Press block machine structure and its application prospect

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A roll forming machine can be divided into several parts, safe coupling ， pressure roller, bearings, used to support pressure roller system, feeding system, the pressure bracket, the transmission system, lubrication system and hydraulic put pressure on the system， frame.

Fig 2 Horizontal profile of a typical roll forming machine. Two pressure rollers supported on the automatic alignment of the spherical roller bearings, the bearings installed in the rack. The drive gear through the safety coupling with gear reducer input shaft. By the gear reducer □ motor speed is reduced to the speed of the pressure roller. Gear accelerator, the synchronization of the two helical gear and output shaft. Pressure roller and connected to double output shaft gear reducer with a the Jaw gear couplings. The pressure roller surface (Figure 3 can not see) the feeding system is installed. Did not indicate there to the main gear lubrication system device, the sliding section of bracket on the gearbox, coupling, and the pressure roller with hydraulic pressure from the device.

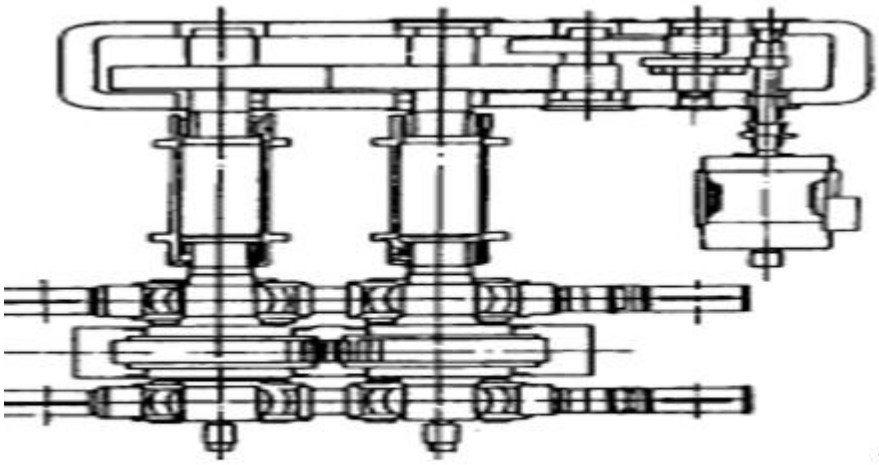
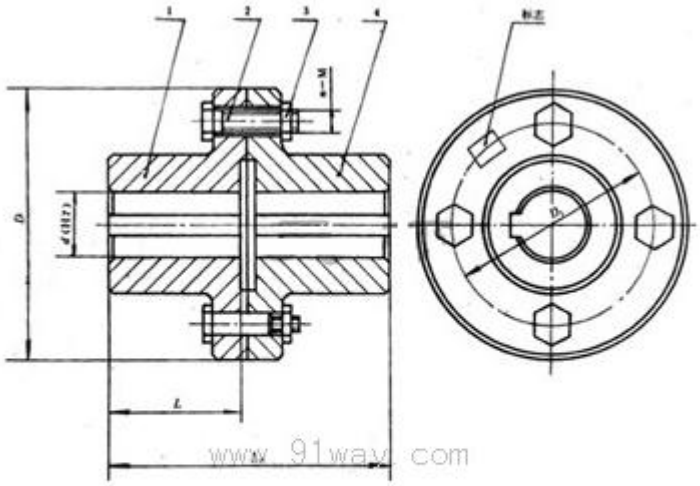


Fig2 A typical of the machines to roller section

1. Safe coupling

Molding machine work, material (adding) do not avoid zone ， A small iron and hard thing into the roller gear area and prevent roller the rotation of the wheels. In this case, in order to ensure that the molding machine the roller security work, the activities of the component must have a certain distance .The concessions from the translation of the function, and in serious cases can overload, united the open transmission shaft can take off. So the coupling design should have comfortable should this concession and safety protection function. This design USES the double friction roller type safe coupling, it with "roller" friction clutch "and" function, namely, use rolling the son chain, meet the molding machine activities on roller bearing a component big "will move a type" concession request; Use of friction transmission, setting overload protection. This safe coupling also has easy installation, adjustment and

convenient maintenance, reliable working, long service life, not affected by environmental factors influence characteristics.



Flange coupling

2. Pressure roller

The most important part of the roll forming machine is the pressure roller itself. The different designs are possible. First of all, the pressure roller has Caine work the surface of solid forgings made. The hard surface allows suitable to choose a variety of surface structures for the production of high strength of the cake. Another way, the pressure roller of the roller core may be replaced. In this way, the roll itself is easy to be water cooled. The work surface of the roll ring is usually processed into a shallow ball and socket. The latest design of the molding machine used in this way. Conduction to the pressure roller temperature must be down to ensure that the bearings at low temperatures the surface of the roller ring

must be cooled, usually due to higher feed temperature, in order to avoid the occurrence in the material surface "melt".

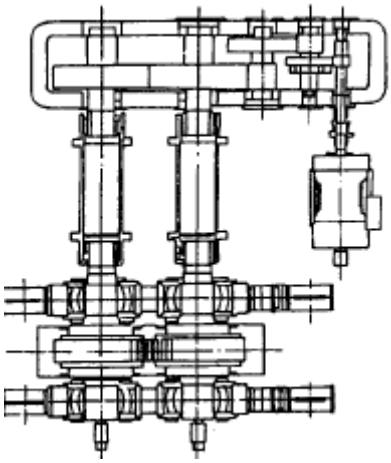


Fig 3 Profile of a typical roll forming machine

The hard pressure roller advantage is that it can replace the simple machine parts. When the severe wear of the pressure roller surface, within the scope of the regulations in the outer diameter surface of the re-to welding . This will enable the device is always to maintain efficient operation. Of course, the use of pre-processed components can ensure that the people expected to pass the hot and would not make the pressure roller overheating. The inner surface of the heat of the cooling system sleeve (Figure 4) will be more economic use, and require the use of cleaner cooling water. In order to avoid improper handling of water in contact with the roller core corrosion, pressure roller and a cooling device cooling water system closure is appropriate. Most of the equipment used can shake a shallow rectangular metal box, with high and uniform density and strength in order to facilitate the discharge of air and ensure that the material bread. Advantages the figure, equipment selection of gear

coupling is easy to disengage. Shown on the left, the upper pressure roller centerline is half of the coupling has been moved to the left, the pressure roller is easily torn off and the scene (to see cutaway view of stent).

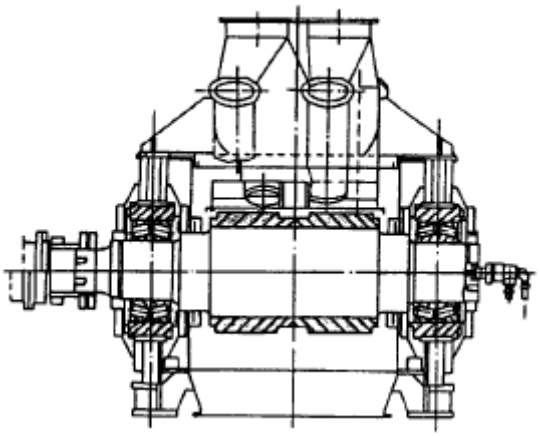


Fig 4 Briquetting machine with thermal sleeve and the cooling system pressure roller profile

3. Bearings (pressure roller support device)

In modern large-scale briquetting machine, the pressure roller in the efficient and small size, self-calibrated spherical roller bearings. In this way, free to adjust especially in the wide pressure roller, pressure roller with removable feeding uneven and to the material thickness (how much).

To ensure that the briquetting machine work more safely, it is crucial to the correct selection of the appropriate bearing. The most important considerations include the design of bearings and seals, cooling and lubrication. Bearing comprising a bearing force and distribution must be optimal. This requires a precise calculation. Come like Koppern latest briquetting machine, the actual deformation of the bearing is carried out

detailed calculations using finite element method. The purpose of these calculations is consistent with the deformation of the bearing sleeve and the theoretical distribution of bearing loads (Figure 5).

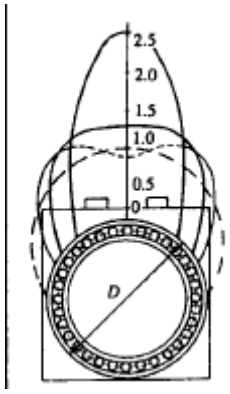


Fig 5 Self-calibration of spherical roller bearing load distribution map

If necessary, cooling systems will ensure that the bearings at low temperatures, and can improve lubrication grease at low temperatures but also to ensure that the bearings in the bearing kit has a good sealing performance. High load, low speed bearing using a special grease, it has about as high as 10-3/m2 viscosity, and the addition of certain additives.

4. Feeding system

Top of the feeding system in the bracket is facing the pressure briquetting machine roll gap. Feed fine and □ of or require large production, and some other special reason, a simple gravity feed chute may not be adopted in these cases, the screw feeder is a must. The diameter of the pitch characteristics of the screw feeder is in the center of the pitch and the edge of the feeding is not the same and the pitch of different geometric dimensions and the size of the roll gap area is

restricted.

To make the pressure roller machine uniform feed distribution along the roll width, using a multi-screw feeder. For example, a production capacity of 80 100t / h briquetting machine, single roller width is between 1000 ~ 1200mm, this requires the installation of multi-screw feeder. Spiral into a certain angle installed on both sides of the feeding center, under the action of gravity, the material into the feeder, conveying spiral pitch down, forcing the material directly into the pressure nip between the roll (Figure 6)

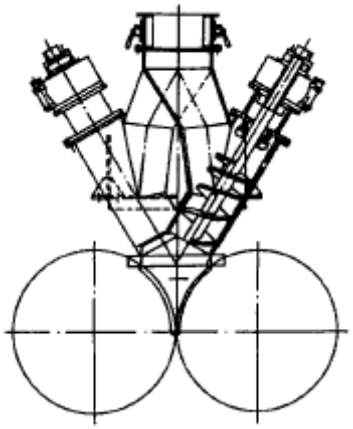


Fig 6 Spiral to the schematic of the feeder

In particular, fine-grained material in the compaction process, the materials in the air discharge plays an important role for the efficient work of the briquetting machine, for example, in the briquetting of the potassium salt, the density of the bulk material is about as 1g/cm3material the density of the cake is about 2 g/cm3, if the output of 100t / h, then approximately 50m3 / h air is discharged, so a lot of air through the pores of the bulk compound excreted. As the bulk compound pores become

smaller with the compaction process, therefore, a tablet of this material will become more difficult.

Pressure roll roll band to band compacted into blocks, because the material tightly fill the pressure roller, moving down the material in the air must be going against the logistics up the overflow, if not the quiver of the machine will result in the loss of machinery and equipment. Therefore, the design must implement (1) allow air discharged from the lower part of the feeder between the roll surface: (2) to ensure that the gap on both sides and the pressure roller shoulder angle (Figure 7).

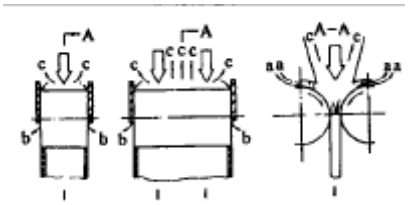


Fig 7 The escape of air in the briquetting machine

Studies have shown that if roller width 600mm, over 500 air only from both sides of the overflow, this roller width limit always depends on the particle size distribution of bulk materials or the permeability of the bulk material. With the roll width increases, the air may be forced to clip roll band to band's material can not escape, resulting in a further increase in the briquetting machine load. To avoid this problem, briquetting machine of 1000 a total width of 1200mm, the total working width will be divided into two 500 a 600mm two parts, each part of the set up two spiral. In order to allow the air to overflow, all spiral is the same (see Figure 4), in order to meet the requirements of various feed speed and

equipment production capacity, the speed of the screw must be adjusted separately.

5. Pressure stent

Pressure stent in the design of briquetting machine, you must make it able to withstand the pressure of the high-pressure roller coming and supporting feeding system, usually with double stent. The so-called standard stents require easy maintenance, for example, due to wear or maintenance must be the pressure roller is removed. Not only that, like □ knock Koppern company and the development of a "hinge" bracket (Figure 8), this bracket is easy to remove or replace pressure roller. Bracket connected to the bottom of the vertical part of the horizontal portion of the above, the vertical bracket can be hinged at the down, remove part of the pressure roller attachment and floating roller side of the hydraulic tank, and disconnect the gear couplings grease piping, after connection of the cooling water system, the pressure roller can be pulled out to an easy overhead crane to lift. If using a standard bracket, replacement of a pressure roller of the fee may a week, while the articulated bracket may only need two classes can be. In order to make maintenance work more convenient, the design of a pressure roller to remove the device and a lifting bar, both connected with the pressure roller bearing box.

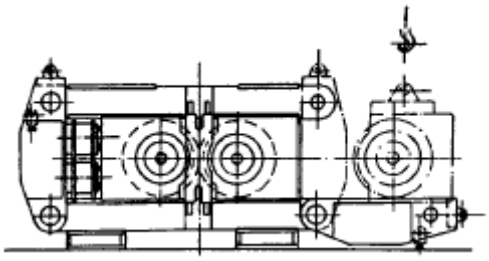


Fig 8 Schematic of the articulated bracket

6. Drive gear

The pressure roller drive gear of the machine by two large gear couplings, including synchronized helical gears, gear reducer, and a secure coupling between the people axis in the motor and gearbox input. Typically, the safety coupling is an automatic reset of the institutions, it can drive torque range of 1.7 to 1.9 times usual hours of work adjustment. Reduction gear consists of two parts :: Reducers and synchronous torque distribution gear, under normal circumstances, the safety factor of the reducer for synchronous torque distribution gear safety factor of 2. The large gear reducer is equipped with oil cooling and filtering devices to ensure that the equipment of continuous operation.

The most important is the connection of the synchronization gears and gear couplings guarantee provided to the uniform linear velocity of the pressure roller. Equipment in order to obtain higher yields only in the case of no shear stress.

7. Lubricating

A continuous lubrication system provides continuous to the main gear and a sliding surface of the floating roller, reliable special grease. To ensure effective work, the lubrication system is monitored. Large machines tend to always have the automatic lubrication of the gear coupling system, it will give the device long-term continuous operation without having to stop for lubrication maintenance.

8.Hydraulic put pressure on the system

The hydraulic put pressure on the system used to provide to the hydraulic tank pressure to change the pressure on roller closer to the compaction of materials and fixed roller. To meet special needs, the level and size of the pressure can be adjusted freely. Pressure gradient with the change of the pitch increased, the pressure gradient can be adjusted in a wide range by changing the sub-nitrogen in the hydraulic accumulator pressure. Also used as safety devices in the hydraulic system when the material is pressure pressure roller gap. An electric control system to monitor its function.

9．Frame

In order to improve the speed of the old machine overloaded, and rigid he shortage problem, this design USES the from both left, up, right,

with four The frame of a frame structure, each end frame with pin shaft link between, Make the convenient in assembling and disassembling, make simple, and the bearing can frame .Force is powerful, meet the large to roller machine work requirements.