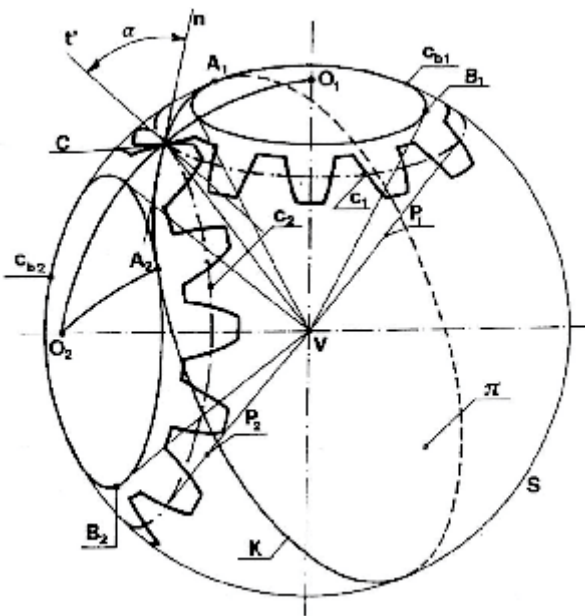


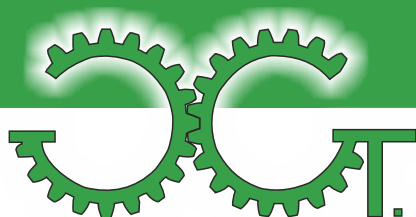
# *Green Gear Trasmissioni S.r.l.*



CATALOGUE - MILL GEAR SPINDLES - 2015 EDITION

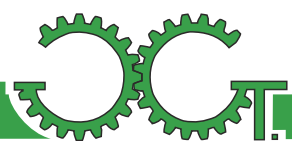


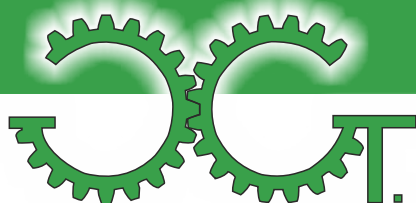




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## **GGT MILL GEAR SPINDLES GREENFLEX GF SERIES REFERENCES**

Green Gear Trasmissioni Srl **GreenFlex GF** series mill gear spindles are particularly designed for rolling mill applications, where driving and driven components are necessarily misaligned and where the application angle can easily change. Gear spindles are critical components of the rolling mill kinematic chain and for this reason **Green Gear Trasmissioni Srl** have been capable to design **GF series**, which ensure and guarantee performances, operating efficiency, less and easier maintenance, thanks to improved teeth profile and surface contacts, special heat treatments, better materials and seal system and experience.



Fig.1



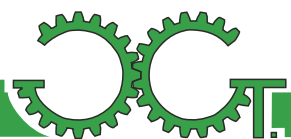
Fig.2

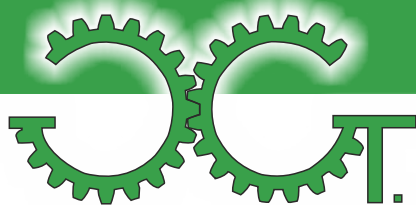


Fig.3



Fig.4





## **GGT MILL GEAR SPINDLES GF SERIES REFERENCES**



Fig.5

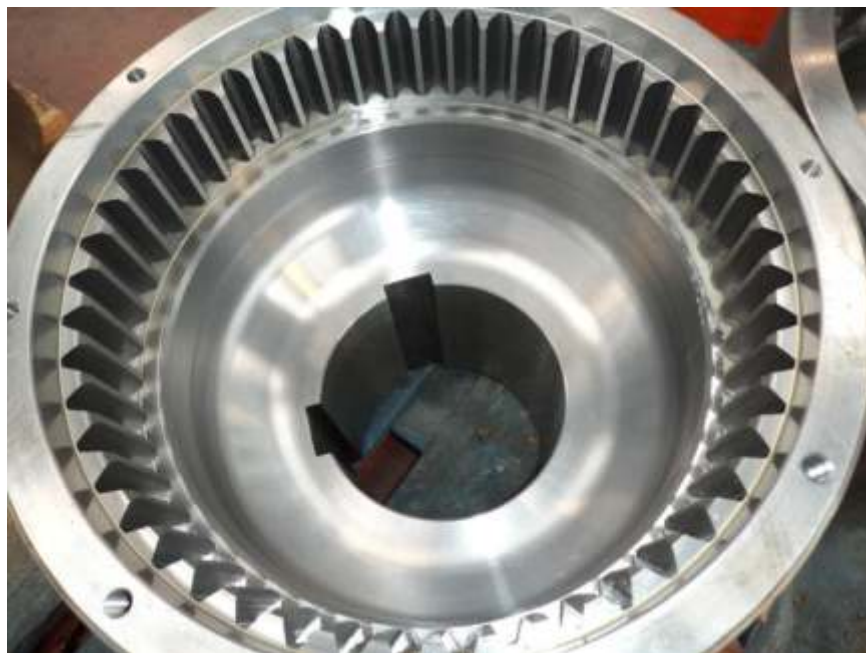
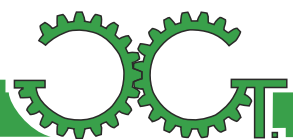
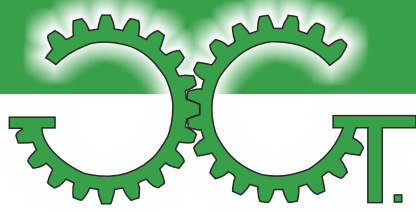


Fig.6





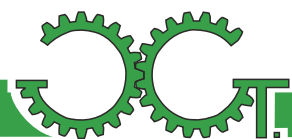
## GGT MILL GEAR SPINDLES

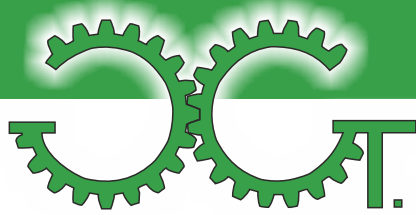
## GF SERIES

### COMPOSITION



Fig.7





## GGT MILL GEAR SPINDLES

## GF SERIES

### DETAILS

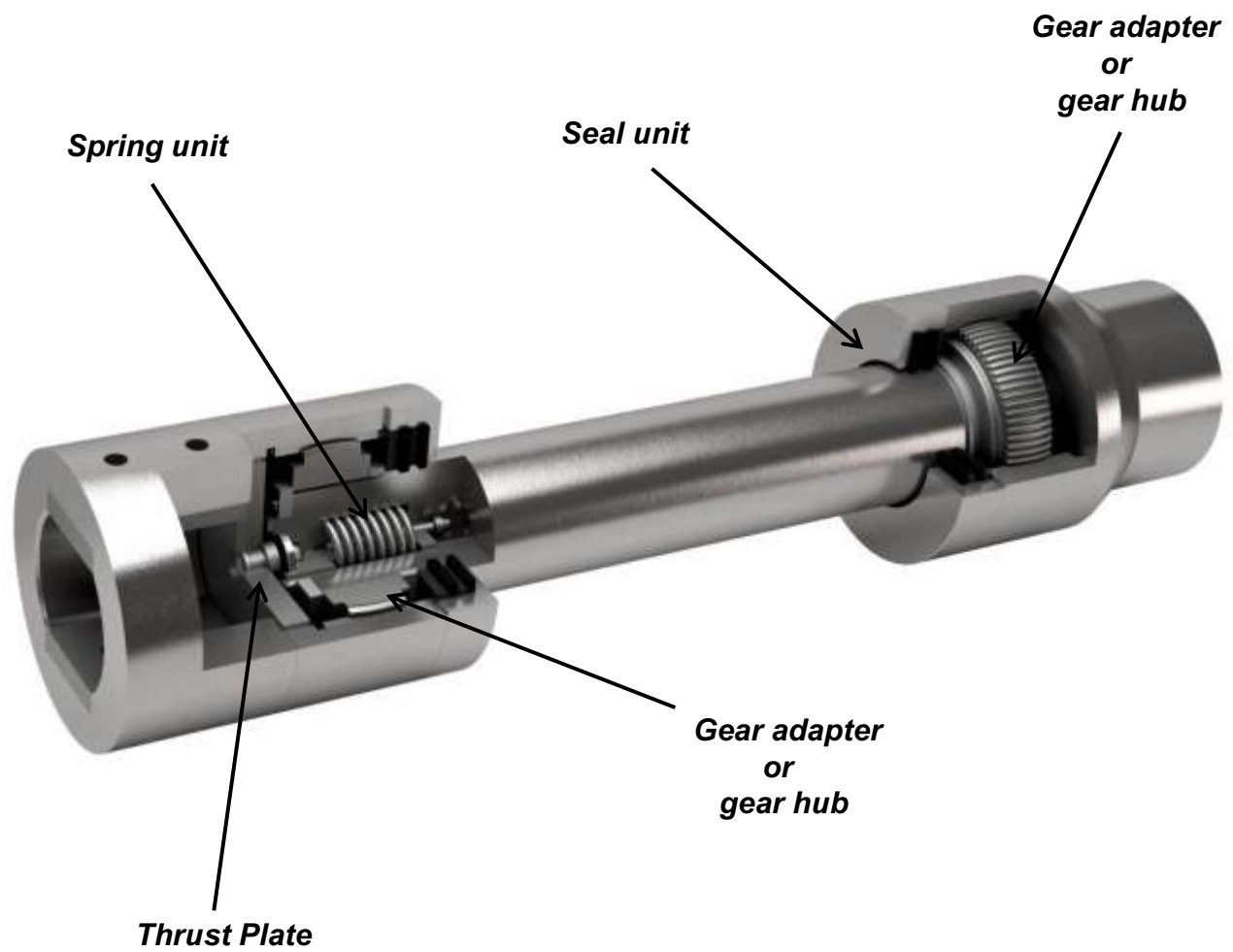
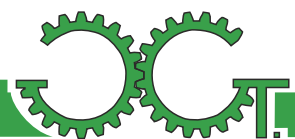
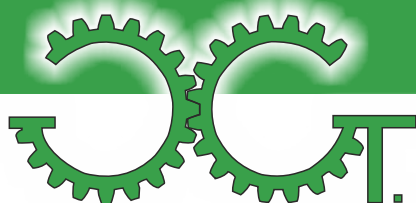


Fig.8



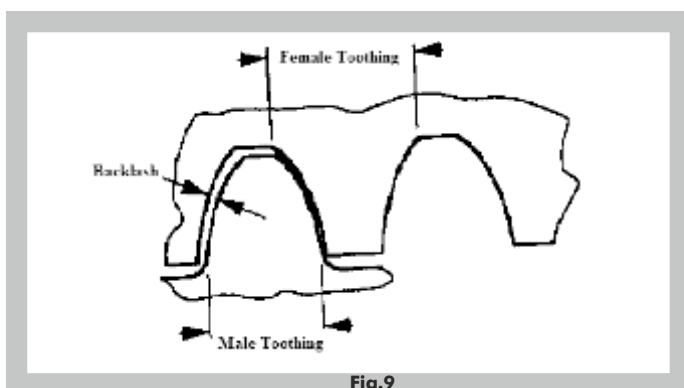


## TYOLOGIES OF GREENFLEX GF

GGT offer various types of mill gear spindles to cover all types of applications in the finishing area. Among them, the most common ones are the following:

- |   |               |
|---|---------------|
| GF made in 42CrMo4 with gas nitriding   | <b>TYPE 1</b> |
| GF made in 31CrMo12 with gas nitriding  | <b>TYPE 2</b> |
| GF made in 41CrAlMo7 with gas nitriding | <b>TYPE 3</b> |
| GF made in X38CrMoV51 (AISI H11)        | <b>TYPE 4</b> |

## MISALIGNMENT



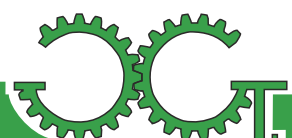
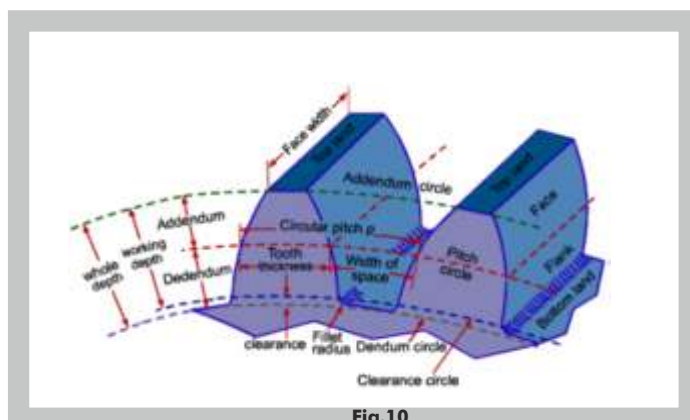
Using the special profiles, our gear spindles ensure optimal connections, between pinion shafts and roll necks, even with high misalignment, axial and radial displacements.

Max dynamic misalignment compensated by GGT toothing:

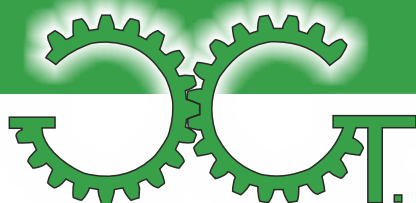
- Max dynamic angle:  $3^{\circ}30'$
- Max static angle:  $5^{\circ}00'$

## GGT TOOTHING

The crowned gear teeth of GGT gear spindles, GF series, have been designed to ensure the best performances in extreme and critical condition.







## MILL GEAR SPINDLES FOR LONG PRODUCT STEEL PLANT

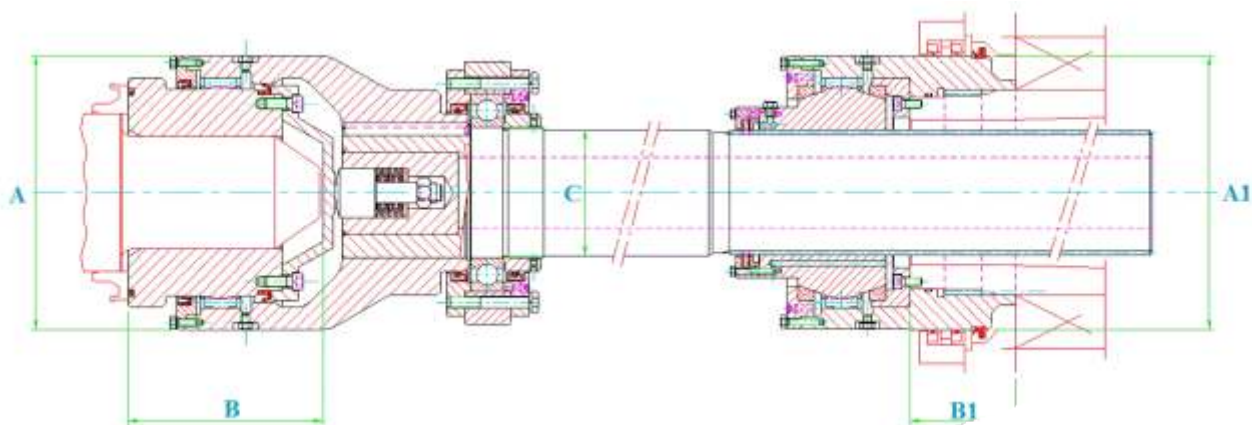


Fig.11

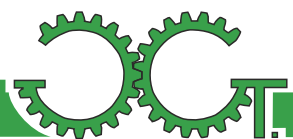
GF made in 42CrMo4 with gas nitriding **TYPE 1**

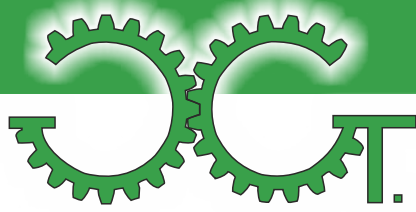
GF made in 31CrMo12 with gas nitriding **TYPE 2**

GF made in 41CrAlMo7 with gas nitriding **TYPE 3**

GF made in X38CrMoV51 (AISI H11) **TYPE 4**

IN CASE OF INQUIRY, OUR TECHNICAL DEPT. WILL BE PLEASED TO SELECT THE BEST SOLUTION FOR YOUR APPLICATION





## MILL GEAR SPINDLES FOR HOT & COLD ROLLING MILL

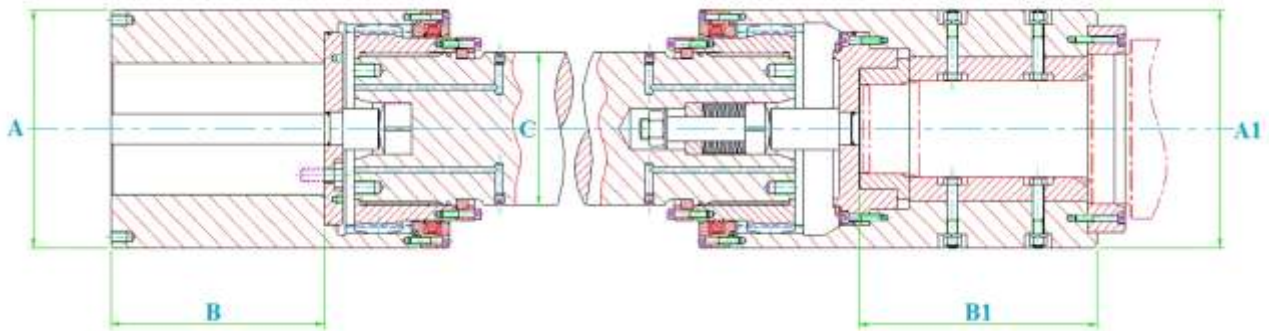
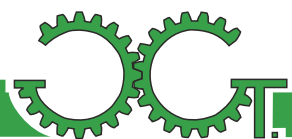
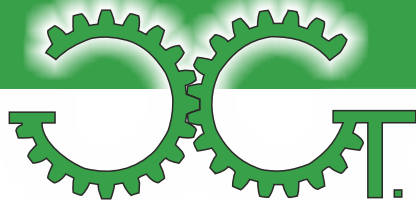


Fig.12





## TECHNICAL DATA

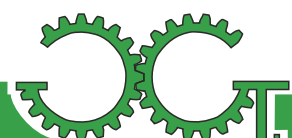
GF made in 42CrMo4 with gas nitriding **TYPE 1**

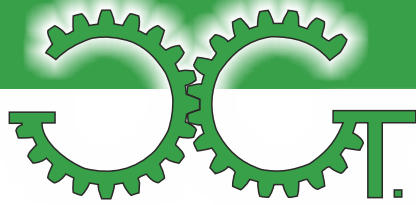
GF made in 31CrMo12 with gas nitriding **TYPE 2**

GF made in 41CrAlMo7 with gas nitriding **TYPE 3**

GF made in X38CrMoV51 (AISI H11) **TYPE 4**

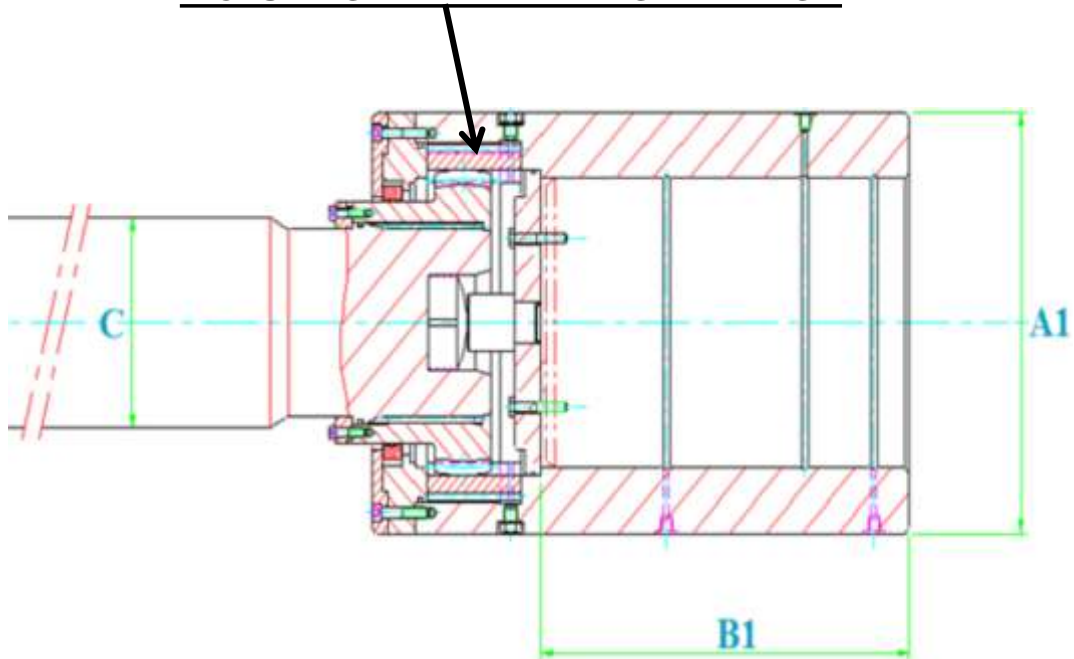
SIZE	NOMINAL TORQUE Tk [kNm]				MAX TORQUE Tk [kNm]				MAX SPEED [rpm]				DIMENSIONS [mm]									
	TYPE 1	TYPE 2	TYPE 3	TYPE 4	TYPE 1	TYPE 2	TYPE 3	TYPE 4	TYPE 1	TYPE 2	TYPE 3	TYPE 4	A/A1	B/B1	C	d1	d2	d3	K	w	h	
GF275	106	151	177	393	264	378	444	982	1278	1891	2004	2780	275	200	160	170	200	195	127	50	40	
GF290	124	178	209	463	311	445	523	1157	1197	1771	1877	2603	290	210	170	180	210	205	135	50	40	
GF300	133	190	223	494	332	475	558	1235	1128	1670	1770	2455	300	220	182	190	220	215	142	50	40	
GF315	147	210	247	546	367	525	617	1365	1074	1589	1684	2336	315	235	195	200	230	225	150	50	40	
GF330	188	269	316	699	470	673	790	1749	1007	1490	1579	2190	330	245	200	210	245	235	157	50	40	
GF345	211	302	355	785	528	755	887	1963	950	1406	1490	2067	345	260	215	225	260	245	168	63	45	
GF360	227	325	382	845	568	813	955	2113	897	1328	1408	1952	360	270	225	235	275	260	176	63	45	
GF375	244	349	410	907	610	873	1025	2269	863	1277	1354	1877	375	285	240	245	285	270	184	63	45	
GF395	337	482	566	1253	843	1205	1416	3133	807	1195	1267	1757	395	300	250	255	300	285	190	63	45	
GF415	376	538	632	1399	941	1345	1580	3497	764	1131	1199	1663	415	315	265	270	315	295	202	75	50	
GF435	409	585	687	1521	1023	1463	1718	3803	714	1057	1120	1554	435	330	280	285	330	310	214	75	50	
GF455	440	629	739	1635	1100	1573	1848	4089	673	996	1056	1464	455	350	295	300	350	325	225	75	50	
GF485	624	893	1049	2322	1561	2233	2623	5805	627	928	984	1364	485	370	310	315	365	345	236	90	65	
GF510	738	1055	1240	2743	1844	2638	3099	6858	594	879	932	1292	510	390	330	330	390	365	248	90	65	
GF535	820	1173	1378	3050	2051	2933	3446	7625	559	828	878	1217	535	410	345	350	410	385	262	90	65	
GF560	888	1270	1492	3302	2220	3175	3731	8255	526	779	826	1145	560	430	362	370	430	400	276	100	75	
GF585	1126	1610	1892	4347	2815	4025	4729	10868	497	735	779	1080	585	450	375	385	450	415	288	100	75	
GF615	1262	1805	2121	4874	3156	4513	5302	12184	468	693	735	1019	615	475	395	405	475	440	304	100	75	
GF645	1364	1950	2291	5265	3409	4875	5728	13163	446	660	700	970	645	500	416	425	500	465	318	100	75	
GF675	1476	2110	2479	5697	3689	5275	6198	14243	421	623	660	916	675	520	437	445	525	485	332	130	90	
GF710	1832	2620	3079	7074	4580	6550	7696	17685	397	587	622	863	710	550	460	470	550	505	352	130	90	
GF740	1979	2830	3325	7641	4948	7075	8313	19103	376	556	589	817	740	570	484	490	575	530	366	130	90	
GF770	2129	3044	3577	8219	5322	7610	8942	20547	358	530	562	779	770	600	504	515	605	550	386	130	90	
GF800	2280	3260	3831	8802	5699	8150	9576	22005	342	506	536	744	800	620	525	540	630	575	405	150	100	
GF835	2937	4200	4935	11340	7343	10500	12338	28350	325	481	510	707	835	650	550	560	660	595	420	150	100	
GF870	3171	4535	5329	12245	7928	11338	13322	30611	312	462	490	679	870	680	574	590	690	625	440	150	100	
GF905	3399	4860	5711	13122	8497	12150	14276	32805	289	428	454	629	905	710	596	610	720	645	460	150	100	
GF940	3643	5210	6122	14067	9108	13025	15304	35168	276	409	434	601	940	740	620	640	750	675	480	150	100	



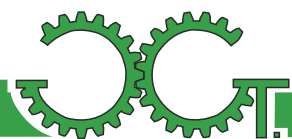


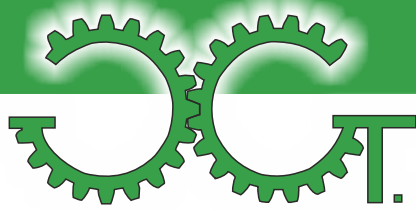
## MILL GEAR SPINDLES FOR HOT & COLD ROLLING MILL

INCLUDING INTERMEDIATE GEAR RING



TYPE 3						
SIZE	Tk [kNm]	Tmax [kNm]	MAX SPEED [rpm]	d3 [mm]	A1 [mm]	B1 [mm]
GF.290	177	444	2004	210	290	205
GF.320	223	558	1770	230	320	225
GF.360	316	790	1579	260	360	260
GF.400	400	1000	1310	290	400	295
GF.440	615	1538	1190	320	440	320
GF.490	739	1848	1056	355	490	360
GF.540	1240	3100	932	390	540	400
GF.590	1395	3488	835	425	590	425
GF.650	2121	5302	755	470	650	470
GF.710	2479	6198	670	510	710	520
GF.770	3079	7696	605	560	770	560
GF.840	3755	9388	555	600	840	620
GF.910	4935	12338	495	660	910	630
GF.980	5711	14276	434	710	980	715





## TECHNICAL DATA

IN CASE OF INQUIRY, OUR TECHNICAL DEPT. WILL BE PLEASED TO SELECT THE BEST SOLUTION FOR YOUR APPLICATION

GF made in 42CrMo4 with gas nitriding **TYPE 1**

GF made in 31CrMo12 with gas nitriding **TYPE 2**

GF made in 41CrAlMo7 with gas nitriding **TYPE 3**

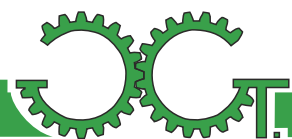
GF made in X38CrMoV51 (AISI H11) **TYPE 4**

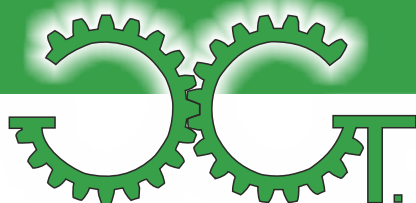


Fig.13



Fig.14





## MILL GEAR SPINDLES FOR TUBE PLANT

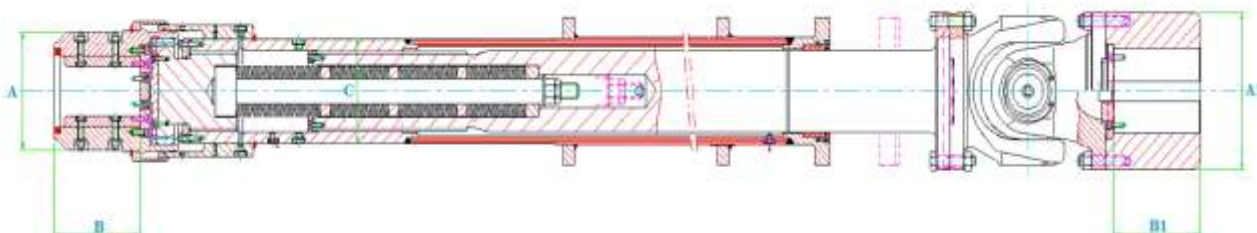


Fig.15

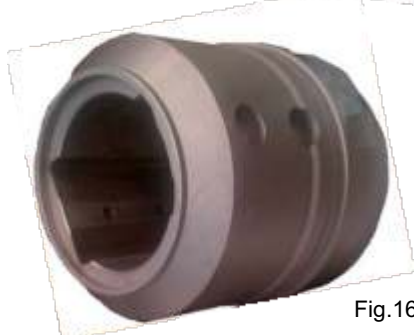


Fig.16



Fig.17

GF made in 42CrMo4 with gas nitriding

**TYPE 1**

GF made in 31CrMo12 with gas nitriding

**TYPE 2**

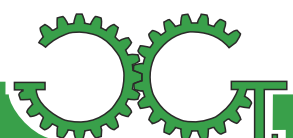
GF made in 41CrAlMo7 with gas nitriding

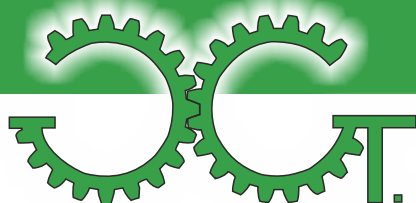
**TYPE 3**

GF made in X38CrMoV51 (AISI H11)

**TYPE 4**

IN CASE OF INQUIRY, OUR TECHNICAL DEPT. WILL BE PLEASED TO SELECT THE BEST SOLUTION FOR YOUR APPLICATION





## **SPECIAL DESIGN**

### **GREENFLEX WITH VARIABLE SET-UP GF.X**

**Green Gear Trasmisioni Srl Company** offer to the iron & steel market mill gear spindles with a special device to set-up one of the two work rolls driving the mill stands designed to produce the threaded rod, named GEWI.



Fig.18



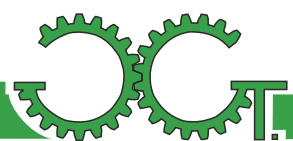
Fig.19

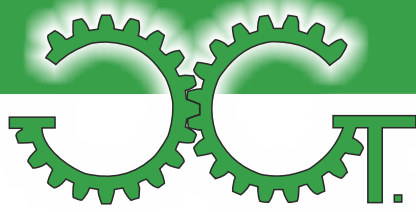


Fig.20



Fig.21





## SPECIAL TYPE OF GREENFLEX WITH VARIABLE SET-UP GF.X

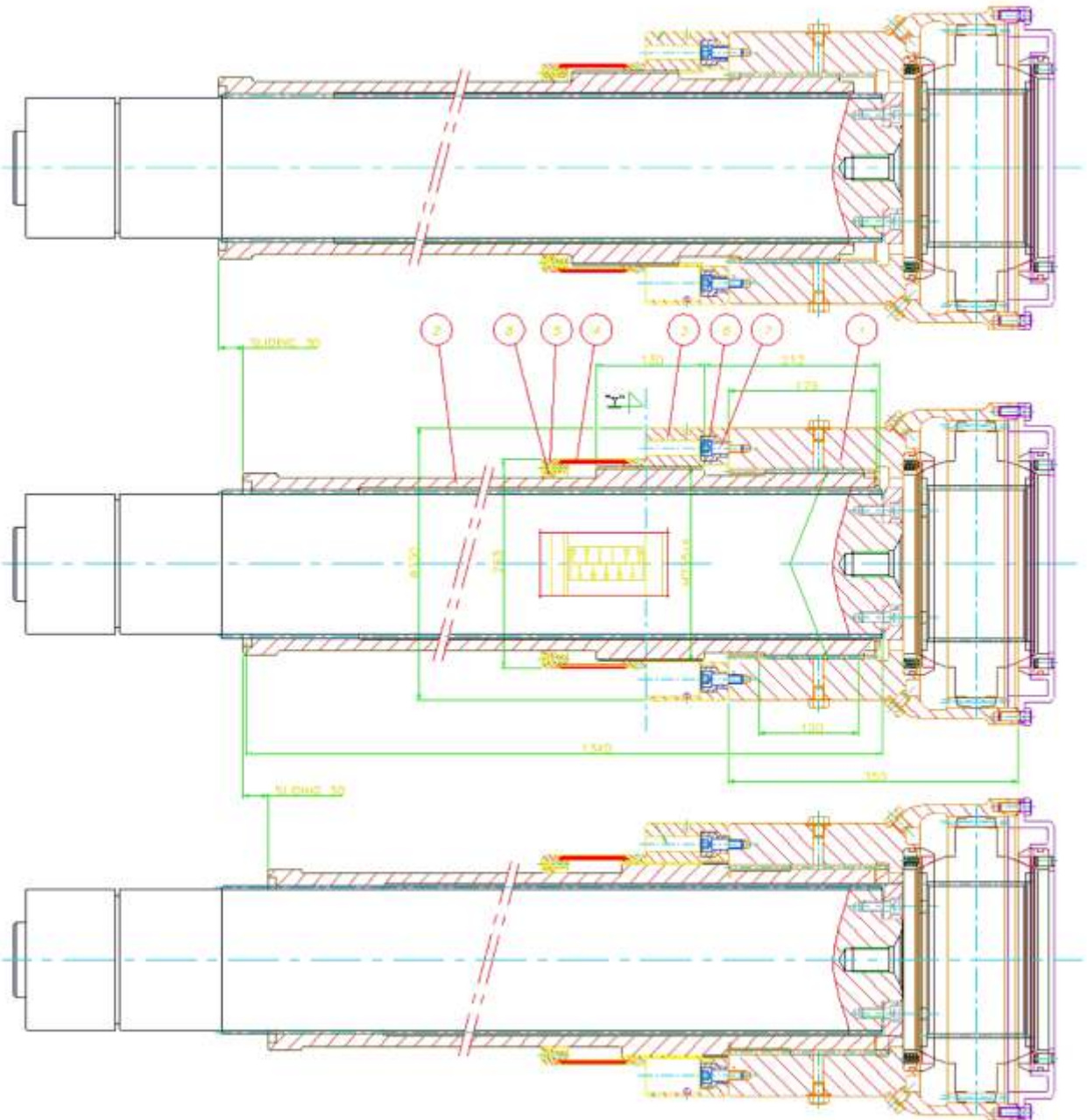
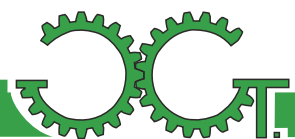
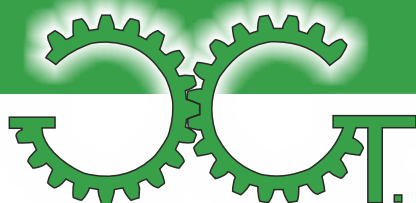


Fig.22







## SPECIAL TYPE OF GREENFLEX WITH VARIABLE SET-UP GF.X

### COMPONENTS

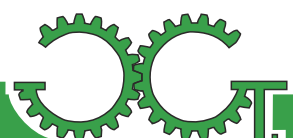


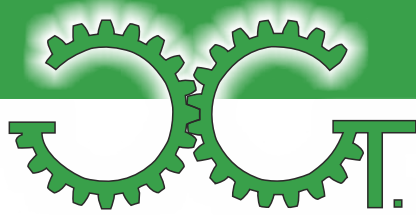
Fig.23

Our mill gear spindles are engineered and designed by a team of skilled and experienced engineers in our technical office at Scurzolengo (Asti). Our spindles are made of the best European steel raw materials and are heat treated in Italy.



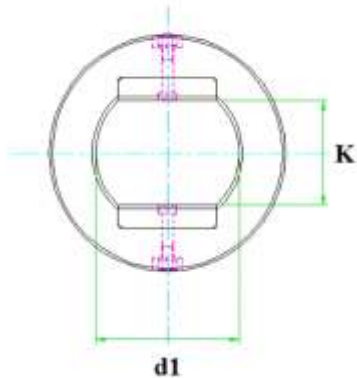
Fig.24



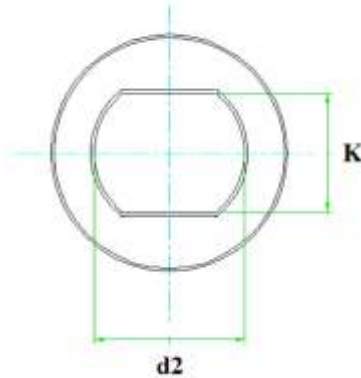


## FINISHED BORE TYPOLOGY

ROLL END SLEEVE FLAT KEYED BORE



ROLL END SLEEVE INTEGRAL BORE



PINION END SLEEVE KEYED BORE

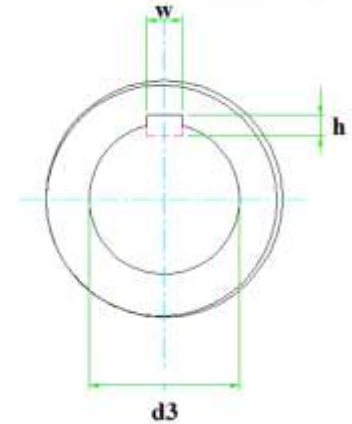


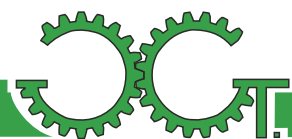
Fig.25

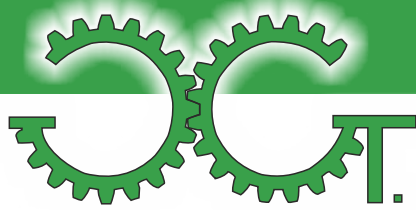
### ROLL END

- 1.TWO FLAT WEAR KEYS
- 2.TWO FLAT AND TWO ROUND WEAR KEYS
- 3.INTEGRAL BORE
- 4.SPLINED DIN5480

### PINION END

- 1.CYLINDRICAL FINISHED BORE & 1 KEYWAY
- 2.CYLINDRICAL FINISHED BORE & 2 KEYWAYS @ 90°
- 3.CYLINDRICAL FINISHED BORE & 2 KEYWAYS @ 180°
- 4.TAPERED FINISHED BORE & 2 KEYWAYS @ 180°
- 5.CYLINDRICAL FINISHED BORE WITH SHRINK FITTING & OIL PRESSURE REMOVAL





## TYPICAL KINEMATIC CHAIN OF A ROLLING MILL PLANT

### GGT MAIN CUSTOMERS (FERROUS AND NON FERROUS ROLLING MILL):

- HOT STRIP MILL
- COLD ROLLING MILL
- BAR MILL
- WIRE ROD MILL
- PLATE MILL
- SECTION MILL
- MERCHANT MILL
- RAIL MILL
- MULTI PIPE MILL (MPM)
- SEAMLESS TUBE PLANT (PQF / FQM)

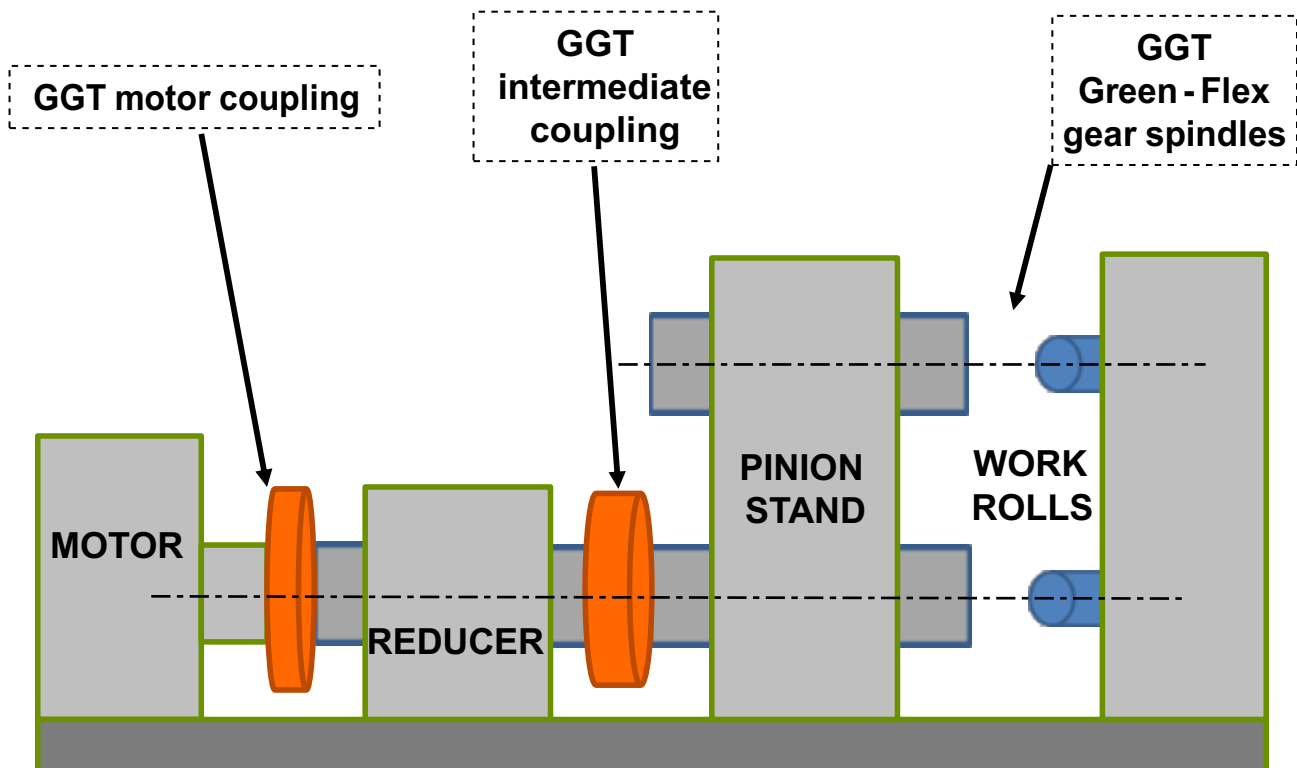
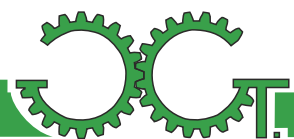
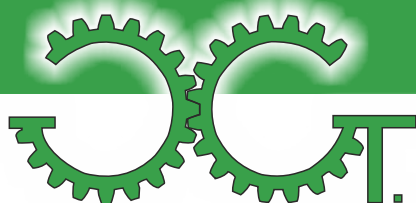


Fig. 26





## LUBRICATION & MAINTENANCE

Our Green-Flex gear spindles can be proposed in two main designs, according to the their lubrication:

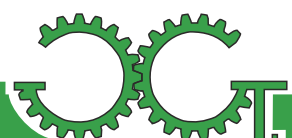
- GREASE LUBRICATION
- CONTINUOUS OIL LUBRICATION

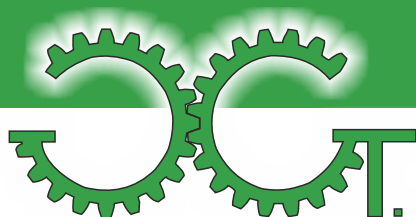
GreenFlex GF series gear spindles must be lubricated on site with rolls in working position. Remove one of the vent plugs assembled in the seal flange, located in the upper side and pump grease through one of the grease plugs placed on the spindle shaft, close to the head. The lubrication is completed when the grease comes out of the vent hole continuously. Then, screw carefully the plug in the pertaining hole; this is a very important operation, since, when only one vent plug is missing, the spindle loses all the grease in a few minutes time, during rotation.

For **telescopic spindle typology**, employ two grease nipples located on the same side of the spindle and pump about 1 kg. of grease in each of the two grease nipples.

**VERY IMPORTANT:** always pump grease when the spindle is in fully compressed length position. **RECOMMENDED GREASE:** For standard operation, please see the technical features of the grease, listed below. Further information

GREASE TECHNICAL FEATURES	
<i>NLGI grade</i>	1 ÷ 2
<i>Thickener</i>	CaSO <sub>4</sub> / Complex Lithium
<i>Grade of Penetration</i>	280 ÷ 380
<i>Dropping Point</i>	250° ÷ 300°C
<i>Oil Viscosity at 40°C</i>	650 ÷ 1200 cSt
<i>Additives</i>	EP
<i>MoS<sub>2</sub> mineral content</i>	5 ÷ 10%
<i>Timken EP Test</i>	50 ÷ 70 kg.
<i>Corrosion</i>	Negative





### LUBRICATION FREQUENCY:

- **Start-up**: after few hour operation, check and add grease, if necessary;
- **During commissioning**: for the first month, lubricate every three days;
- **In normal operation**: lubricate every 15 days;
- **During work roll change**: lubricate the sleeve bore by the recommended grease;

**MAINTENANCE:** Perform scheduled inspections to achieve long spindle life-time and proper operation.

- 1) After 2 weeks;
- 2) After 1 month;
- 3) After 2 months;

Later on, inspections are to be carried out every 5 to 6 months or every 5000 working hours, at least once a year.

Inspections to be performed are as follows:

- a) Flange bolt tightening;
- b) Gear tooth wear check;
- c) Noise and/or vibration;
- d) Be sure that no excessive grease leakage is present, caused by seal wear, grease nipples and plug failure.

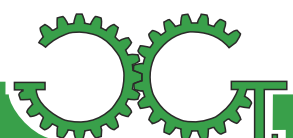
**Please, change spindle position from top to bottom and vice versa at regular intervals, in case of non-reversing application, in order to get a homogeneous wear on both tooth flanks.**

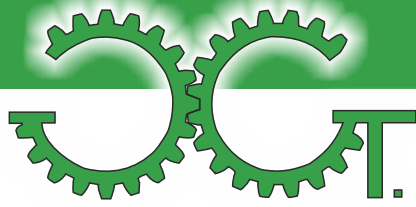
### RECOMMENDED SPARES:

Every 6 GF spindles installed, we suggest you to keep in stock the following spares:

- N.2 complete spindles;
- N.2 roll end sleeve coupling boxes;
- N.2 sets of hubs and intermediate rings (if any);
- N.2 sets of seal units;

**SAFETY: All rotating components must be guarded, to prevent any accident. Gear spindles should be installed according to the international and local safety rules.**





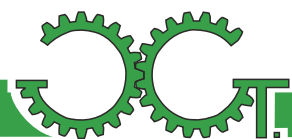
## **GGT MILL GEAR SPINDLES GF SERIES ASSEMBLY DEPARTMENT**

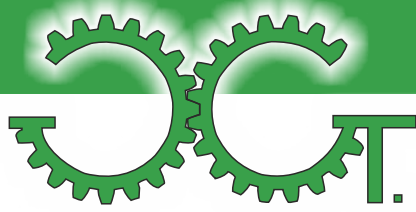


Fig.27



Fig.28





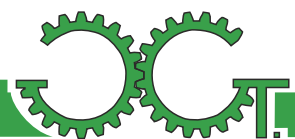
## PICTURES

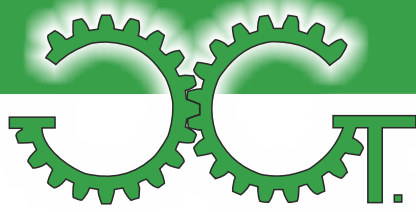


Fig.29



Fig.30





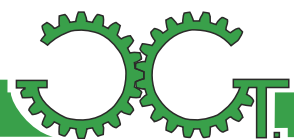
## GEAR SPINDLES FOR LONG PRODUCT MILLS



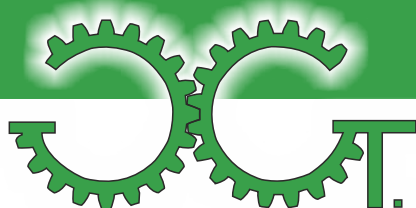
Fig.31



Fig.32







## GEAR SPINDLES FOR LONG PRODUCT MILLS



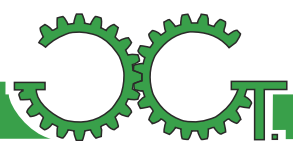
Fig.33

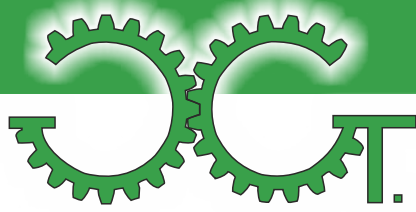


Fig.34



Fig.35





## GEAR SPINDLES FOR SEAMLESS TUBE MILL PLANT



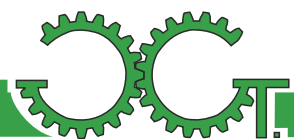
Fig.36

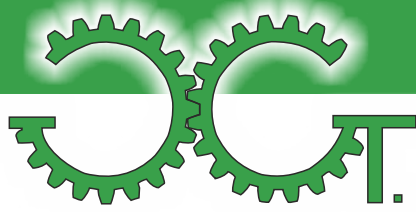


Fig.37



Fig.38





## GEAR SPINDLES SPECIAL COMPONENTS



Fig.39



Fig.40



Fig.41

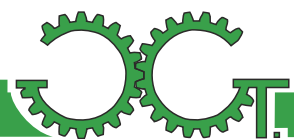
Fig.42

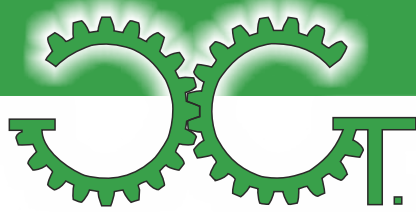


Fig.43



Fig.44





## GEAR SPINDLES FOR RESIZING MILLS



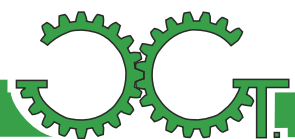
FIG. 45  
SPECIAL MILL GEAR SPINDLES FOR TUBE MILLS

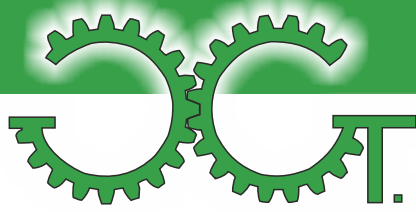


FIG. 46 - ROLL SIDE GEAR HEAD



FIG. 47- PINION SIDE GEAR HEAD





## GEAR SPINDLES FOR HOT STRIP MILLS

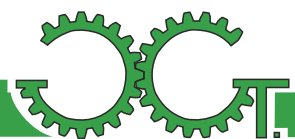


FIG. 48 GEAR SPINDLE ROLL END COUPLING BOX



FIG. 49-50

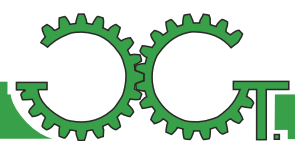
GEAR SPINDLE  
ROLL END  
DIA. 1300 mm

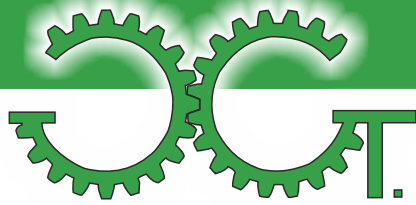




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