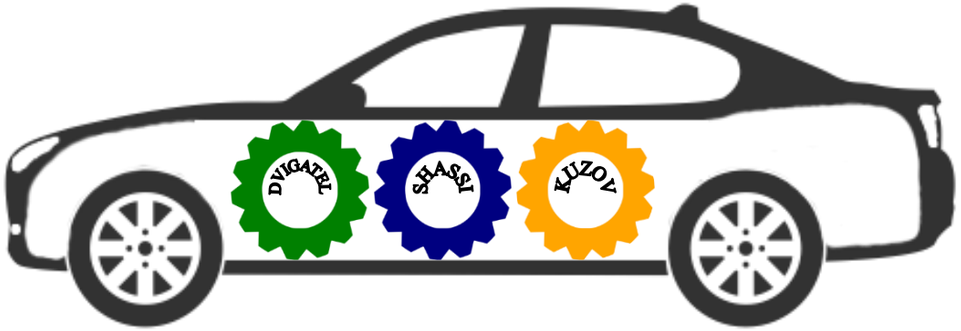
AVTOMOBILLAR KONSTRUKSIYASI



12th Topic: Differential. Wheel drives.

(12-Mavzu: Differensial. Yetakchi g‘ildiraklar yuritmalari.)

Part 2

Associate Professor: Yusupov Sarvarbek

12-Mavzu: Differensial. Yetakchi g‘ildiraklar yuritmalari.

(12th Topic: Differential. Wheel drives.)

O‘quv rejasi:

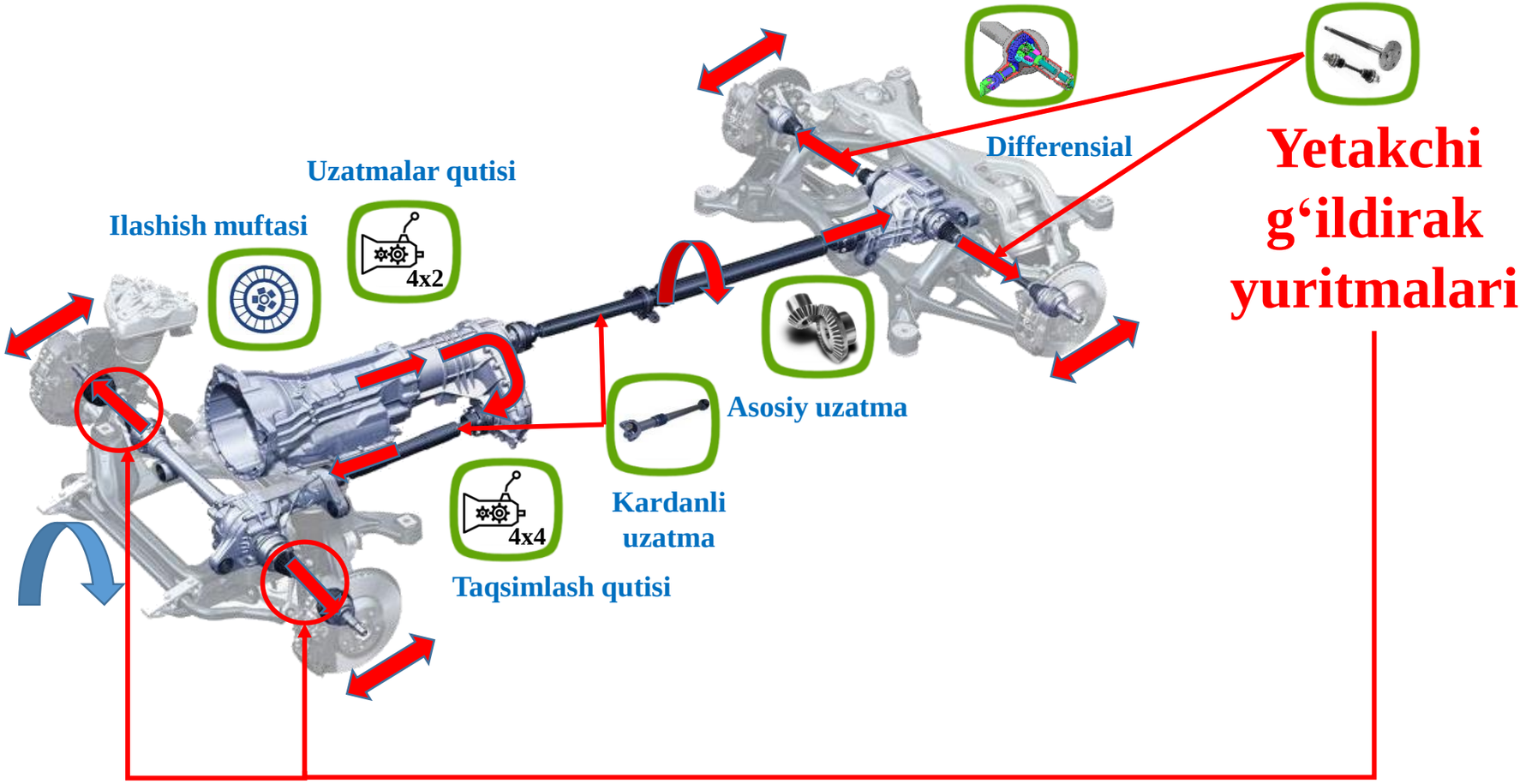
12.1. Differensialning vazifasi va turlari.

12.2. Differensialning konstruksiyalari va ularning ishlash prinsipi.

12.3. Yetakchi g‘ildiraklar yuritmalarining vazifasi va turlari.

12.4. Yetakchi g‘ildiraklar yuritmalarining konstruksiyalari va ularning ishlash prinsipi.

TRANSMISSIYA



[1]

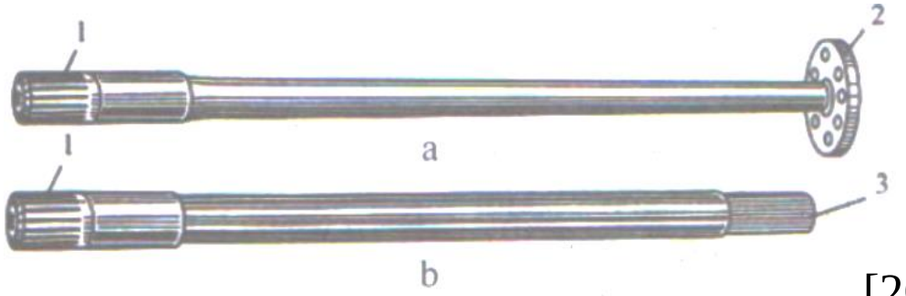
12.3. Yetakchi g‘ildiraklar yuritmalarining vazifasi va turlari.

Differensialdan yetakchi g‘ildiraklarga burovchi moment yarim o‘qlar deb nomlangan vallar orqali uzatiladi.

Zamonaviy avtomobillarda asosan ikki turdagi yarim o‘qlardan foydalanilgan.

Yarim o‘qlarning **tashqi uchlari** g‘ildirak gupchagiga flanets yoki shlits yordamida ulanadi.

Ichki uchlari esa ko‘pchilik avtomobillarda differensialdagi yarim o‘q shesternyasi bilan shlits yordamida biriktiriladi.



[20]

a-flanetsli; b-flanetssiz.

1, 3-shlitsli uchlari, 2-flanets.

Avtomobil harakatlanayotganida yarim o‘qlarga burovchi momentdan tashqari eguvchi momentlar ham ta’sir etadi.

Eguvchi momentlar avtomobilning yetakchi g‘ildiraklariga ta’sir etadigan quyidagi kuchlardan vujudga keladi:

- **Avtomobilning og‘irligidan G vujudga kelgan reaksiya kuchi R_z;**
- **Tortish kuchi R_T (tormozlashda tormoz kuchi);**
- **Avtomobil burilayotganida yoki yonga sirpanganda vujudga keladigan yonaki kuch R_Y.**

Burovchi moment yarim o‘qdan yetakchi g‘ildirak gupchagi podshipniklari orqali yuboriladi.

Shunga ko‘ra, avtomobillarda ishlatiladigan yarim o‘qlar uch turga bo‘linadi:

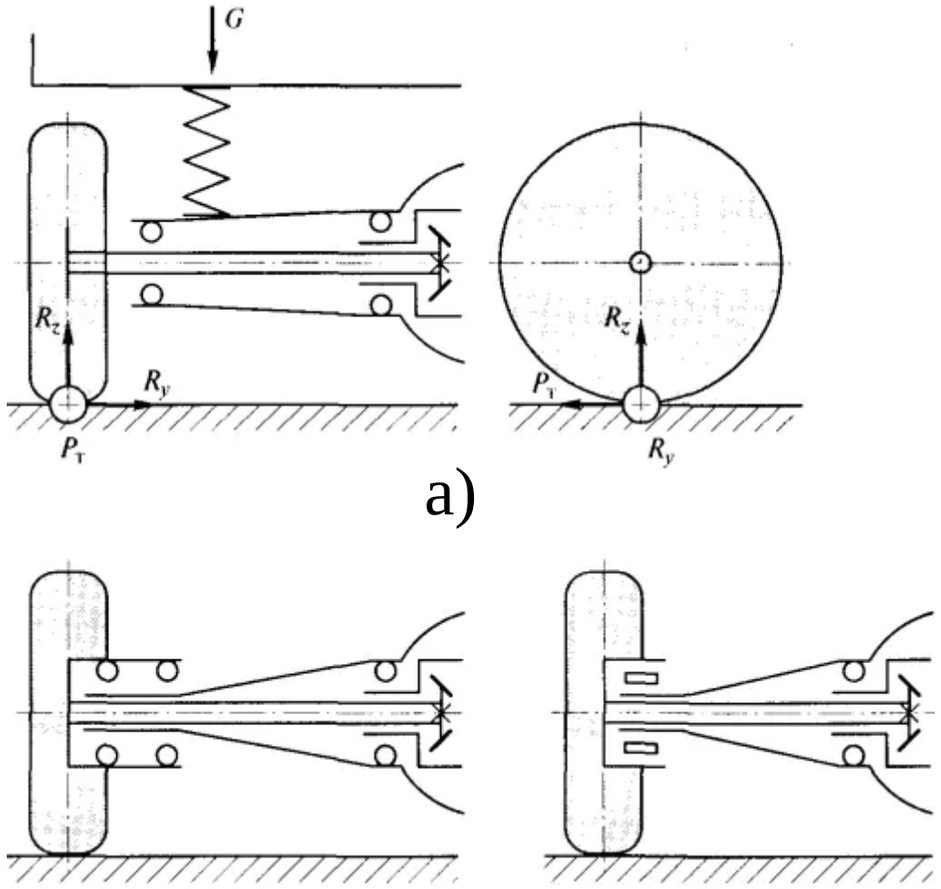
a - **yarim yuksizlantirilgan;**

b - **to‘la yuksizlantirilgan;**

c - **¾ qismi yuksizlantirilgan.**

G - ko‘prikka tushadigan vertikal yuklama;

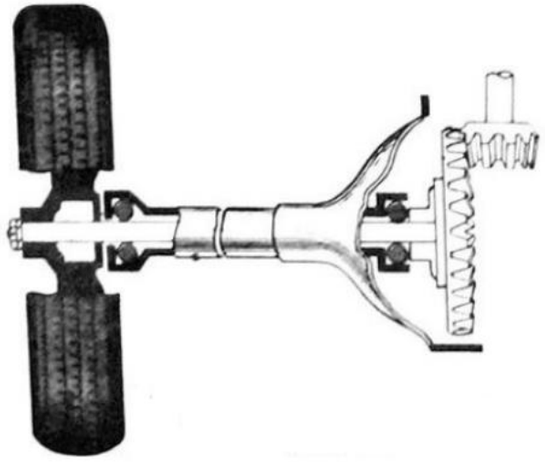
R_Z - yo‘l reaksiyasi; P_T - tayanch kuchi.



a) b) c) [21]

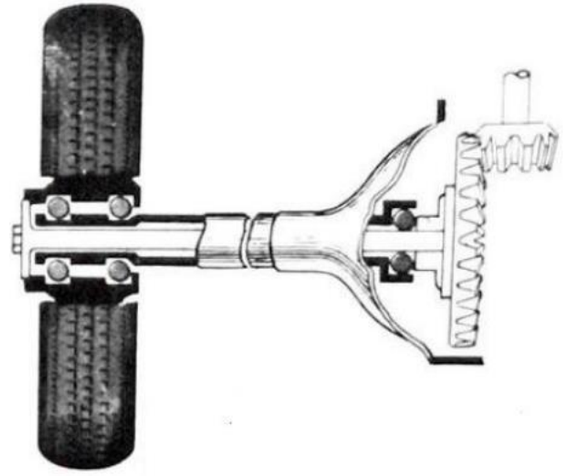
Shu bilan birga, har bir yarim o‘q g‘ildirakka tushadigan va bu kuchlar ta’sirida hosil bo‘luvchi eguvchi momentni faol qabul qila oladi.

Yarim yuksizlantirilgan



¾ qismi yuksizlantirilgan

To‘la yuksizlantirilgan



[22]

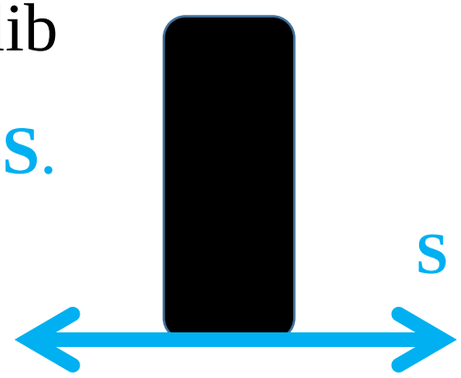
Xususan, eguvchi momentlar avtomobilning yetakchi g‘ildiraklariga

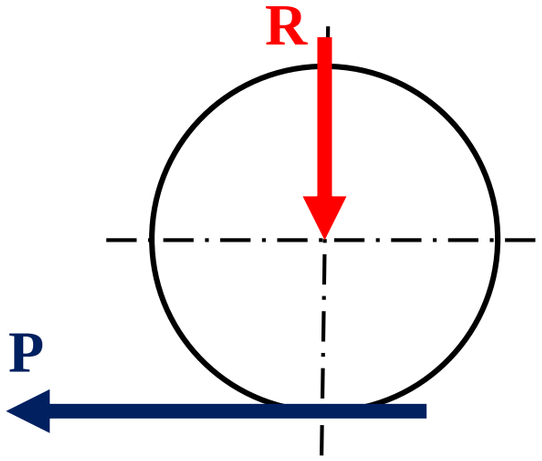
ta’sir etadigan quyidagi kuchlardan vujudga keladi:

1) Tik yo‘nalishda g‘ildirak markaziga yo‘nalgan **radial kuch – R** (avtomobilning og‘irligi G dan vujudga keladigan reaksiya kuchi);

2) Avtomobilning yetakchi g‘ildiraklari aylanganda hosil bo‘lgan **tortuvchi kuch – P**;

3) Burilishdagi markazdan qochma va yo‘l to‘shamining yonaki qiyaligi natijasida qirilib chiqadigan, **yondan ta’sir qiluvchi kuchlar – S.**



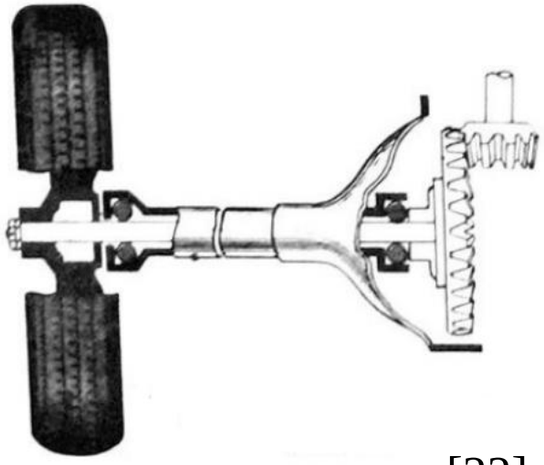


12.4. Yetakchi g‘ildiraklar yuritmalarining konstruksiyalari va ularning ishlash prinsipi.

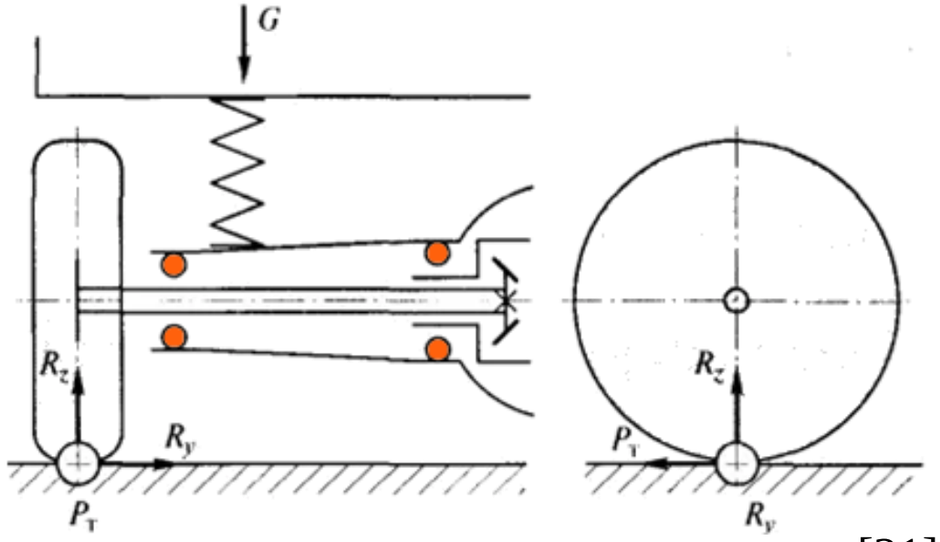
Yarim yuksizlantirilgan yarim o‘qning tashqi uchi bevosita orqa ko‘prik karteridagi podshipnikka o‘rnatiladi.

Unga barcha kuchlar ta’sir etadi, shuningdek undan yana yetakchi g‘ildiraklarga burovchi moment ham uzatiladi.

Bunday yarim o‘qlar asosan yengil avtomobillarning orqa ko‘priklarida qo‘laniladi.



[22]

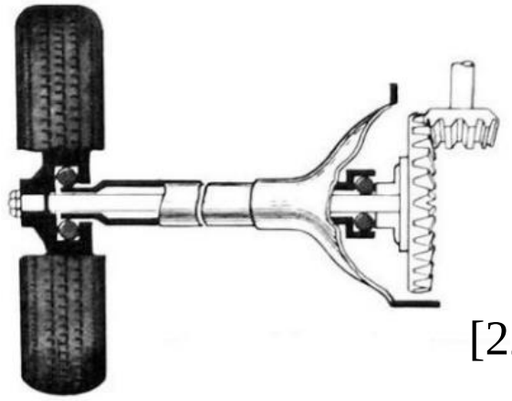


[21]

Yarim o‘qning tashqi uchi yetakchi g‘ildirakning gupchagiga mahkamlanib, gupchakning o‘zi esa karterning kerilgan yengiga podshipnikda o‘rnatilsa, **to‘rtdan uch qismi yuksizlantirilgan (3/4) yarimo‘qlar deb yuritiladi.**

Bunda **R_T, R_Z** va **R_Y** kuchlaridan hosil bo‘lgan eguvchi momentning ko‘p qismi podshipnik orqali karterga uzatilib, oz qismi yarim o‘qqa ta’sir qiladi.

Bunday yarim o‘qlar kamdan-kam qo‘llanilib yengil va kichik yuk avtomobillarining yetakchi ko‘priklarida ishlatiladi.



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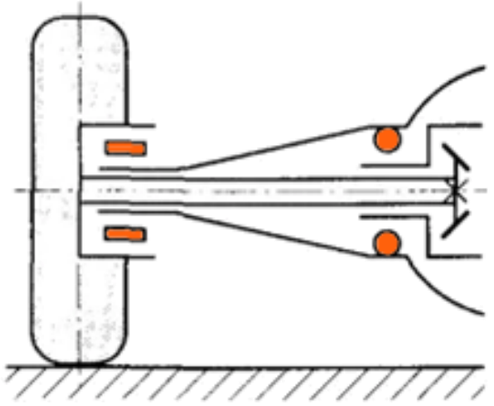
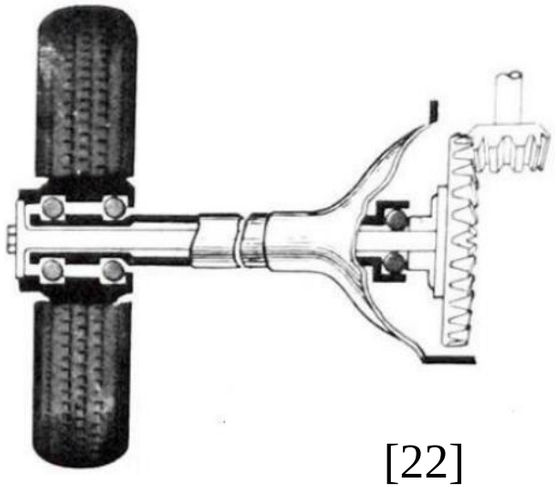


[21]

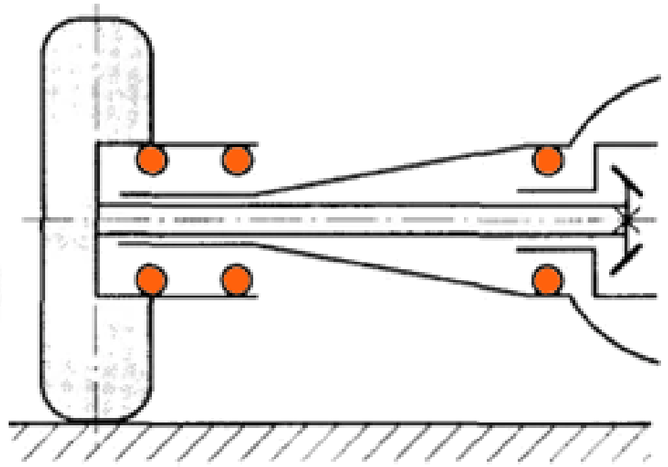
Yarim o‘qning tashqi uchi yetakchi g‘ildirakning gupchagi bilan tutashgan, gupchag esa yetakchi ko‘prik karteriga o‘tkazilgan ikkita podshipnikda yotsa, **to‘la yuksizlantirilgan yarim o‘q deb ataladi.**

Bunda **R_T, R_Z** va **R_Y** kuchlaridan hosil bo‘lgan eguvchi barcha kuchlar yarim o‘qqa tushmasdan, bevosita karterga tarqatiladi.

Bu turdagi yarim o‘qlar o‘rta va katta yuk avtomobillari hamda avtobuslarda qo‘llaniladi.



[22]



[21]

Damas avtomobilining yetakchi g‘ildirak yuritmalari.

1-orqa ko‘prik g‘ilofi,

2-moy quyish va sathini o‘lchash tiqini,

3-moyni to‘kish tiqini,

4-moy qaytargich,

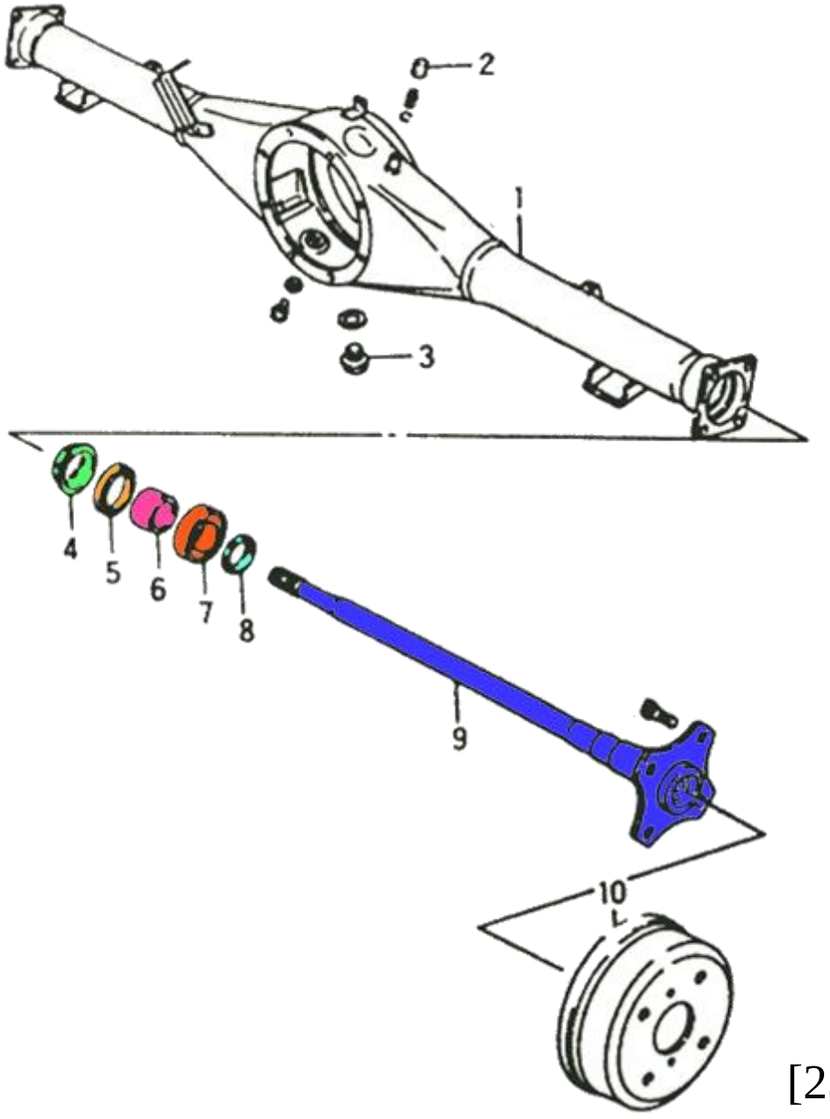
5-zichlagich,

6-zichlash halqasi,

7-podshipnik,

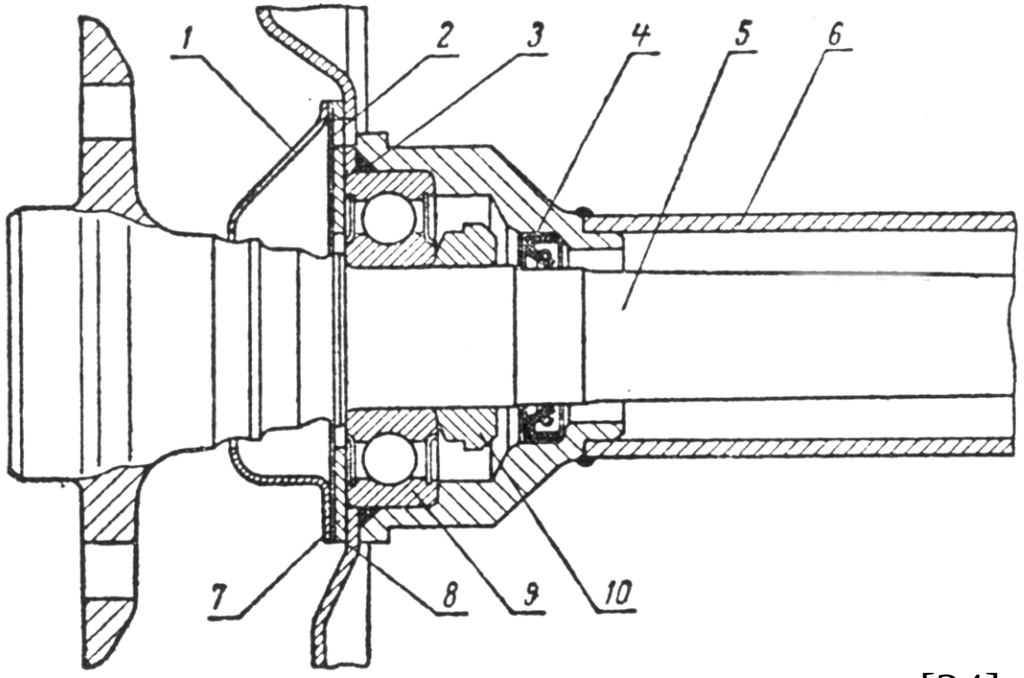
8-yarim o‘q podshipnigini mahkamlash plastinasi,

9-yarim o‘q, 10-tormoz barabani.



[23]

Yengil avtomobillar yarim o‘qlarining ichki tarafdagi uchida shlitsalar mavjud bo‘lib, yetakchi ko‘prikning g‘ilofi ichiga o‘rnatilganida differensialning yarim o‘q shesternyasidagi shlitsali bilan birikadi.

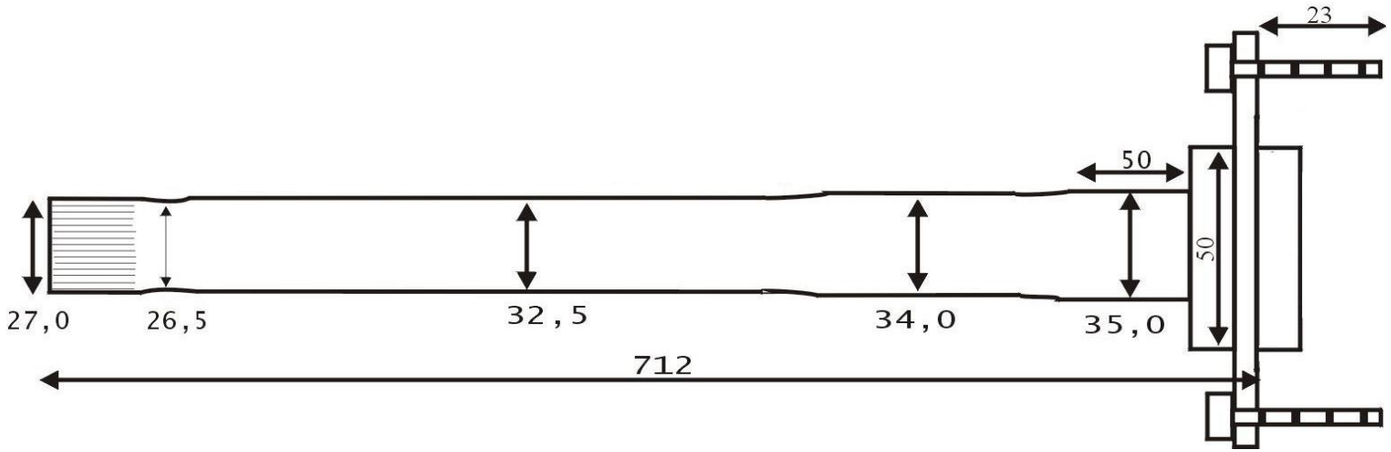


[24]

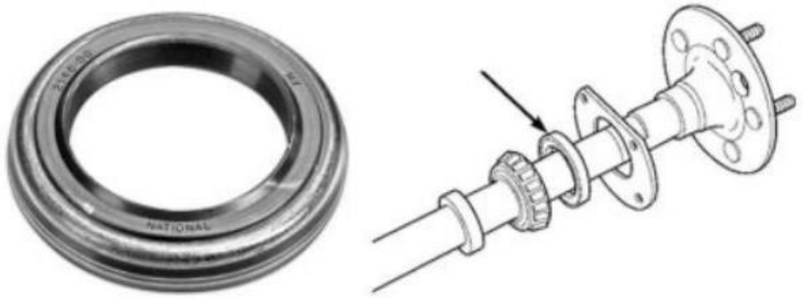
[25]

1-moy qaytargich; 2-qistirma; 3-zichlovchi rezina halqa; 4-zichlagich; 5-yarim o‘q; 6-orqa ko‘prik g‘ilofi; 7-yarim o‘q podshipnigini mahkamlash plastinasi; 8-tormoz mexanizmining shiti; 9-yarim o‘q podshipnigi; 10-podshipnikning tirgak vtulkasi.

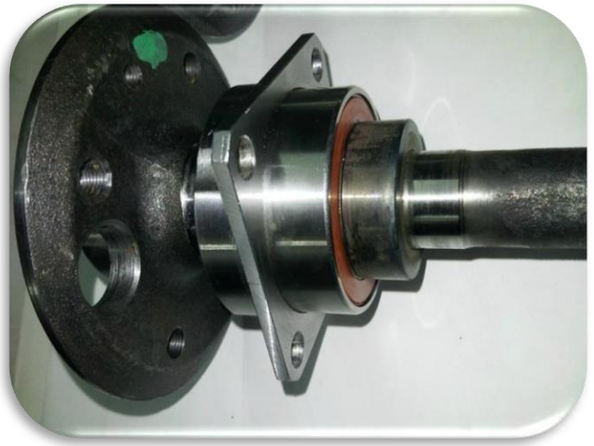
Yengil avtomobilning yarim o‘q konstruksiyasi.



[26]

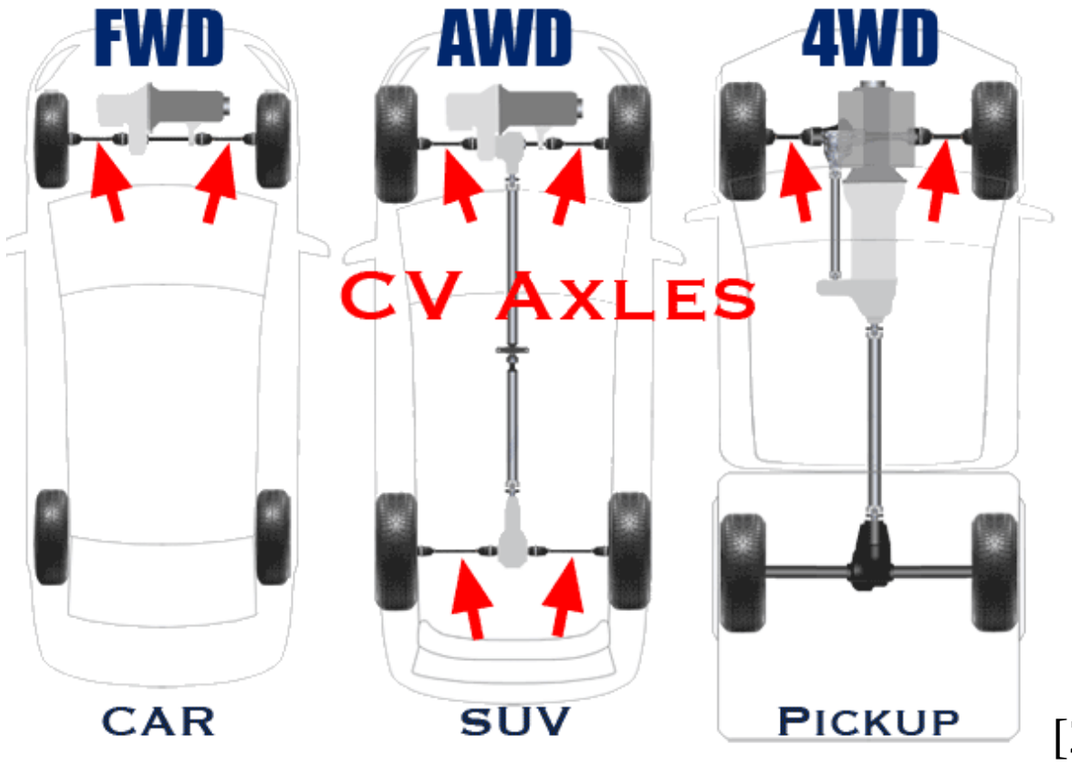


[27]



[28]

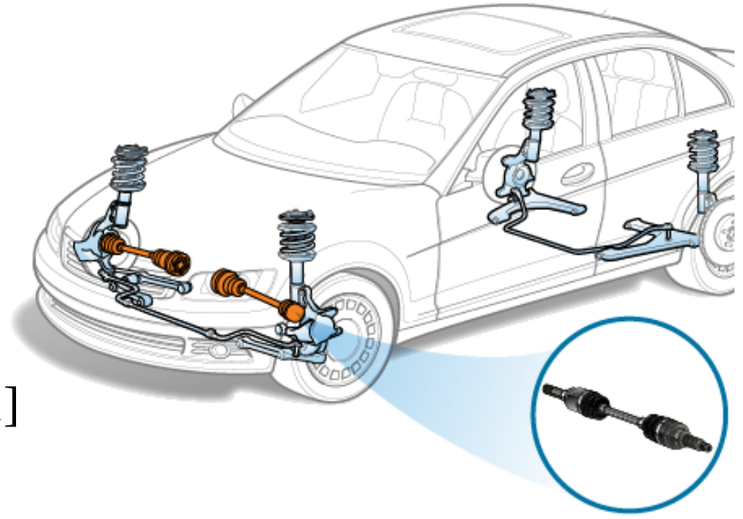
Boshqariluvchi yetakchi g‘ildiraklar yuritmasi.

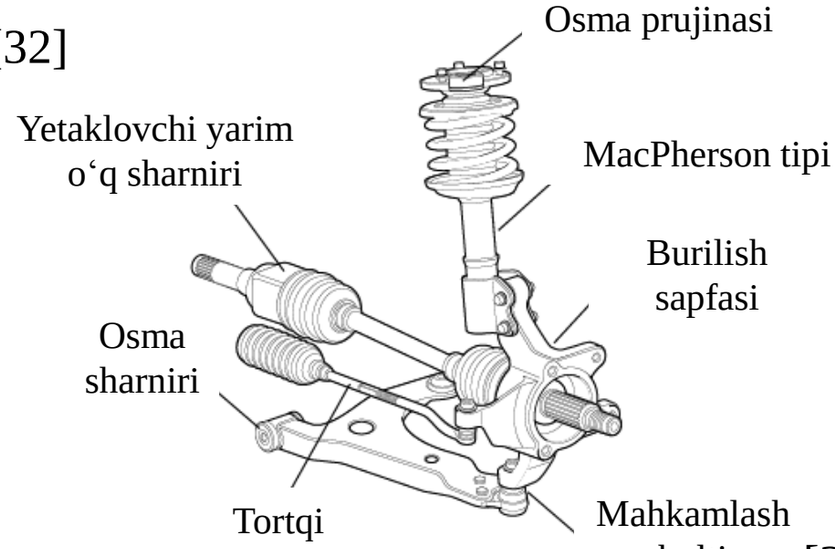


[29]

[31]

[32]



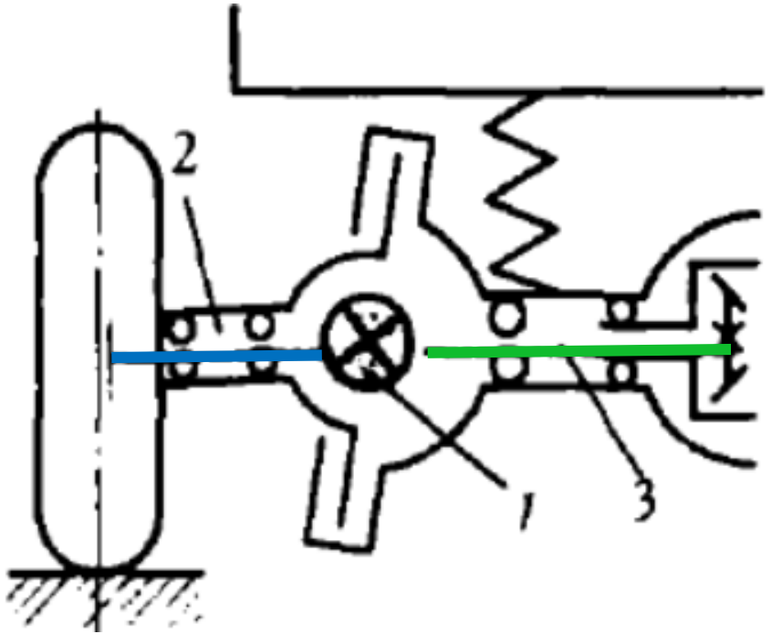


[30]

CV - constant-velocity

Boshqariluvchi yetakchi g‘ildiraklar yuritmasida burovchi moment differensialdan har qaysi yetakchi g‘ildirakka ikkita **ichki** va **tashqi** yarim o‘qlar va ularni bog‘lab turuvchi burchak tezliklari bir xil bo‘lgan, bo‘luvchi ariqchaga (kanavka) ega to‘rtta sharchali, kardanli sharnir orqali uzatiladi.

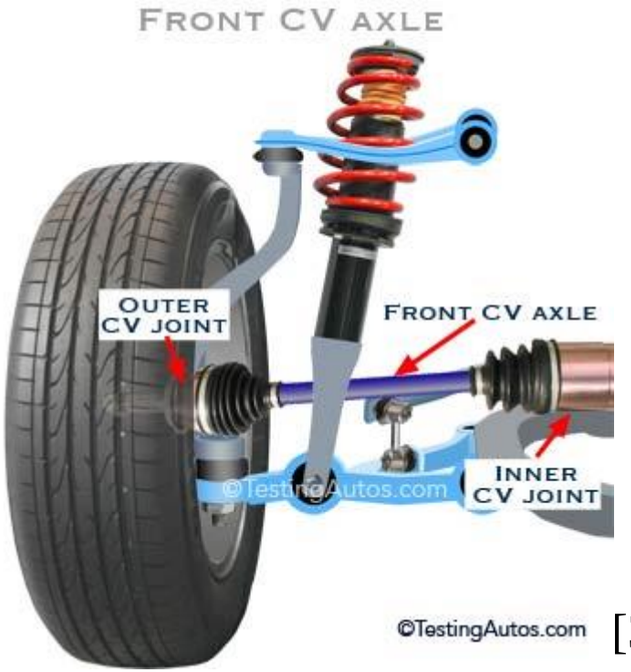
Bunday yuritma konstruksiyasi nomustaqil osmali, nokesma (yaxlit) ko‘priklarda qo‘llaniladi.



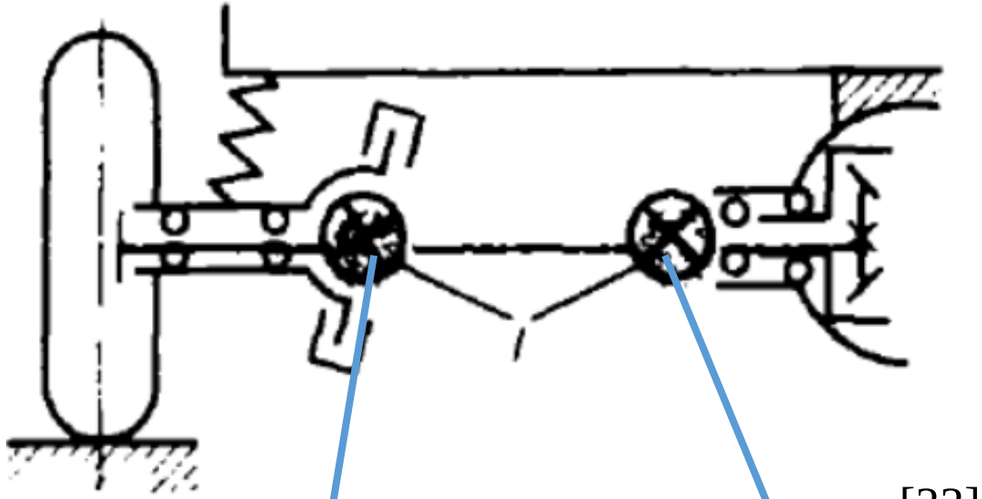
1-kardanli sharnir; 2-tashqi yarim o‘q; 3-ichki yarim o‘q.

[33]

Mustaqil osmaga ega old yuritmali avtomobillarda har qaysi boshqariluvchi yetakchi g‘ildirakka burovchi moment, burchak tezliklari bir xil bo‘gan ikkita kardanli sharnirlar bilan uzatiladi.

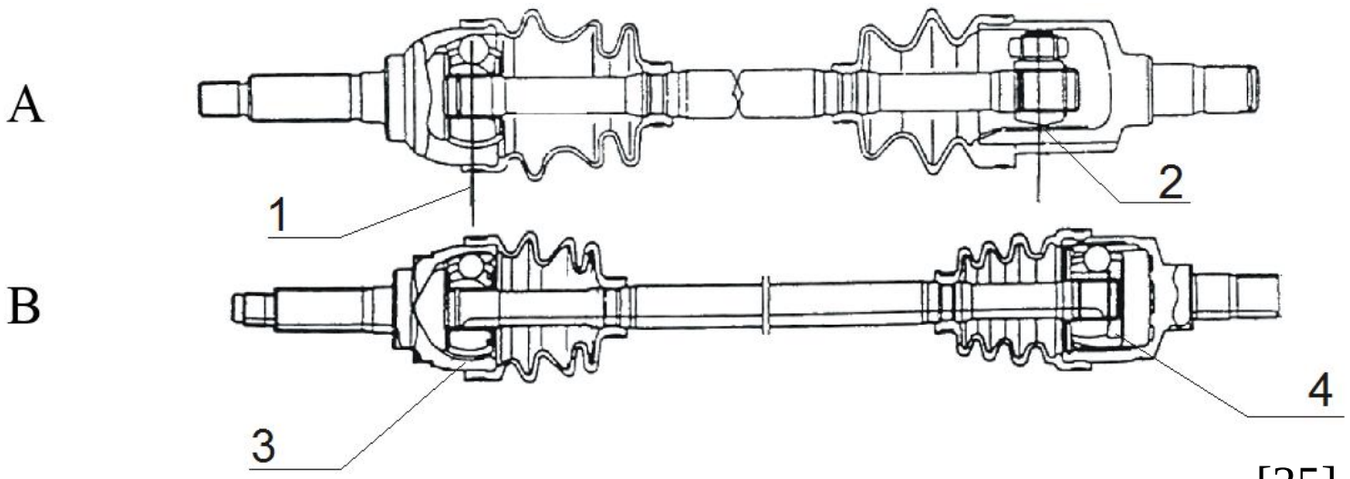


[34]


[33]


[32]

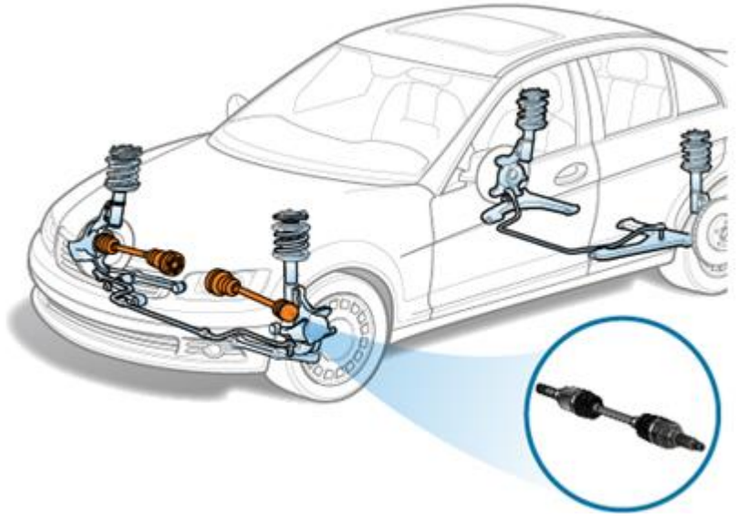
Oldingi boshqariluvchi va yetakchi g‘ildiraklarning yuritmasi.

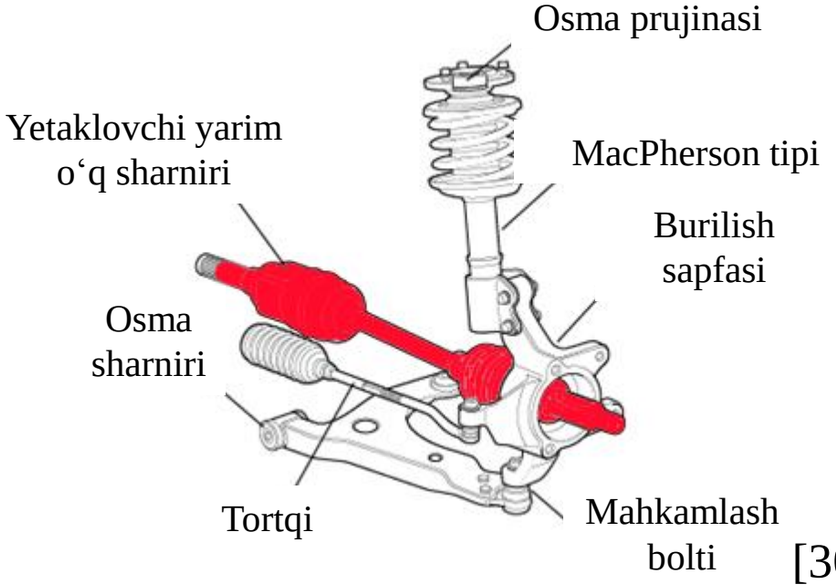


[35]

A-chap g‘ildirak yuritmasi. B-o‘ng g‘ildirak yuritmasi.

1-olti sharikli tashqi sharnir; 2-uch shipli ichki universal sharnir; 3-olti sharikli tashqi sharnir; 4-olti sharikli ichki universal sharnir.

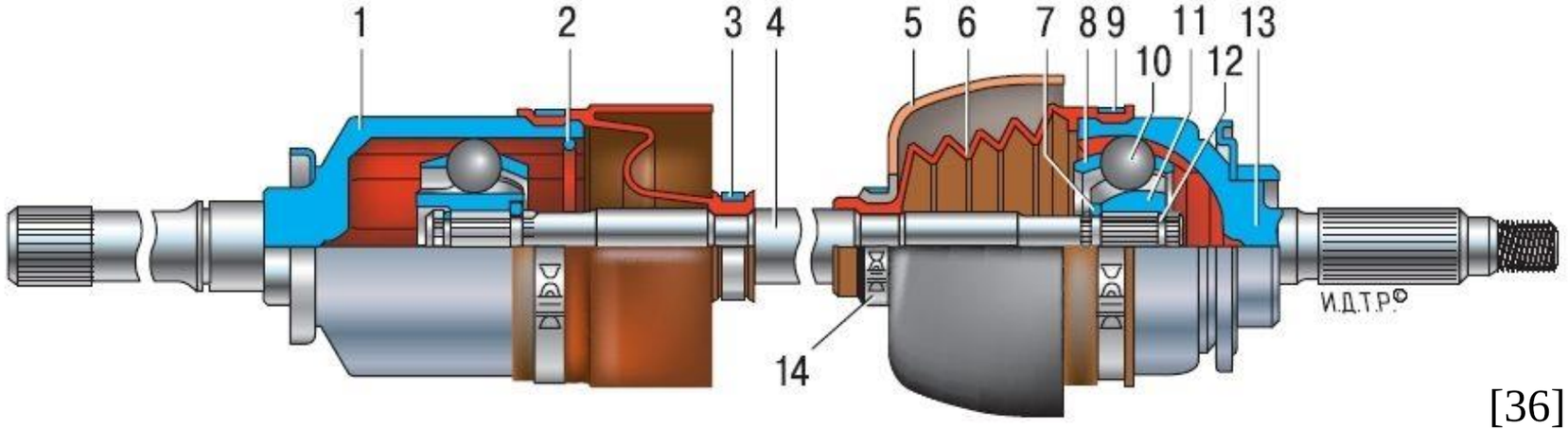




[30]

Oldingi boshqariluvchi va yetakchi g‘ildirak konstruksiyasi.

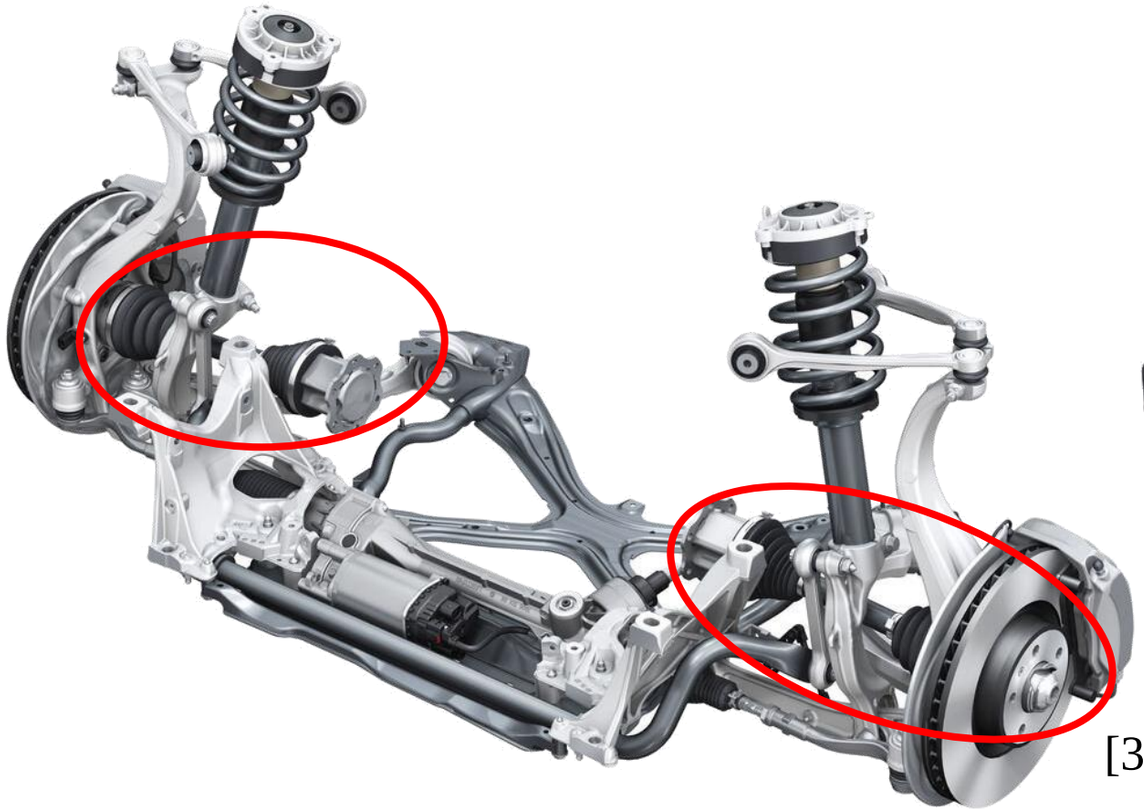
[32]



[36]

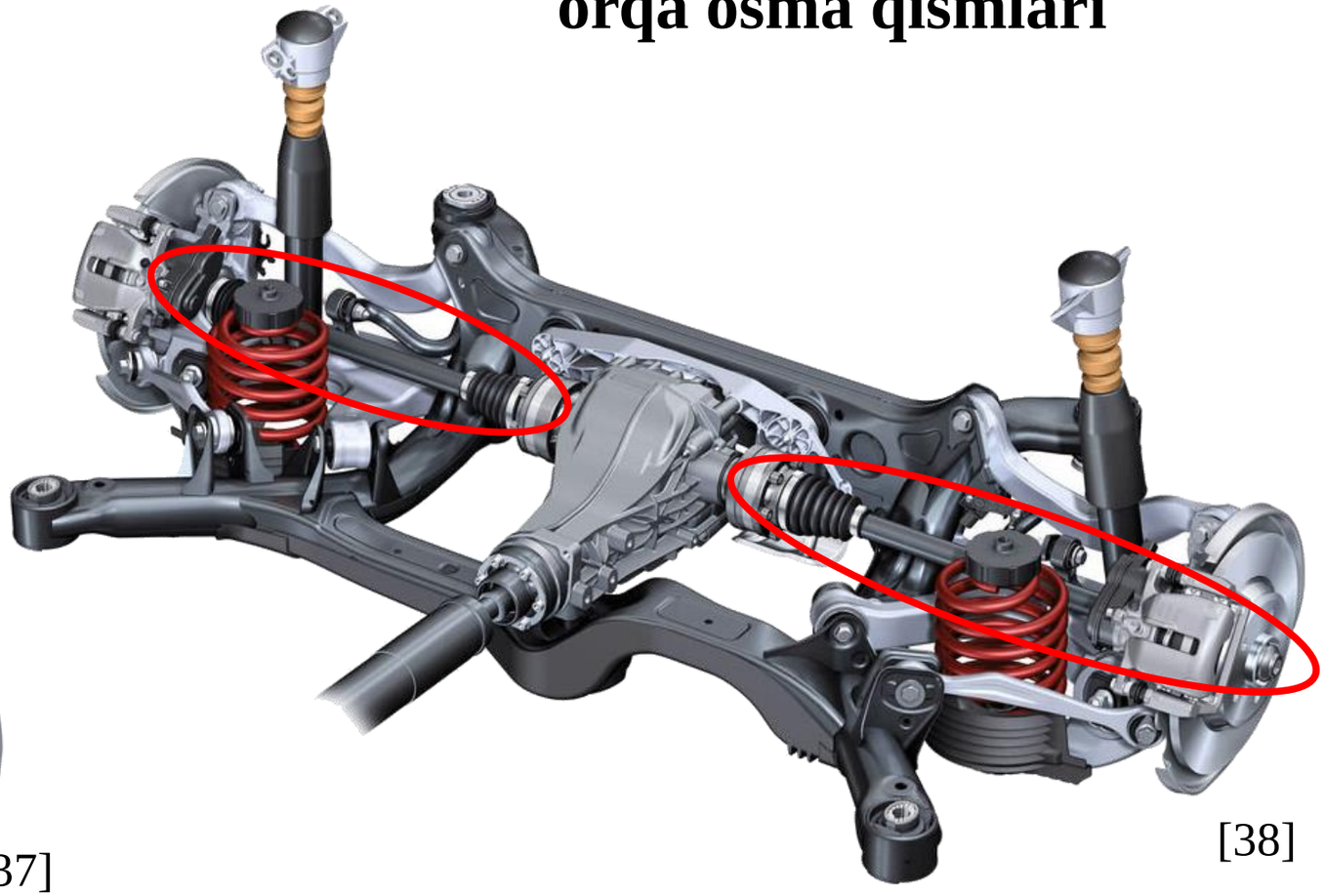
1 – корпус внутреннего шарнира; 2 – фиксатор; 3 – хомут крепления чехла; 4 – вал привода колеса; 5 – защитный кожух чехла; 6 – защитный чехол; 7 – упорное кольцо обоймы; 8 – сепаратор; 9 – хомут; 10 – шарик; 11 – обойма наружного шарнира; 12 – стопорное кольцо; 13 – корпус наружного шарнира; 14 – хомут крепления кожуха

Audi Q5 avtomobilining old osma qismlari



[37]

Audi Q5 avtomobilining orqa osma qismlari



[38]

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27. Mentsnot Getu. Design of rear axle shaft for light weight green vehicle. Thesis. Axle shaft seal. Addis Ababa University. March 1, 2018. –p. 8
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E'TIBORINGIZ UCHUN RAHMAT!!!