

STURMEY ARCHER PINION PINS.

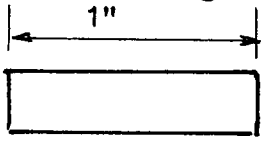
ALL 0.240" diam. (Nominal.)

K.510.
HSA.114.



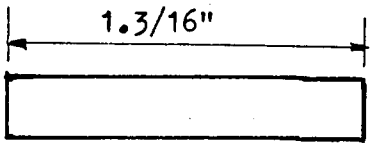
AW, AB, AG, AC, FC, AT, AF.

K.206.



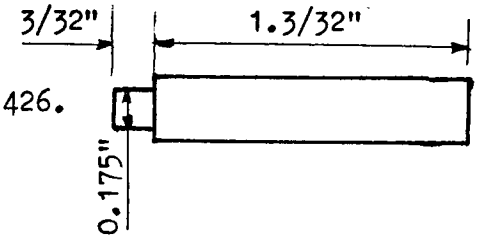
AM, KS, KSW, TC.

K.417.
HSA.135.



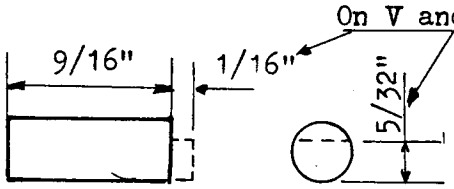
FW, S5.

K.426.

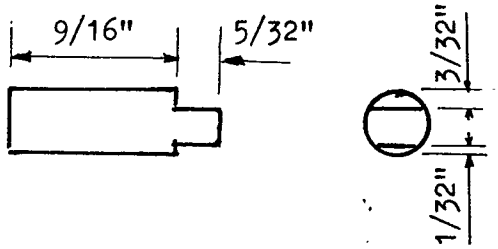


FG.

N.24.

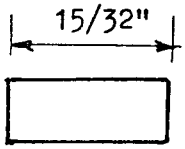


K, KB, A, FN, N, FM, ASC.



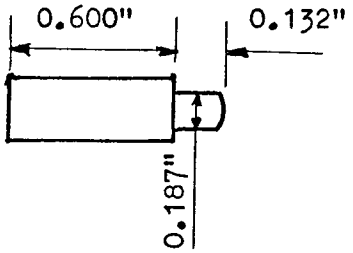
K. (for repairs.)

K.705.



AR.

K.510A.



AR.

SW Pinion Pins 0.275" diam.

DIMENSIONS of STURMEY ARCHER GEARS.

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HUB.	ITEM.		O / D.	I / D.	Tooth Depth.	Theoretical O / D.	Theoretical I / D.	Width of Face.	Nominal Bore.
AM	Pinion. *	14T.	0.515"	0.400"	0.058"	0.500"	0.366"	0.350"	0.240"
FW	Pinion. *	14T.+	0.515"	0.400"	0.058"	0.500"	0.366"	0.490"	0.240"
FM	Pinion.	14T.+	0.518"	0.400"	0.059"	0.500"	0.366"	0.310"	0.240"
FM	Pinion.	14T.+	0.518"	0.400"	0.059"	0.500"	0.366"	0.250"	0.187"
FM	Pinion.	15T.	0.520"	0.395"	0.063"	0.531"	0.397"	0.310"	0.240"
FM	Pinion.	15T.	0.520"	0.395"	0.063"	0.531"	0.397"	0.250"	0.187"
AM	Sun.	15T.	0.516"	0.404"	0.056"	0.531"	0.397"	0.375"	Axle.
KS	Sun.	15T.	0.514"	0.410"	0.052"	0.531"	0.397"	0.375"	Axle.
KS	Pinion. *	15T.	0.514"	0.395"	0.060"	0.531"	0.397"	0.340"	0.240"
KSW	Pinion. *	15T.	0.514"	0.395"	0.060"	0.531"	0.397"	0.320"	0.240"
SW	Pinion.	15T.ø	0.545"	0.435"	0.055"	0.531"	0.397"	0.310"	0.275"
KSW	Sun.	18T.	0.610"	0.495"	0.058"	0.625"	0.491"	0.375"	Axle.
AC	Sun.	20T	0.673"	0.560"	0.057"	0.687"	0.553"	0.310"	0.408" sq.
AW	Sun.	20T.	0.673"	0.560"	0.057"	0.687"	0.553"	0.375"	0.406"
AW	Pinion.	20T.	0.673"	0.560"	0.057"	0.687"	0.553"	0.310"	0.240"
SW	Sun.	20T.	0.673"	0.560"	0.057"	0.687"	0.553"	0.350"	Axle.
A	Sun. #	20T.	0.682"	0.555"	0.064"	0.687"	0.553"	0.375"	Axle.
A	Sun. #	20T.	0.682"	0.555"	0.064"	0.687"	0.553"	0.625"	0.470"
X	Sun.	20T.	0.682"	0.555"	0.064"	0.687"	0.553"	0.937"	Axle.
K	Sun.	20T.	0.673"	0.555"	0.059"	0.687"	0.553"	0.375"	Axle.
T	Sun.	20T.	0.673"	0.560"	0.057"	0.687"	0.553"	0.5625"	0.422"
T	Pinion.	20T.	0.673"	0.560"	0.057"	0.687"	0.553"	0.245"	0.380"
FW	Pinion. *	21T.	0.690"	0.580"	0.055"	0.718"	0.585"	0.290"	0.240"
X & FX	Pinion.	22T.	0.736"	0.605"	0.065"	0.750"	0.616"	0.420"	0.312"
BSA	*Pinion.*	*22T.*	*0.740"*	*0.608"*	*0.066"*	*0.750"*	*0.616"*	*0.390"*	*0.250"*
A	Pinion. #	22T.	0.736"	0.605"	0.065"	0.750"	0.616"	0.312"	0.240"
FW	Sun.	24T.	0.795"	0.680"	0.058"	0.812"	0.678"	0.440"	0.550"
1902	Pinion.	24T.	0.810"	0.670"	0.070"	0.812"	0.678"	0.361"	0.250"
AM	Pinion. *	25T.	0.831"	0.720"	0.056"	0.843"	0.709"	0.295"	0.240"
KSW	Pinion. *	27T.	0.890"	0.775"	0.058"	0.906"	0.772"	0.295"	0.240"
FW/FM	Sun.	30T.	0.985"	0.875"	0.055"	1.000"	0.866"	0.310"	0.406"
FM	Sun.	30T.	0.985"	0.875"	0.055"	1.000"	0.866"	0.262"	0.408" sq.
KS	Pinion. *	30T.	0.985"	0.865"	0.060"	1.000"	0.866"	0.404"	0.240"

All the above dimensions are typical "as measured" and can vary a few thou. between gears.
All the S.A. gears are cut to 32 DP. Most have a modified form.

Theoretical O / D = $\frac{T + 2}{DP}$

Theoretical depth of tooth = $\frac{2.157}{DP}$ = 0.067" for 32 DP.

Theorectical I / D (Root diam.) = O / D - 0.134"

\+ Should be 15T to suit rule 2. (See sheet *"Teeth On Various Gears."*)
ø Should be 16T to suit rule 2. " " " " " "
\# Also covers, C, V, N, and FN.
* Part of Compound Pinions.

J. G. 1995. (3rd issue.)

TEETH IN VARIOUS GEARS

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HUB.	SUN.	No. & Size of PLANETS.		GEAR RING	REMARKS.
AW, AB, AG.	**20** K.508	4 @ **20**	K.16	**60** K.511A	Single stage direct.
TCW, S3B, S3C.	**20** Axle	4 @ **20**	K.16	**60** various.	Single stage direct.
K, KB, KC.	**20** Axle	4 @ **20**	K.16	**60** K.11	Single stage direct.
SW, SB, SG.	**20** Axle	3 @ **15** [1]	L.5	**52** L.10	Single stage direct.
AM.	**15** Axle	3 @ **25** x **14**	K.654	**54** K.658	Single stage compound.
AM. Tandem.	**15** Axle	3 @ **25** x **14**	TF.205	**54** K.658	Single stage compound.
TC. Fixed.	**15** Axle	3 @ **25** x **14**	TF.205	**54** TF.208	Single stage compound.
AC.	**20** K.719 **20** K.720	4 @ **20** 4 @ **20**	K.16 K.16	**60** K.817 **60** K.511A	Two stage compound.
ASC. Fixed.	**30** K.809A **20** K.808	3 @ **14** [2] 4 @ **20**	K.816A K.16	**60** Shell. **60** K.511B	Two stage compound & single stage direct.
FW, FG, S5.	**24** K.409 **30** K.408 [4]	3 @ **21** x **14** [2]	K.416	**60** K.511A	Single stage compound & single stage direct.
FM.	**30** K.809A **30** K.821	3 @ **14** [2 3] 3 @ **14** [2 3]	K.816A K.822B	**60** K.817 **60** K.511A	Two stage compound & single stage direct.
AF, FC.	**30** K.809A **20** K.808	3 @ **14** [2 3] 4 @ **20**	K.816A K.16	**60** K.817 **60** K.511A	Two stage compound & single stage direct.
KS.	**15** Axle	3 @ **30** x **15**	K.205	**60** K.208	Single stage compound.
KSW.	**18** Axle	3 @ **27** x **15**	K.242	**60** K.208	Single stage compound.
N, FN, V, A.	**20** Axle **20** Sliding.	4 @ **22** 4 @ **22**		**64** **64**	Two single stage trains.
X, BSA.	**20** Axle	4 @ **22**		**64**	Single stage, moving planet cage.
1902.	**16** Axle.	4 @ **24**		**64**	Single stage, moving planet cage.
T, TF.	**20** TF.108	4 @ **20**	TF.105	**60** TF.111C	Single stage direct.
AR.	**15** Axle **20** K.704	3 @ **20** 4 @ **20**	K.16 K.16	**54** K.708A **60** K.511	Two stage compound.
S2.	**24** HSA.245	3 @ **18**	HSA.248	**60** HSA.251	Single stage direct.

Rules. For equal spacing of Planet Pinions.

1. Total of teeth on the Sun plus teeth on the Gear Ring should be divisible by the number of Planets.
2. Teeth on the Sun plus 2x teeth on the Planet Pinions should equal the teeth on the Gear Ring.

Notes.

[1] Should be 16 to suit rule 2. The parts lists state 16 teeth. However all hubs examined and all spares in boxes have 15 teeth.

[2] Should be 15 to suit rule 2.

[3] These were originally 15 teeth, they were changed in 1940 to 14 teeth. they have the same PCD so are now much stronger.

[4] For FW and FG only, S5 uses HSA.269 with square cut dogs.

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Issue 4.

BALL CUPS & BALL RINGS.

C:\Amipro\Docs\Hubs\BallCup.Sam.

All models have 24 tpi.

Model.	L.H. Ball Cup Thread.	Pawls.	Ratchets.	R.H. Ball Ring Thread.	Pawls.	Ratchets.	Other Pawls / Other Ratchets.
1902/a.	2.1/4" 1 Start. L.H.		8 Dogs.	4 Lugs. *		24 Dogs.	2 & 16 in Driver.
1902/b.	2.1/4" 1 Start. L.H.		8 Dogs.	2.3/16" 1 Start. R.H.		24 Dogs.	2 & 16 in Driver.
1902/c.	2.1/4" 1 Start. L.H.		8 Dogs.	2.1/4" 1 Start. R.H.		24 Dogs.	2 & 16 in Driver.

* An actual hub has not been examined but a leaflet announcing the "forthcoming offer for sale in December 1902 of a new three speed hub", explains that the right hand Ball Ring is a light press fit into the shell and is prevented from turning by four lugs. An accompanying illustration shows these four lugs. This would seem to be certain proof that the hub did start life with lugs on the right hand Ball Ring.

1905 (*X*).	2.1/4" 1 Start. L.H.	2	16	4 Lugs.	2	22	2 & 8 on Driver.
1910 X.	2.1/4" 1 Start. L.H.	2	12	2.9/32" 2 Start. R.H.	2	22	2 & 8 on Driver.
1914 FX.	2.1/4" 1 Start. L.H.	2	12	2.9/32" 2 Start. R.H.	2	22	2 & 8 on Driver.
1908 V.	1.5/8" 1 Start. L.H.	2	9	2.7/16" 2 Start. R.H.	2	20	
1908 C.	Pressed in.	1	10	2.7/16" 2 Start. R.H.	8	6	
1910 N.	Pressed in.	3	20	2.7/16" 2 Start. R.H.			
1911 N.	2.7/16" 1 Start. L.H.	3	20	2.7/16" 2 Start. R.H.			
1914 FN.	2.7/16" 1 Start. L.H.	3	20	2.7/16" 2 Start. R.H.	2	20	
1914 A.	2.5/16" 1 Start. L.H.	2	12	2.7/16" 2 Start. R.H.	2	20	
1922 K.& KB.	2.5/32" 1 Start. L.H.	2	12	2.5/32" 2 Start. R.H.	2	10	
1934 K.& KB.	2.5/32" 1 Start. L.H.	2	6	2.5/32" 2 Start. R.H.	2	10	
1932 KC.	2.5/32" 1 Start. L.H.	3	20	2.5/32" 2 Start. R.H.	2	10	
1932 KC.	Brake Drum, 2.5/8" 1 Start. R.H.						
KS&KSW.	2.1/2" 1 Start. L.H.	2	12	2.5/32" 2 Start. R.H.	2	10	
1937 AW.	2.5/32" 1 Start. L.H.	2	10	2.5/32" 2 Start. R.H.	2	10	
1962 AW.	Pressed in.	2	10	2.5/32" 2 Start. R.H.	2	10	
FG.	Bolted into Shell.	3	6	2.5/32" 2 Start. R.H.	2	10	
1954 SW.	1.911" 2 Start. L.H.	3	9	1.911" 2 Start. R.H.	3	9	

Above covers hubs up to approx. 1970.

BSA.	2.1/4" 1 Start. L.H.	2	12	2.1/4" 1 Start. R.H.	2	24	2 & 8 on Driver.

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3rd.. Issue.

DIMENSIONS OF HUB SHELLS.

C\Amipro\Docs\Hubs\Sizes.Sam

HUB.	Diam. L.Flange.		Diam. Body		Diam. R.Flange. (Sprocket end.)	Length Over Flanges
		Left.	Mid.	Right.		
1902 first model.						
1902 second model.	2.864"		2.309"		2.864"	2.330"
1902 final model.	3.050"		2.334"		3.050"	2.330"
1905 X.	3.040"		2.355"		3.040"	2.250"
1910 X.	2.840"		2.365"		2.840"	2.250"
1914 FX	2.840"		2.365"		2.840"	2.250"
V	2.310"	1.720"	2.365"	2.550"	3.125"	2.060"
C	3.310"	2.780"	2.540"		3.125"	2.345"
N						2.345"
FN	3.300"	2.765"	2.540"		3.100"	2.325"
A	3.085"		2.420"	2.550"	3.085"	2.220"
K	2.850"		2.280"		2.850"	2.265"
KS and KSW	3.190"	2.605"	2.280"		2.850"	2.265"
KB	4.325"	3.670"	2.280"		2.850"	2.700"
KC	3.300"	2.770"	2.280"		2.850"	2.350"
AG	4.325"	3.670"	2.280"		2.850"	2.675"
FG	4.325"	3.670"	2.280"		2.850"	2.800"
Standard Steel Shell.	2.850"		2.280"		2.850"	2.235"
Standard Alloy Shell.	2.945"		2.320"		2.945"	2.235"
SW	2.615"		2.040"		2.615"	2.300"
BSA	2.850"		2.365"		2.850"	2.100"

Note: The above dimensions are as measured from a single hub or are the mean of a number of measurements. All these dimensions can vary up to +/- 0.010"

The dimensions above are given as decimals but when manufactured would have been shown to the nearest 1/64".

The above covers hubs until approximately 1970.

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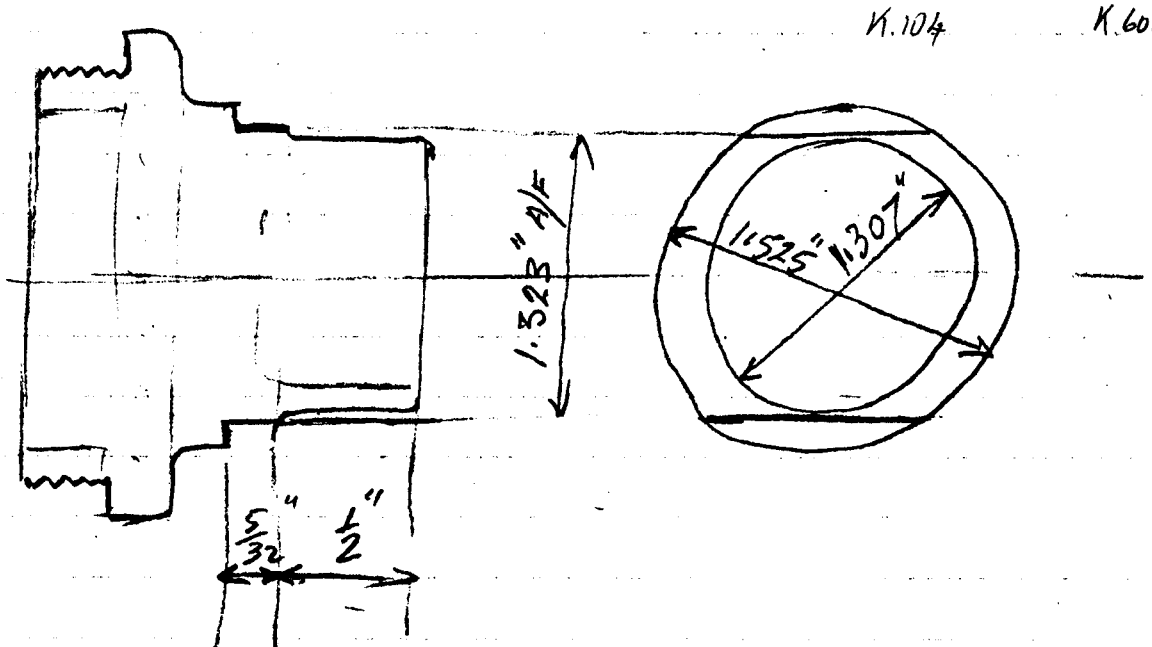
Issue 2.

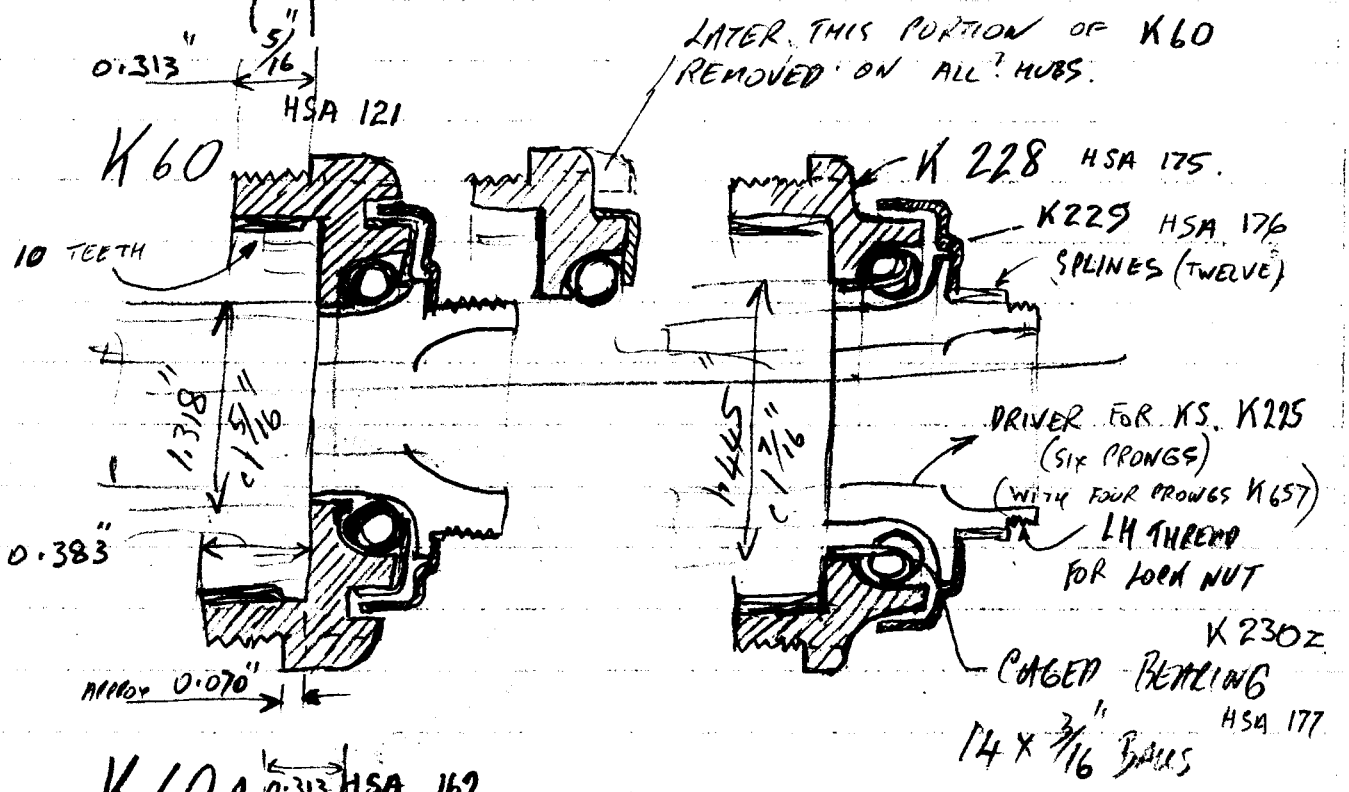
BALL CUPS

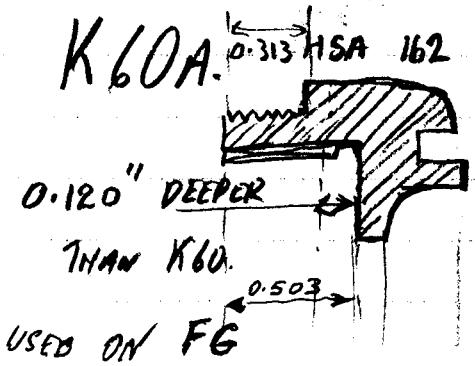
L.H. CUP FOR BRAKE HUBS.

KB + AB. AT

K.104 K.604 K604A

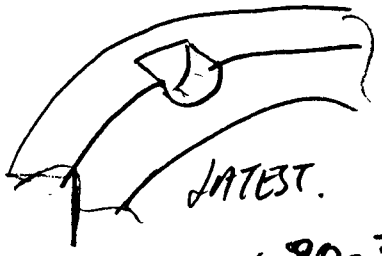




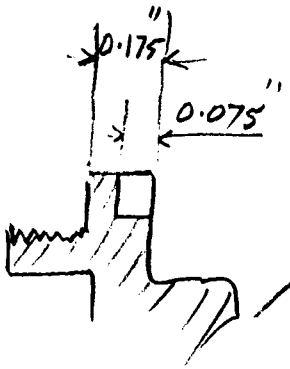


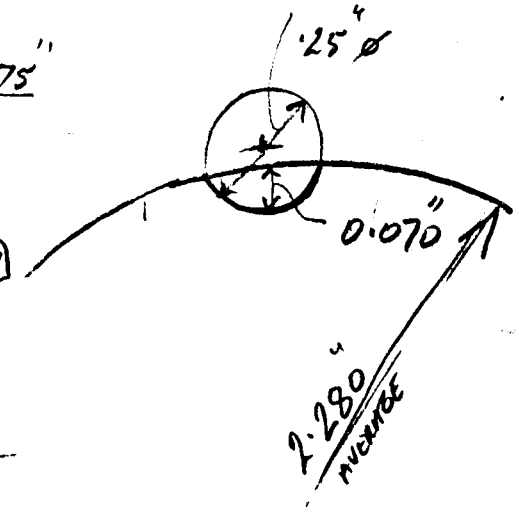
ABOVE INTRODUCED FOR THE K5 WHEN 14T OR 15T SPROCKETS USED.

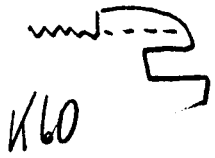
BALL CUPS

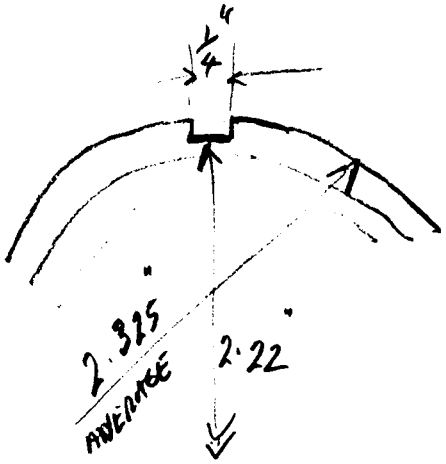


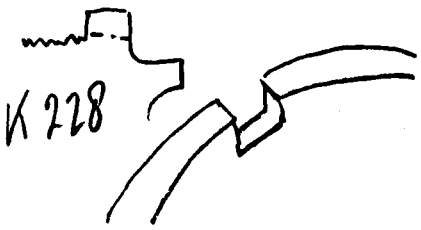
MEASURED ON 80-3

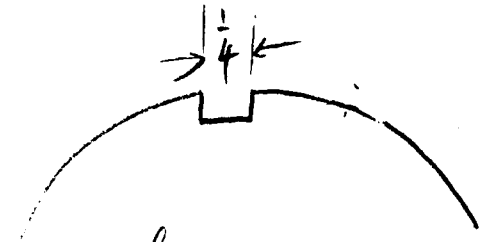




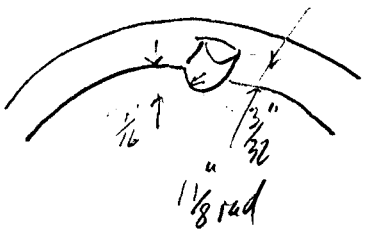




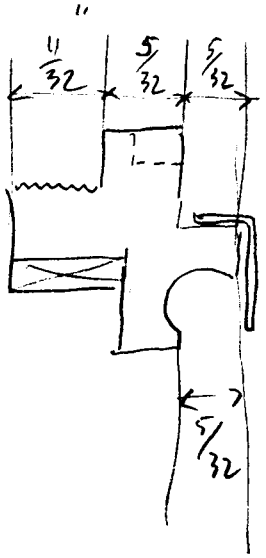




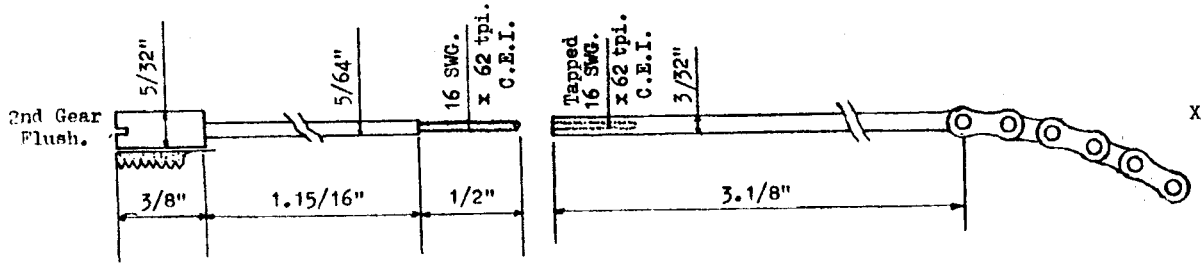
Same as above



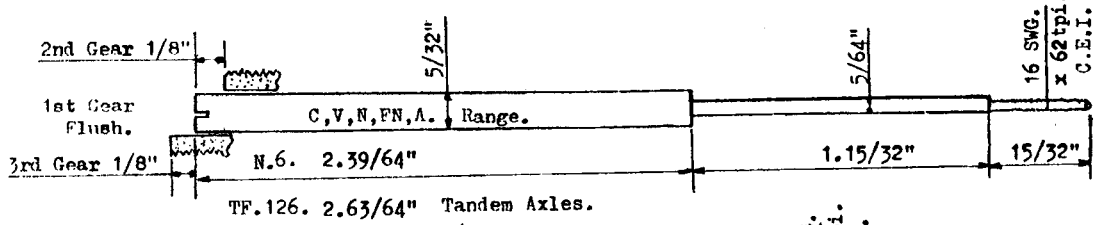
as measured on 75-4.



INDICATORS 1905 - 1939

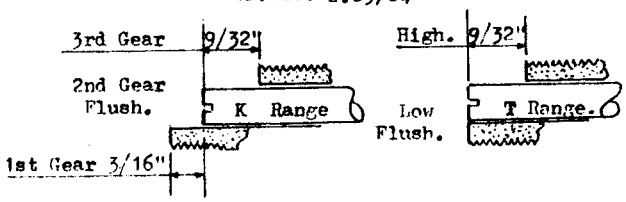


X.



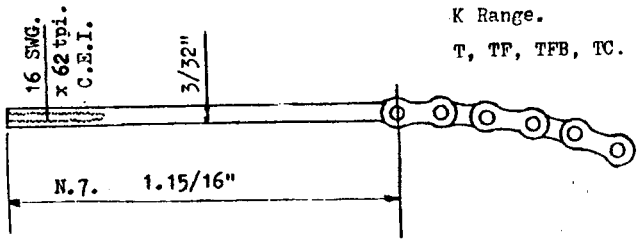
TF.126. 2.63/64" Tandem Axles.

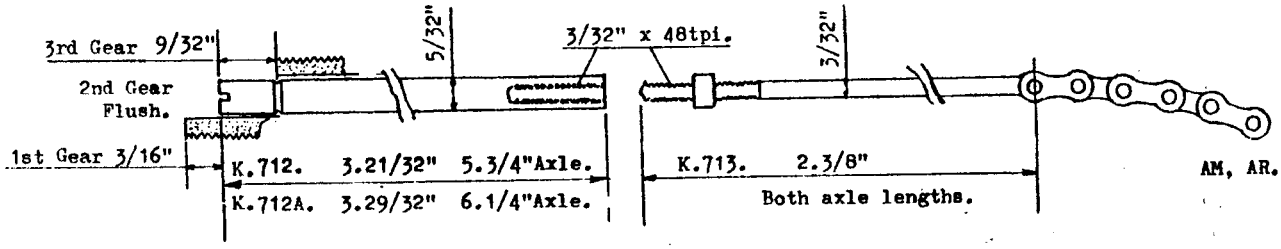
A, N, FN, C, V.



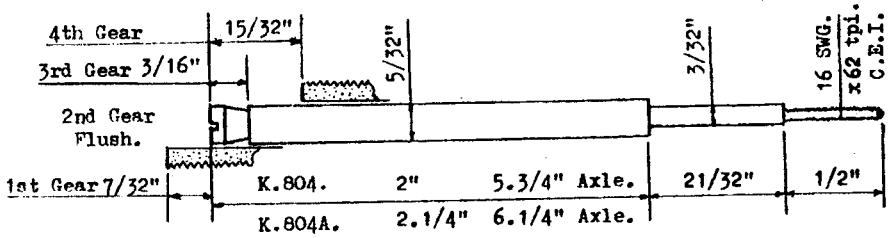
K Range.

T, TF, TFB, TC.

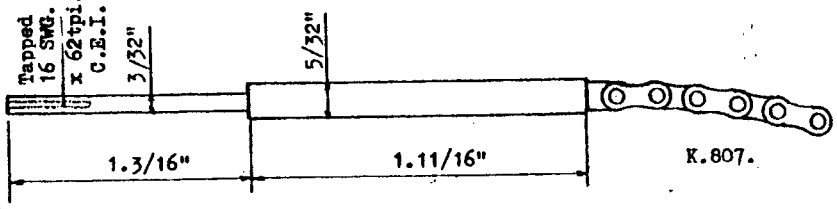




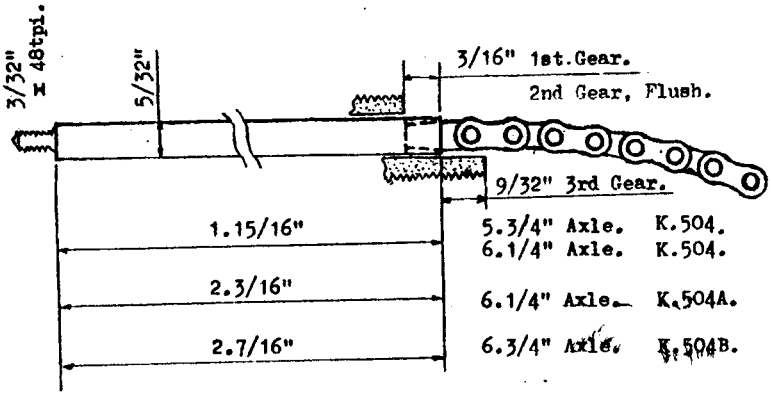
AM, AR.



AF, FM.

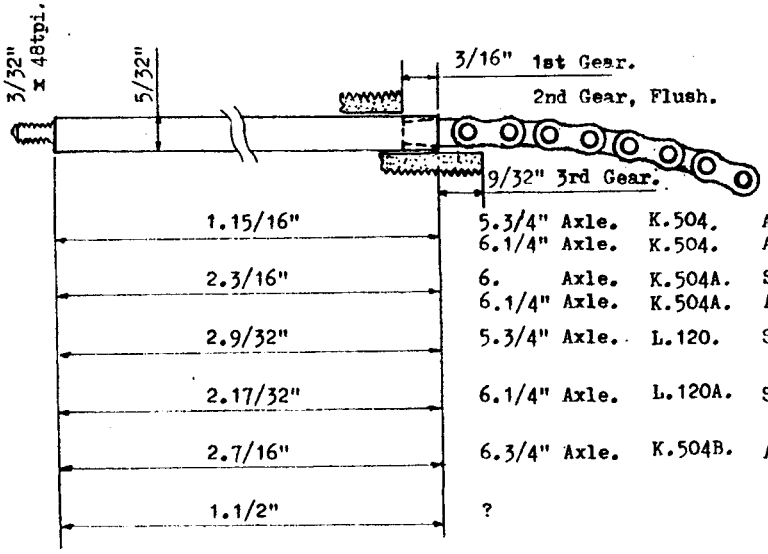


K.807.

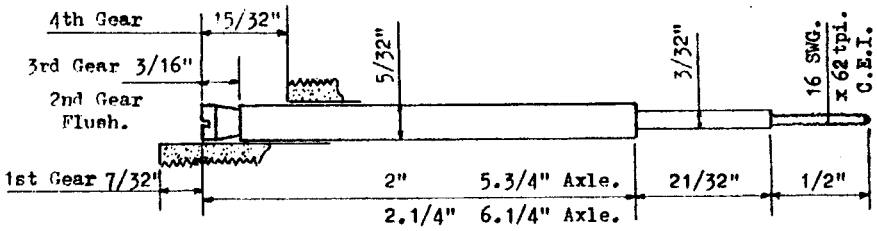


5.3/4" Axle.	K.504.	AW, AB, AM. AR.
6.1/4" Axle.	K.504.	AT.
6.1/4" Axle.	K.504A.	AW, AB, AM, AR.
6.3/4" Axle.	K.504B.	AT.

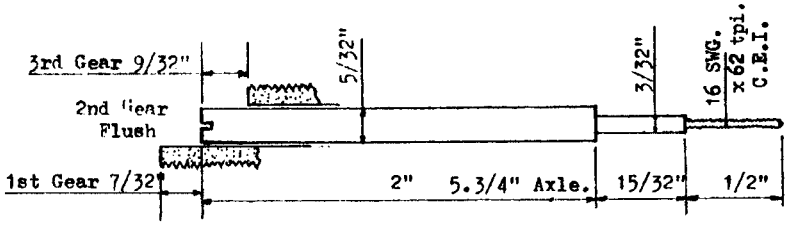
INDICATORS 1940 - 1970



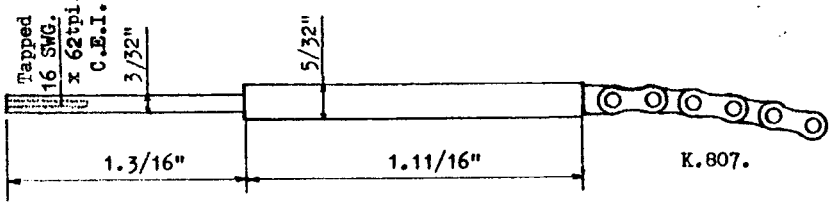
5.3/4" Axle.	K.504.	AW, AB, AG, S3B, TCW. S5
6.1/4" Axle.	K.504.	AT.
6. Axle.	K.504A.	S3C, S5.
6.1/4" Axle.	K.504A.	AW, AB, AG, TCW, S5.
5.3/4" Axle.	L.120.	SW.
6.1/4" Axle.	L.120A.	SW.
6.3/4" Axle.	K.504B.	AT
?		



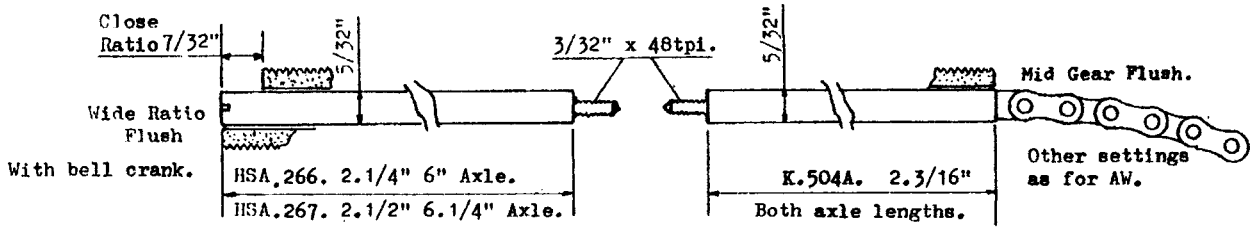
K.804. FW, FM, FC, FG,
K.804A. FW, FM, FC, FG.



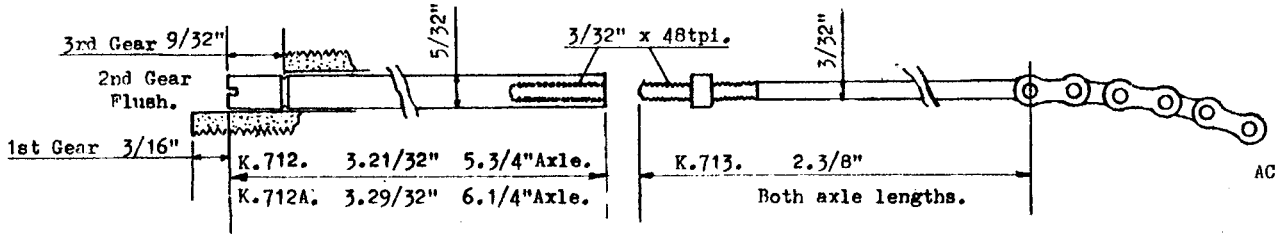
K.716. ASC.



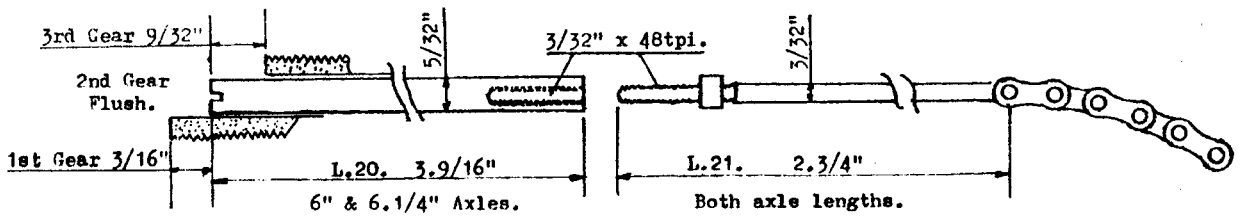
K.807. FW, FM, FC. FG, ASC.



S5.



AC, AM,



SW, SB, SG.