

## **Dangerous Machines (Regulation) Rules, 2007**

### **GSR 505 (E), dated 24.7.2007**

In exercise of the powers conferred by sub-section (1) of Section 36 of the Dangerous Machines (Regulation) Act, 1983 (35 of 1983), and in supersession of the Dangerous Machines (Regulation) Rules, 1984, except as respects things done or omitted to be done before such supersession, the Central Government hereby makes the following rules, namely: -

#### **1. Short title and commencement**

- (1) These rules may be called The **<sup>1</sup>Dangerous Machines (Regulation) Rules, 2007**.
- (2) They shall come into force on such date as the Central Government may, by notification in the Official Gazette, specify, and different dates, may be specified for different rules.

#### **2. Definitions:-** In these rules, unless the context otherwise requires,-

- (a) "Act" means the Dangerous Machines (Regulation) Act, 1983 (35 of 1983);
- (b) "Form" means a form appended to the First Schedule to the rules;
- (c) "Schedule" means a Schedule appended to these rules.

#### **3. Form of licence issued under Section 9**

- (1) every licence issued to a person authorising him to manufacture, or to commence or to carry on business as the manufacturer of any dangerous machine shall be issued in Form 1.
- (2) There shall be issued for each category of dangerous machine, a separate licence and every such licence shall be issued in Form I.
- (3) Every licence to commence or carry on business as a dealer of a dangerous machine shall be issued in Form II.
- (4) Every licence referred to in sub-rule (2) shall be valid for dealing with the types or models of dangerous machines specified in the licence.

#### **4. Standards and specifications of power threshers, power operated chaff cutter and sugarcane crushers**

Every licence issued under Rule 3 shall ensure that the power thresher, power operated chaff cutter and sugarcane crushers manufactured by him/her complies with the standards and specifications laid down in the Second Schedule.

#### **5. Modifications of existing dangerous machines how to be made**

- (1) every person who has, immediately before the commencement of the Act, in his/her custody or control any power thresher, power operated chaff cutter and sugarcane crusher which does not comply, in all respects, with the provisions of the Act, and the rules and orders made there under, shall get it modified so as to ensure that the feeding system conforms to the specifications laid down in the Third Schedule.

(2) The transmission system of every power thresher, power operated chaff cutter and sugarcane crusher shall be provided with suitable guards as specified in the Third Schedule.

**Foot Note:**

**1. Vide the Gaz. of India, Ext. Pt.II, S.3(ii), dated 25.7.2007, pp. 12-37 No.337.**

**The First Schedule**

**Form I**

**[See Rule 3(1) and (3)]**

**Form of Licence for Manufacture or Commencement of carrying on business as a Manufacturer of a Dangerous Machine**

Licence No... ..

Whereas M/s .....  
of.....  
has/have.....

(give full address)

applied for a licence for commencement of/carrying on business as a manufacturer  
of.....  
.....

(here specify which dangerous machine)

And whereas the Controller is satisfied that the condition specified in Clause (a) of Sub-section (4) of Section 9 or, as the case may be, sub-section (4) of Section 9 has been complied with. Now, therefore, in exercise of the powers, conferred by Section 9 of the Act, licence is granted/renewed to M/s..... for a period of five years to commence/carry on business as a manufacturer of the:

- 1.**
- 2.**
- 3.**

(Give name of machine power thresher, power operated chaff cutter, power operated sugar cane crusher] and trade name with brief description and overall dimensions) This licence is issued subject to the following conditions, namely:

- (1) The manufacturer shall ensure that the machine and every part thereof complies with the standards specified by Rule 4 of the Dangerous Machine (Regulation) (Amendment) Rules, 2007.
- (2) Without prejudice to the generality of condition under (1) above, the manufacturer shall ensure that the following parts are secured by safeguard of substantial construction:
  - (a) the prime-mover and every part thereof;

- (b) the transmission machinery and every part thereof; and
  - (c) Every other dangerous part such as rollers, blowers, elevators, knife blades and the like.
- (3) The manufacturer shall clearly and legibly provide the machine with danger signals indicating the point beyond which no limb shall be inserted for the purpose of feeding the machine or for any other purpose while the machine is in operation.
- (4) The manufacturer shall ensure that the following particulars are legibly and conspicuously marked or inscribed on every dangerous machine by such method as would make it indelible, namely:
- (a) the direction of the rotation and the number of rotations per minute;
  - (b) Its power requirements; and
  - (c) the name and correct address of the manufacturer, the year of manufacture and the date, number and other particulars of the licence of the manufacturer.
- (5) Every manufacturer shall supply along with each dangerous machine a manual containing general instructions regarding the operation of such machine, in Hindi and regional languages.
- (6) Before, transferring the possession of the machine whether by sale, lease, hire or otherwise, the manufacturer shall deliver to the person acquiring the machine a declaration to the effect that the machine conforms to the standards laid down by or under this Act and also complies, in all respects, with the provisions of the Act and rules and orders made there under.
- (7) Failure to comply with the conditions specified above or of any provision of the Act or rule or order made there under will make this licence liable to suspension or cancellation as provided in Section 10.

[**Nota Bene**:-All references to the Act or any section thereof are references to the Dangerous Machines (Regulation) Act, 1983 (35 of 1983) or the relevant section thereof).

Granted this ..... day of .....

**Date:**

**Designation**

**Place:**

**Seal**

**Form II**

**[See Rule 3(3)]**

**Form of Licence for Commencement or Carrying on Business as a Dealer of a Dangerous Machine.**

Licence No.....

Whereas M/s..... of .....

(here give full address)

has/have applied for a licence for commencement of/carrying on business as a dealer of.....

(here specify which dangerous machine)

And whereas the Controller is satisfied that the applicant proposes to commence/carry on business in.....

(Specify which machine)

which conform to the standards laid down by or under the Dangerous Machines (Regulation) Act, 1983 (35 of 1983).

Now, therefore, in exercise of the power conferred by sub-section (4) of Section 9, licence is granted to M/s..... for a period of five years to commence/carry on business as a dealer of:

Serial Number	Name of the Machine	Make/model and brief description	Horsepower/kilowatt requirement of the machine
1			
2			
3			

(Specify, types of threshers, power operated chaff cutter and power operated sugarcane crusher or other dangerous machine)

This licence is issued subject to the following conditions, namely: -

- (1) The dealer shall deal only in machines of a manufacturer licenced under the Act.
- (2) Before transferring the possession of any machine whether by sale, lease, hire or otherwise, the dealer shall deliver to the person acquiring the possession of such machine, a declaration to the effect that the machine conforms to the standards laid down by or under this Act and also complies with, in all respects, the provisions of this Act and the rules and orders made there under.
- (3) Failure to comply with the conditions specified above or of any provision of the Act or rule or order made there under will make this licence liable to Suspension cancellation as provided in Section 10.

**Nota Bene:-** All references to the Act or any section thereof are references to the Dangerous Machines (Regulation) Act, 1983 (35 of 1983) or the relevant section thereof.

Granted this.....day of.....

**Date:**

**Designation**

**Place:**

**(Seal)**

## **The Second Schedule**

### **(See Rule 4)**

1. A power thresher shall comply with the following Indian Standards as may be relevant-ISO 9020-2002 (Power threshers - Safety Requirements)
2. A power operated chaff cutter shall comply with the requirements of the following Indian Standards-  
  
IS 15542: 2005 (Power Operated Chaff Cutter - Safety requirement IS 11459: 1985 specification for power operated chaff cutter)
3. A power operated sugarcane crusher shall comply with the requirements of the following Indian Standards:-  
  
IS 15561 : 2005 (Sugarcane Crushers - Safety requirements)  
  
IS 1973 : 1999 (Sugarcane Crusher - Specifications (third revision))

## **The Third Schedule**

### **(See Rule 5)**

1. Every power thresher, power operated chaff cutter and power operated sugarcane crusher referred to in Rule 5 shall be so modified as to ensure that the feeding system conforms to Section 7 as the case may be of IS 9020: 2002, Sections 7.2, 7.3 of IS 15542: 2005 and Sections 5.1, 5.1.1., 5.1.2, and 5.2 IS 15561 : 2005 of the Indian Standards respectively.
2. The transmission system shall be provided with suitable guards as specified in Section 6 of Indian Standards No. IS 9020 of 2002, Section 8 of Indian Standards No. IS 15542:2005 and Section 6 of IS 15561: 2005 respectively.
3. The recommended dimensions of the chute for Hammer-mill, Drummy and Syndicator type threshers are given in Table 1 below.
4. The recommended dimensions of chute for spike tooth cylinder type threshers are given in Table 2 below. The recommended dimensions of the chute for power operated chaff cutter and power operated sugarcane crusher is given in Table 3 and Table 4 below respectively. The feeding hopper of the power thresher shall conform to Section A-2 of ANNEX A of IS 9020:2002. The positive feed rollers with conveyer or chute system used on chaff-cutter type power thresher shall conform to Section A-3 of ANNEX-A of IS 9020:2002. The conveyor feeding system used with spike tooth or rasp-bar type power thresher of power rating of 5.5 kW or higher shall conform to Section A-4 of ANNEX-A of IS 9020: 2002. The recommended dimension of conveyor system for power operated chaff cutter is given in Table-5.

**Table 1**

**Recommended Dimensions of Chute for Hammer-Mill, Drummy and Syndicator Type Threshers.**

Si.No	Size of the prime mover for thrsher	A	C*	E	F
1	2	3	4	5	6
	kW(HP)	mm	mm	mm	mm
(i)	3.7(5)	500	200	50	125
(ii)	5.5(7.5)	550	200	60	175
(iii)	7.5(10)	600	220	60	190
(iv)	11(15) and above	650	220	60	200

\*For syndicator type thresher the dimension should be 230 mm

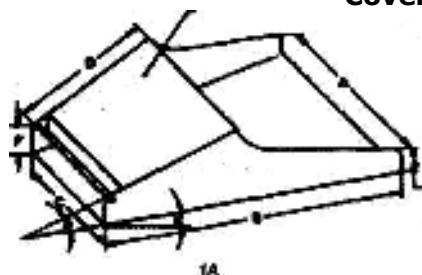
Table 2

Recommended Dimensions for Chute for Spike Tooth Cylinder type Threshers

SI. No.	Size of the prime mover	A	C*	E	F
1	2	3	4	5	6
	kW(HP)	mm	mm	mm	mm
(i)	3.7(5)	440	350	60	190
(ii)	5.5(7.5)	480	400	60	190
(iii)	7.5(10)	540	480	60	190
(iv)	11(15) and above	590	530	60	210

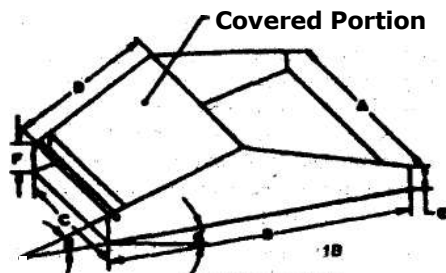
Note.- A, C, E and F refer to the dimensions as shown in the figure.

Covered Portion



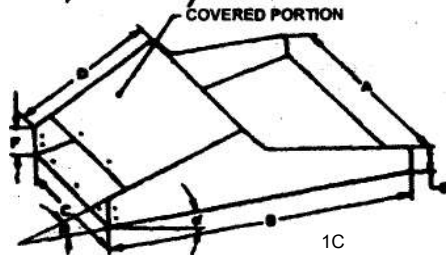
1A

Covered Portion



1B

COVERED PORTION



1C

**Figure 1. An Improved Feeding Chute**

**Table 3**

**Recommended dimensions of chute for power operated chaff cutter**

<b>SI. No.</b>	<b>Description</b>	<b>Dimension (mm)</b>
<b>(1)</b>	<b>(2)</b>	<b>(3)</b>
(i)	Minimum length of chute	900
(ii)	Minimum thickness of sheet metal of chute	1.6
(iii)	Minimum length of chute cover	450
(iv)	Height of chute from ground level	750 to 1100

**Table 4**

**Recommended Dimensions of feed platelchute for sugarcane crusher.**

<b>SI. No.</b>	<b>Description</b>	<b>Dimension (mm)</b>
<b>(1)</b>	<b>(2)</b>	<b>(3)</b>
(i)	Minimum thickness of Sheet Metal of feed plate/chute	1.6
(ii)	Maximum opening for feeding the cane in feed plate/chute	60
(iii)	The feed plate or feed chute shall be covered on front for a minimum distance of	600

**Table 5**

**Recommended Dimensions of conveyor system for power operated chaff cutter**

<b>SI. No.</b>	<b>Description</b>	<b>Dimension (mm)</b>
<b>(1)</b>	<b>(2)</b>	<b>(3)</b>
(i)	Minimum length of conveyor cover	1200
(ii)	Minimum length of covered conveyor cover	450
(iii)	Minimum thickness of sheet metal for cover	1.6
(iv)	Feed reversing mechanism	Shall conform to the requirements in Annex-A of IS 15542-2005
(v)	Minimum thickness of MS Sheet (IS:2062} for guard of blower,	116 Provided

**Annexure-A**

**(Clauses 4.2 and 7.1) .**

**Requirements For Feeding Systems Of Power Threshers**

A-1.1 Material

Mild steel sheet (see IS 2062) shall be used in the manufacture of the feeding chute. The thickness of sheet shall not be less than 1.6 mm

A 1.2 Shape

The shape of the chute shall be as shown in Figure 1

A-1-3 Dimensions

A-1.3.1, the total length of chute, length of covered portion (see B and D in Fig. 1) shall be 900 mm. min. and 450 mm. min. respectively. The angle of lift of covered portion (see B Fig. 1) shall be between 10° to 30°. However, the length of the covered portion of chute for chaff-cutter type thresher shall not be less than 550 mm.

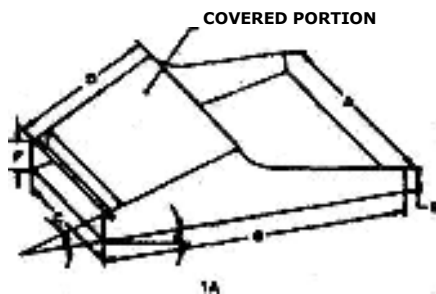
A-1.3.2 Other dimensions, when read in conjunction with Fig.1 for feeding chute of hammer mill type, drummy type and chaff-cutter type threshers of various power ratings are given in Table 3 for guidance.

**Table 3**

**Recommended Dimensions of Chute for Hammer Mill, Drummy and Chaff-Cutter Type Threshers.**

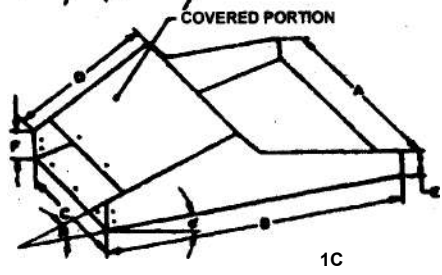
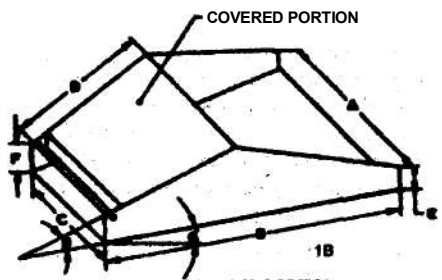
SI. No. (1)	Size of the Prime-the Thresher, kW (2)	A mm (3)	C mm (4)	E mm (5)	F mm (6)
(i)	3.7	500	200	50	125
(ii)	5.5	550	200	60	175
(iii)	7.5	600	220	60	190
(iv)	II and above	650	220	60	200

A-1.3.3 Other dimensions, when read in conjunction with Fig.1 for chute of spike tooth cylinder type thresher of various power ratings are given in Table 4 for guidance.



COVERED PORTION  
1B





**Figure-1 An Improved Feeding Chute Covered Portion**

A D  
 B E  
 C

**Table 4**

**Recommended Dimensions for Chute for Spike Tooth Cylinder Type threshers  
 (Clause A-1.3.3)**

Sl.No.	Size of the Prime Thresher kW	A mm	C mm	E mm	F mm
(1)	(2)	(3)	(A)	(5)	(6)
(i)	3.7	440	350	60	190
(ii)	5.5	480	400	60	190
(iii)	7.5	540	480	60	190
(iv)	11 and above	590	530	60	210

**A 1.4 Other Requirements**

A-1.4.1. To facilitate easy and smooth feeding of the crop during operation, the feeding chute shall be properly mounted on the thresher. In the-mounted position, angle  $\alpha$  (see Fig.1) shall be kept as under:

- (a) For hammer-mill and drummy-type threshers  $10^\circ$  to  $15^\circ$
- (b) For chaff-cutter type threshers -  $0^\circ$  to  $5^\circ$
- (c) For spike tooth type threshers -  $10^\circ$  to  $15^\circ$

A-1.4.2 No sharp edges shall be provided on the feeding chute.

A. 1.4.3. The covered portion of the chute shall be rigidly attached and shall not be able to be detached without cutting.

A-1.4.4 The feeding chute shall be so fixed with the thresher that it is not possible to remove it easily.

**A 2 Feeding Hopper**

A-2.1 Material

A.2.1.1 Hopper - Mild steel sheet (see IS 2062) shall be used. The thickness of the sheet shall not be less than 1.6 mm.

A 2.1.2 Star Wheels - Cast iron (see IS 210) shall be used.

A-2.1.3 Star Wheel Shaft Mild steel rod (see IS 2062) shall be used.

## A-2.2 Shape

The shape of the hopper unit shall be as shown in Fig.2

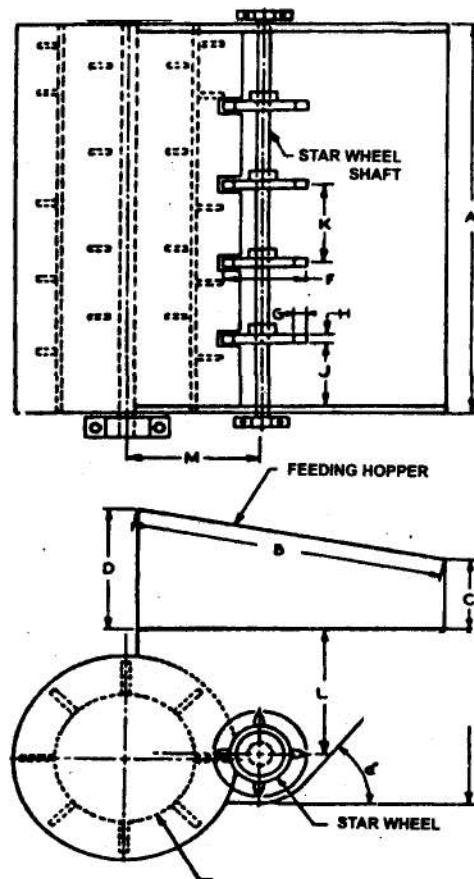
## A 2.3 Dimensions

A-2.3.1 The dimension A in Fig.2 shall be 400 mm more than the length of the threshing cylinder and shall be declared by the manufacturer.

A-2.3.2 The thickness of sheet for the hopper shall be 1.6 mm.

A-2.3.3 The dimensions of the hopper and star wheels when read in conjunction with Fig.2 shall be as given in Table 5.

### THRESHING CYLINDER



## Figure 2. Details Of Feedig Hopper

Star Wheel	Shaft	Star Wheel	
Feeding	Hopper	Threshing Cylinder	
A	C	G	L
B	D	H	M
C	F	K	

**Table 5**

### Dimensions of Hopper and Star Wheel

(Clause A 2.3.3)

Sl.No.	Size of the Prime Mover for	B	C	D	E	F	G	H	oc
		Min mm	Min MM	Min mm	Min mm	mm	mm	mm	15 Deg
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
(i)	7.5	900	180	340	75	280	45	20	50
(ii)	11	900	200	370	500	280	45	20	50
(iii)	15	925	220	400	535	280	45	20	50
(iv)	18.7 and above	950	240	430	565	280	15	20	50

**Note.**-Hopper feeding system is normally used with the threshers of 7.5 KW or more power ratings.

#### A-2.3.4 Mounting Dimensions

A-2.3.4.1 The feed hopper shall be built as an integral part of the thresher.

A-2.3.4.2 The location of the star wheels in relation to hopper sides (see J in Fig.2) shall be 75 mm. The centre to centre distance of two star wheels (see K in Fig.2) shall be 220 mm.

A-2.3.4.3 The fixation of star wheel shaft in hopper (see L in Fig.2) and fixation of star wheel in relation to centre of threshing cylinder (see M in Fig.2) shall be 350 mm and 450 mm respectively).

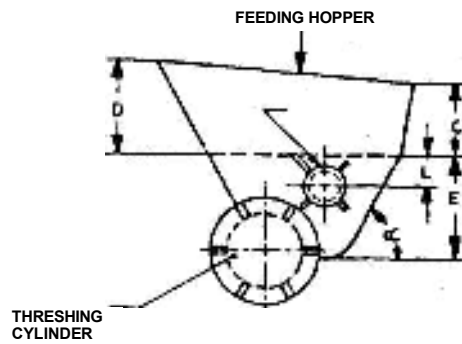
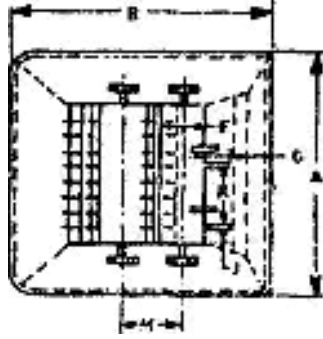
#### A-2.4 Other Requirements

A-2.4.1 The hopper shall be attached on the top of the threshing cylinder or on the side. If it is attached on the sides a feed regulating shaft shall be provided and it shall be operated at a speed of 25 to 55 rpm.

A-2.4.2 No sharp edges shall be provided in hopper or on star wheels.

A-2.4.3 The casting shall be smooth and shall not be porous.

A-2.5. Other types of feeding mechanisms may also be used with feeding hoppers. A typical shape of the hopper unit with feed roller type feeding mechanism is shown in Fig. 3. The material and dimensional requirement of feed roller type feeding mechanism are given in A-2.5.1 and A-2.5.2



**Details Of Feeding Hoppep With Feed Roller**  
**Feeding Hopper**  
**Feed Roller**

- |          |          |
|----------|----------|
| <b>A</b> | <b>F</b> |
| <b>B</b> | <b>G</b> |
| <b>C</b> | <b>J</b> |
| <b>D</b> | <b>K</b> |
| <b>E</b> | <b>L</b> |

### A-2.5.1 Material

The material for the construction of hopper, feed rollers and feed roller shaft shall be of mild steel (see IS 2062).

### A-2.5.2 Dimensions

A-2.5.2.1 The dimensions A in Fig.2-A shall be 400 mm more than the length of the threshing cylinder and shall be declared by the manufacturer.

A-2.5.2.2. The thickness of sheet for hopper shall be 1.6 mm. Min. A-2.5.2.3 The dimensions of the hopper and feed rollers when read in conjunction with Fig.3 shall be as given in Table 6.

**Table 6**  
**Dimensions of Hopper and Feed Roller**  
**(Clause A 2.5.2.3)**

SI.No.	Size of the Prime for	B	C	D	U.	F	G	H	oc
		Min	Min	Min	Min	mm	mm	mm	+5
		mm	mm	mm	mm				deg
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
(i)	15	740	150	545	560	300	100	15	55
(ii)	26.3	900	200	560	570	300	100	15	55
(iii)	37.5	925	230	570	580	300	100	15	55

**Note.-** Hopper feeding system with feed roller type feeding mechanism is normally used with thresher of 15 kW or more power ratings.

A-2.5.2.4 The feed hopper shall be built as an integral part of the thresher.

A-2.5.2.5 The location of the feed rollers in relation to hopper sides (see J in Fig.3) shall be 90 mm. The centre to centre distance of two feed roller rods (see K in Fig.3) , shall be 355 mm.

A-2.5.2.6 The fixation of feed roller in hopper (see L in Fig.3) and fixation of feed roller in relation to centre of threshing cylinder (see M in Fig.3) shall be 125 mm and 450 mm respectively.

A-2.5.2.7 No sharp edges shall be provided in hopper or on feed rollers.

### A-3 Positive Feed Rollers with Conveyor or Chute

A-3.0 The system is used on a chaff-cutter type thresher. It comprises a feed pressing roller, two corrugated feed rollers and a feeding chute or conveyor with power transmission system. For this type of threshers with power ratings of 15 kW or more, a feed reversing mechanism is recommended. It comprises a gear box, a clutch lever and

two joining shafts with universal joints (see Fig.4). In some threshers fast and loose pulleys to cut off the drive to the upper and lower feed rollers are also used. In the feeding system with feed reversing mechanism, if the hand of an operator gets entrapped, the clutch lever is pressed by his hand or shoulder and the drive to the feed roller is cut off in the neutral position or the direction of the upper and lower feed rollers is reversed.

### **A-3.1 Material**

A-3.1.1 Chute - The chute shall be made of mild steel sheet (see IS 2062) having thickness of not less than 1.6 mm.

A-3.1.2 Conveyor - Canvas or rubber (see IS 1891 (Part I) or steel slats (see IS 2062).

A-3.1.3 Driving Roller - Cast iron (see IS 210).

A-3.1.4 Pressing Roller - Cast iron (see IS 210).

A-3.1.5 Feed Rollers - Cast iron (see IS 210).

A-3.1.6 Tension Spring - Spring steel (see IS 4454 (Part 1)]

A-3.1.7 Clutch Lever - Mild steel (see IS 2062).

A-3.1.8 Gears - Cast iron (see IS 210).

A-3.1.9 Gear Box - Cast iron (see IS 210) or mild steel (see IS 2062).

A-3.1.10 Gear Shaft - Mild steel (see IS 2062).

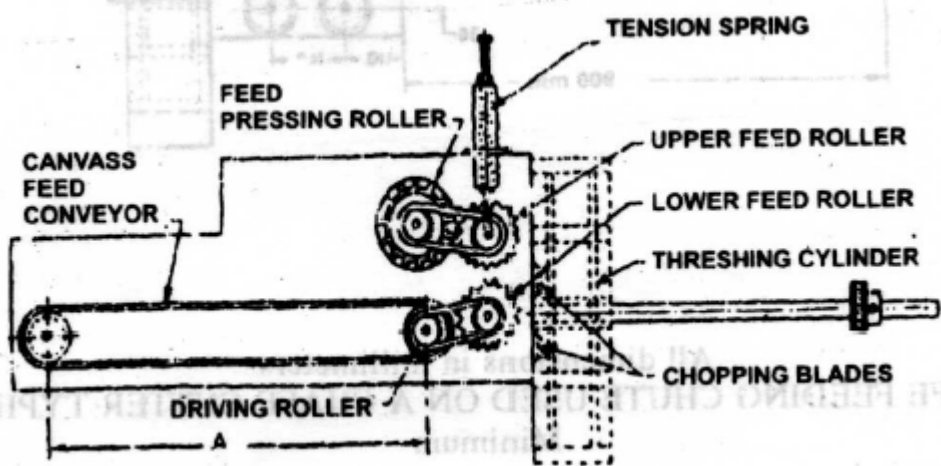
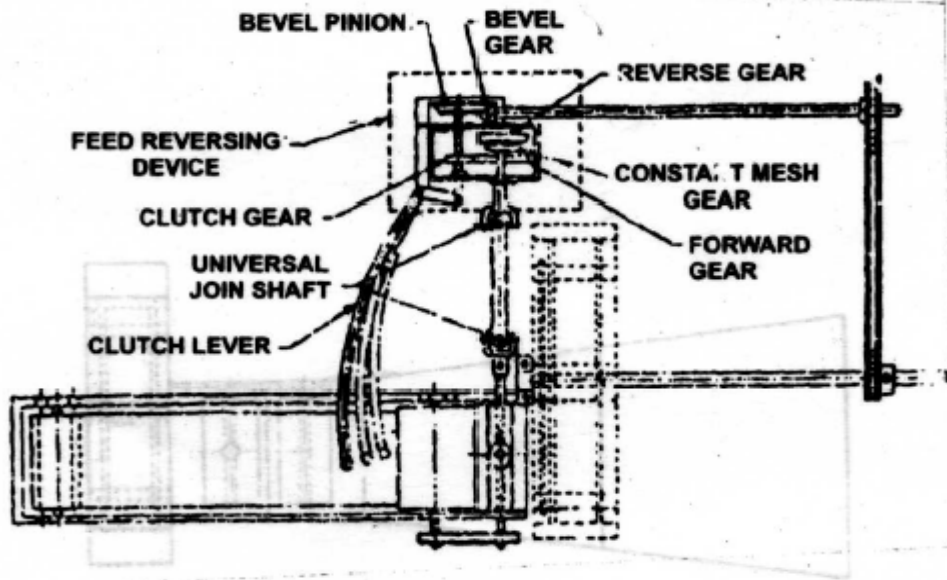
### **A-3.2 Shape**

The shape of feeding system with feed reversing mechanism used for chaff-cutter type threshers is shown in Fig.4.

### **A-3.3 Dimensions**

A-3.3.1 If chute is used, the dimensions shall be as given in A- 1.3.1 and A-l.3.2 and the arrangement should be as shown in Fig.5.

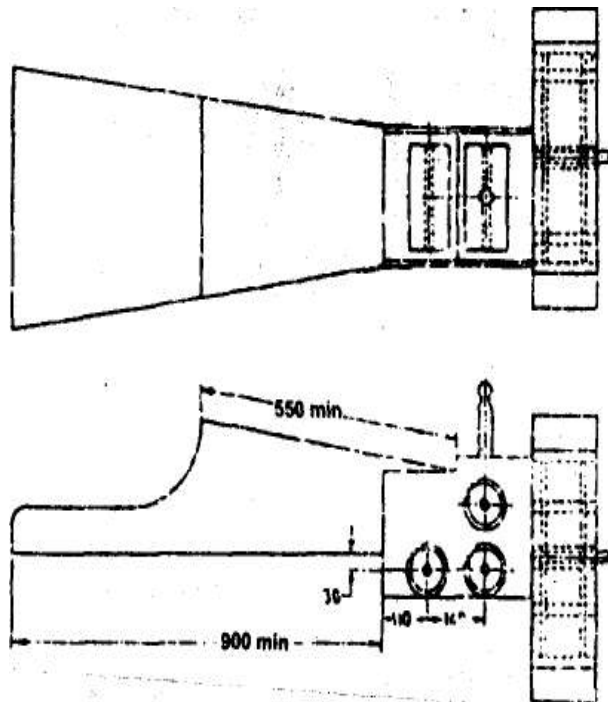
A-3.3.2 If conveyor is used, the length of centre to centre distance of conveyor rollers (see A in Fig.4) shall be minimum of 1200 mm. Minimum of 450 mm of length of conveyor at feed inlet side shall be covered.



**Feed Reversing Device for Chaff Cutter Type Threshers**



Bevel Pinion  
 Reveal Gear  
 Reverse Gear  
 Feed Reversing Device  
 Clutch Gear  
 Universal Joint Shaft  
 Clutch Lever  
 Constant Mesh Gear  
 Forward Gear  
 Tension Spring  
 Feed Reversing Roller  
 Canvass Feed Conveyor  
 Upper Feed Roller  
 Lower Feed Roller  
 Threshing Cylinder  
 Chopping Blades  
 Driving Roller



**All Dimensions In Millimeters**

**Figure 5. Safe Feeding Chute Used On A Chaff-Cutter Type Thresher  
Minimum**

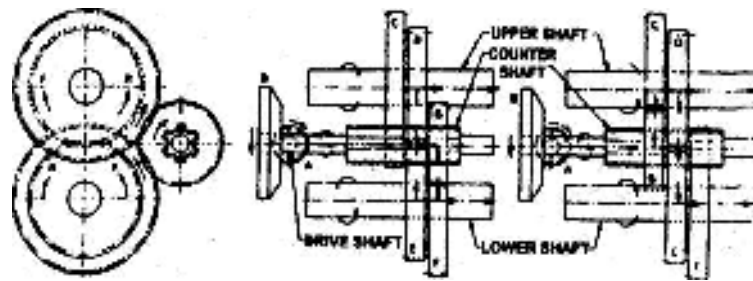
A.3.4 Feed Reversing Device

A-3.4.1 Functioning of Device (see Fig.6)

Pinion 'A' receives the drive from the main shaft of the thresher by means of chain and sprocket. Pinion 'A' meshes with bevel gear 'B' which is mounted on a counter shaft. On the same shaft a spur pinion 'G' is mounted which slices on splines with the help of a hand lever. When pinion 'G' meshes with the gear 'F' on the lower feed shaft, the lower feed roller revolves in clockwise direction and the upper feed roller in anti clockwise direction. This is the feed-in-position.

A-3.4.1.1 When pinion 'G' is meshed with gear 'C', the direction of rotation of the upper and lower rollers is reversed. In other words, the upper roller rotates in clockwise and the lower roller in anti-clockwise direction. This is the reversed or feedback position and the material being fed moves out instead of moving into the threshing chamber.

A-3:4.1.2 The third position is when pinion 'G' does not mesh either with gear 'F' or 'C' This is the neutral position. The lever to slide pinion 'G' can be actuated by hand or foot or shoulder.



Forward Speed      Reverse Speed  
Path Of Travel Of The Power C      Rotation Of  
Gears And Shafts

**Figure 6. Power Transmission Through Feed Reversing System For Chaff Cutter Thresher**

Upper Shaft	A
Counter Shaft	B
Drive Shaft	C
Lower Shaft	D
Forward Speed	E
Reverse Speed	F
	G

A-3.4.1.3 The details of gears in this system shall be as given in Table 7.

**Table 7**

**Details of Gears in the Feed Reversing echanism**

<b>SI.No</b>	<b>Type of Gear/Pinion</b>	<b>Designation</b>	<b>Shaft on which mounted</b>
<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>
1	Bevel Gear	A	Splined shaft on main shaft
2	Do	B	Counter shaft
3	Spur pinion	C	Counter Shaft
4	Spur gear	D	Upper feed roller Shaft
5	do	E	do
6	do	F	Lower feed roller shaft
7	Bevel Gear	G	Splined shaft on Main shaft

#### A-3.4.2 Functioning of Device (see Fig.7)

If the roller handle is put in backward direction, bevel gear 'A' which is mounted on splined shaft receives the drive from main shaft. The main shaft moving in anti-clock wise direction will rotate bevel gear 'A' also in anti-clockwise direction. Bevel gear 'A' meshes with bevel gear 'B' which is mounted on a counter shaft, having at other end a pinion 'C'. This will rotate bevel gear 'B' counter shaft and pinion 'C' in clockwise direction. Gear 'D' meshes with pinion 'C' and rotates in anti-clockwise direction. Gears 'D' and 'E' are on the same shaft, hence the direction of rotation of 'E' would also be the same. Gears 'E' and 'F' mounted on upper and lower feed roller shafts respectively, mesh with each other, therefore the gear 'F' rotates in clockwise direction. The direction of rotation of upper and lower feed rollers would be the same as that of gears 'F' and 'F'. This is the feed-in-position.

A-3.4.2.1 If the roller handle is put in forward direction, bevel gear 'G', which is mounted on splined shaft, receives the drive from main shaft and moves in anti-clockwise direction. Bevel gear 'G' meshes with bevel gear 'B'. The bevel gear 'B', counter shaft and pinion 'C' will rotate in anti-clockwise direction. This will ultimately lead to the rotation of lower feed roller in anti-clockwise direction. This is the reversed or feedback position and the material being fed moves out instead of moving into the threshing chamber.

A-3.4.2.2 In case the roller handle is kept in central position, feed-reversing mechanism will not operate. This is the neutral position.

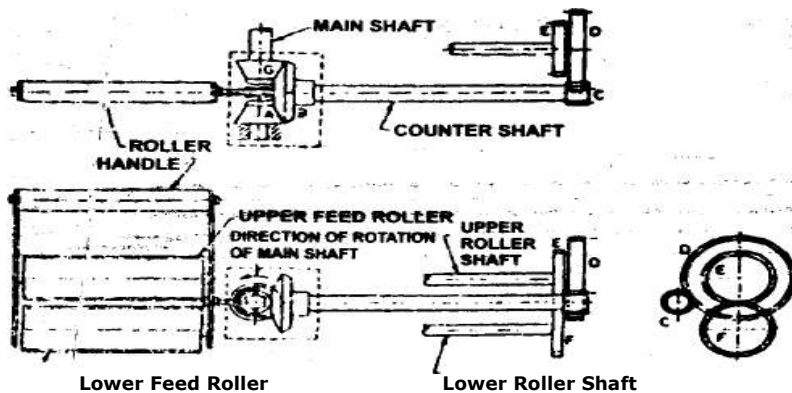
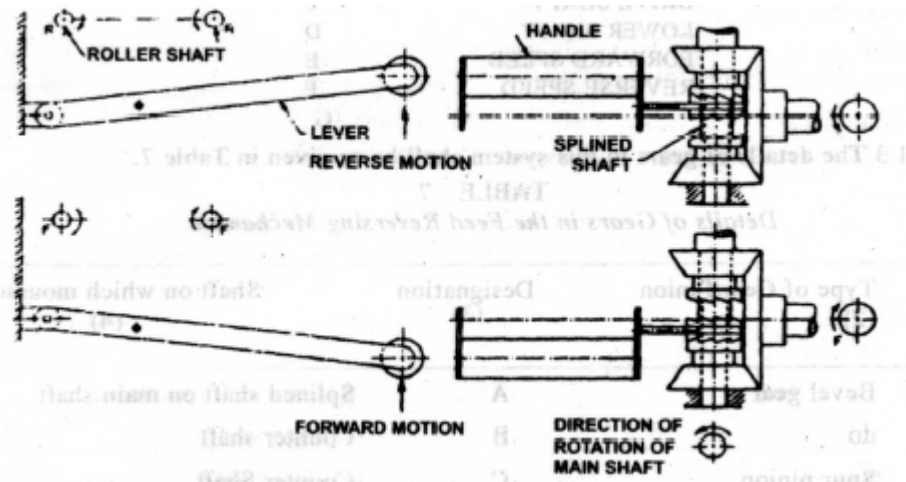
A-3.5 Where conveyor feeding system is not provided in a chaff- cutter type thresher nor the chute is covered from top, a second set (secondary set) of feed rollers shall be placed at 200 to 300 mm axial distance to assist feeding of the crop to the primary set of feed rollers. The top roller (which is idle, that is, not driven positively) of the second set of the rollers shall have moderate axial grooves and a spring control to let the hand be withdrawn without injury before the hand gets to the second set of rollers.

### **A-3.6 Other Requirements**

A-3.6.1 All the sharp edges shall be avoided.

A-3.6.2 Castings shall be smooth and shall not be porous.

A-3.6.3 The shifting of gear shall be easy and smooth.



- |                         |                    |
|-------------------------|--------------------|
| Roller Shaft            | Main Shaft         |
| Handle                  | Counter Shaft      |
| Roller Shaft            | Roller Handle      |
| Lever Shaft             | Upper Feed Roller  |
| Splined Shaft           | Upper Roller Shaft |
| Revers Motion           | Lower Roller Shaft |
| Forward Motion          | Lower Feed Shaft   |
| Direction of Main Shaft |                    |

Figure 7. Working Of Feed Reversing Mechanism For Chaff Cutter Type Thresher

## A-4 Conveyor Feeding System

A-4.0 Conveyor system is generally used with spike tooth or rasp bar type threshers of power ratings of 5.5 kW or higher.

### A-4.1 Material

A-4.1.1 Conveyor - Rubber (see IS 1891 (Part I))

A-4.1.2 Fenders - Mild steel (see IS 2062)

A 4.1.3 Conveyor Roller - Cast iron (see IS 210)

A-4.1.4 Cover - Mild steel sheet (see IS 2062) having thickness of 1.6 mm, Min.

### A-4.2 Shape

The shape of a conveyor system is given in Fig.8.

### A-4.3 Dimensions

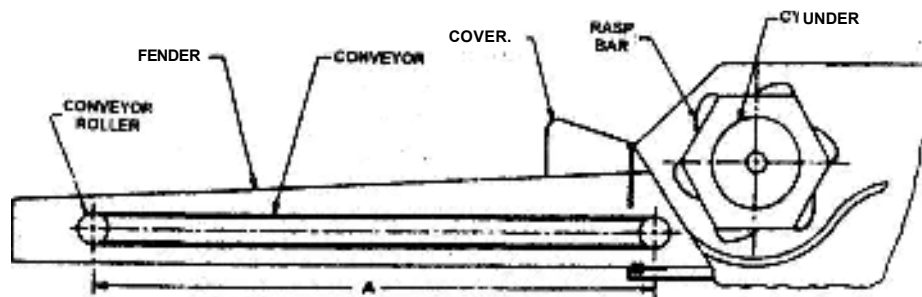
A 4.3.1 The centre to centre distance of conveyor roller (see A in Fig.8), shall be minimum of 1000 mm.

A-4.3.2 The length of covered portion of conveyor shall be minimum of 600 mm,

### A-4.4. Other Requirements

A-4.4.1 All the sharp edges shall be avoided.

A 4.4.2 Castings shall be smooth and shall not be porous.



**Fender  
Conveyor Roller  
Conveyor**

**Cover  
Rasp Bar  
Cylinder**

**Figure 8. Arrangement For Feeding Conveyor For Rasp Bar Type Thresher  
Annexure A**

**[Clause 7.3(B)]**  
**Requirements Of Conveyor**

**A-L Construction**

It comprises a feed pressing roller, two corrugated feed rollers and conveyor with power transmission system. For this type of chaff cutters with power ratings of 15kW or more, a feed reversing mechanism is recommended. It comprises of a gear box, a clutch lever and two joining shafts with universal joints (see Fig.9). In some chaff cutters fast and loose pulleys to cut-off the drive to the upper and lower feed rollers are also used. In the feeding system with feed reversing mechanism, if the hand of an operator gets entrapped, the clutch lever is pressed by his hand or shoulder and the drive to feed roller is cut off in the neutral position or the direction of the upper and lower feed rollers is reversed.

**A 2 Material**

A-2. Conveyor - Canvas or rubber (see IS 1891) (Part 1) or steel slats (see IS 2062).

A-2.2 Driving Roller - Cast iron (see IS 210).

A-2.3 Pressing Roller - Cast iron (see IS 210).

A-2.4 Feed Rollers Cast iron (see IS 210).

A 2.5 Tension Spring - Spring steel (see IS 4454 (Part I))

A-2.6 Clutch Lever - Mild steel (see IS 2062)

A 2.7 Gears Cast iron (see IS 210).

A-2.8 Gear Box Cast iron (see IS 210) or mild steel (see IS 2062)

A-2.9 Gear shaft - Mild steel (see IS 2062)

A-2.10 Stand - Mild steel (see IS 2062)

**A-3 Dimensions**

The length of center-to-center distance of conveyor rollers (see A in Fig.9) shall be minimum of 1200 mm. Minimum of 450 mm of length of conveyor at feed inlet side shall be covered.

**A 4 Feed Reversing Devices**

A 4.1 Functioning of Device (see Fig.10)

Pinion 'A' receives the drive from the main shaft of the chaff cutter by means of chain and sprocket. Pinion 'A' meshes with bevel gear 'B' which is mounted on a counter shaft. On the same shaft a spur pinion 'G' is mounted which slides on splines with the help of a hand lever. When pinion 'G' meshes with the gear 'F' on the lower feed shaft, the lower feed roller revolves in clockwise direction and the upper feed roller in anti-clockwise direction. This is the feed-in-position.

A-4.1.1 When pinion 'G' is meshed with gear \*C" the direction of rotation of the upper and lower rollers is reversed. In other words, the upper roller rotates in clockwise and the lower roller in anti clockwise direction. This is the reversed or feedback position and the material being fed moves out instead of moving into the cutting zone chamber.

A 4.1.2 The third position is when pinion 'G' does not mesh either with gear 'F' or 'C. This is the neutral position. The lever to slide pinion 'O' can be actuated by hand or foot or shoulder.

A 4.1.3 The details of gears in this system shall be as given in Table 2.

**Table 2**  
**Details of Gears in the Feed Reversing Mechanism**

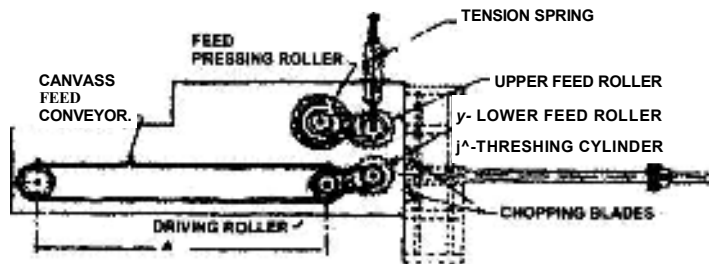
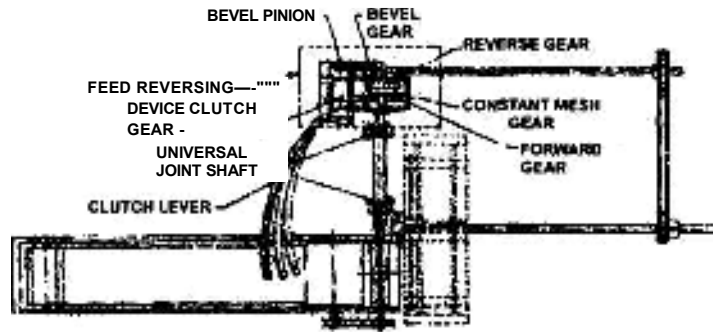
<b>SI. No.</b>	<b>Type of Gear/Pinion</b>	<b>Designation</b>	<b>Shaft on which mounted</b>
<b>(1)</b>	<b>(2)</b>	<b>(3)</b>	<b>(4)</b>
(i)	Bevel gear	A	Splined shaft on main shaft
(ii)	Bevel gear	B	Counter shaft
(iii)	Spur pinion	C	Countershaft
(iv)	Spur gear	D	Upper feed roller shaft
(v)	Spur gear	E	Upper feed roller shaft
(vi)	Spur gear	F	Lower feed roller shaft
(vii)	Bevel gear	G	Splined shaft on main shaft

A 4.2 Functioning of Device (see Fig.11)

A 4.2.1 If the roller handle is put in backward direction, bevel gear 'A' which is mounted on splined shaft receives the drive from main shaft. The main shaft moving in anti-clockwise direction will rotate bevel gear "A' also in anti clockwise direction. Bevel gear 'A' meshes with bevel gear 'B' which is mounted on a counter shaft, having at other end a pinion 'C. This will rotate bevel gear 'B' counter shaft and pinion 'C in clockwise direction. Gear 'D' meshes with pinion 'C and rotates in anti-clockwise direction. Gears 'D' and 'E' are on the same shaft, hence the direction or rotation of 'E' would also be the same. Gears 'E' and 'F' mounted on upper and lower feed roller shafts, respectively, mesh with each other; therefore, the gear 'F' rotates in clockwise direction. The direction of rotation of upper and lower feed rollers would be the same at that of gears 'E' and 'F'. This is the feed-in position.

A-4.2.2 If the roller handle is put in forward direction, bevel gear 'G', which is mounted on splined shaft, receives the drive from main shaft and moves in anti-clockwise direction. Bevel gear 'G' meshes with bevel gear 'B'. The bevel gear 'B' counter shaft and pinion 'C\* will rotate in anti clockwise direction. This will ultimately lead to the rotation of lower feed roller in anti clockwise direction. This is the reversed or feedback position and the material being fed moves out instead of moving into the threshing chamber.

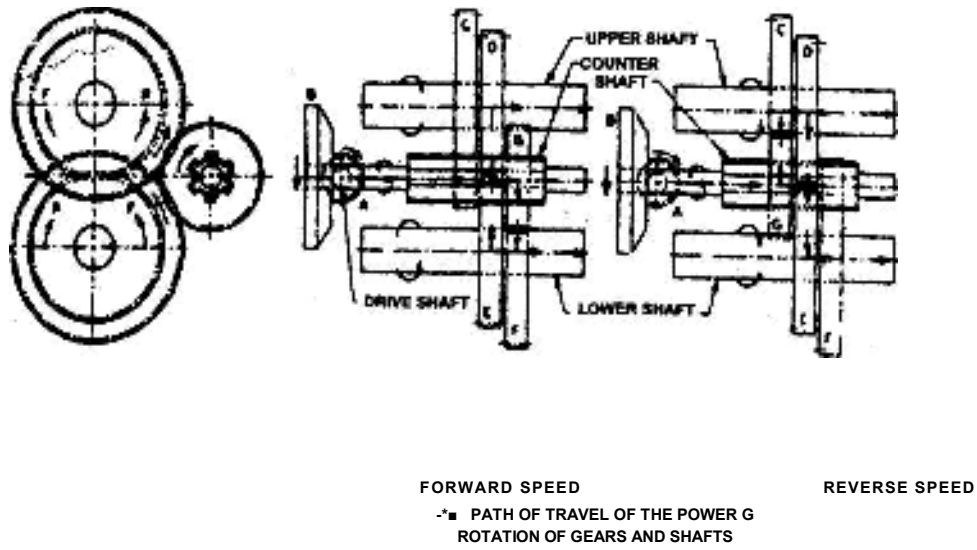
A-4.2.3 In case the roller handle is kept in central position, feed-reversing mechanism will not operate. This is the neutral position.



**Figure 9. Feed Reversing Mechanism For Conveyor Feed Chaff" Cutter**

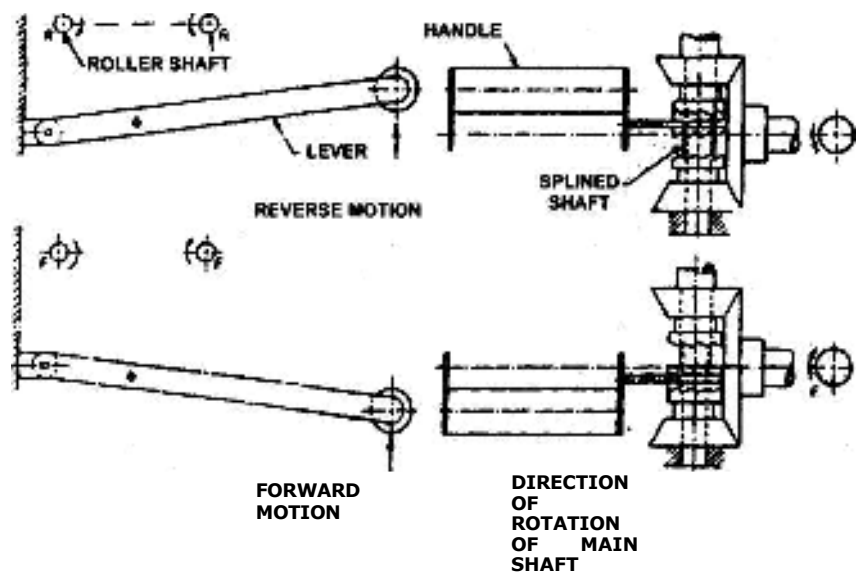
- |                              |                              |                           |
|------------------------------|------------------------------|---------------------------|
| <b>Bevel Pinion</b>          | <b>Bevel Gear</b>            | <b>Tension Spring</b>     |
| <b>Reverse Gear</b>          | <b>Feed Reversing Device</b> | <b>Clutch Gear</b>        |
| <b>Universal Joint Shaft</b> | <b>Clutch Lever</b>          | <b>Constant Mesh Gear</b> |
| <b>Forward Gear</b>          |                              |                           |
- 
- |                          |                          |                           |
|--------------------------|--------------------------|---------------------------|
| <b>Upper Feed Roller</b> | <b>Lower Feed Roller</b> | <b>Threshing Cylinder</b> |
| <b>Chopping Blades</b>   | <b>Driving Roller</b>    |                           |

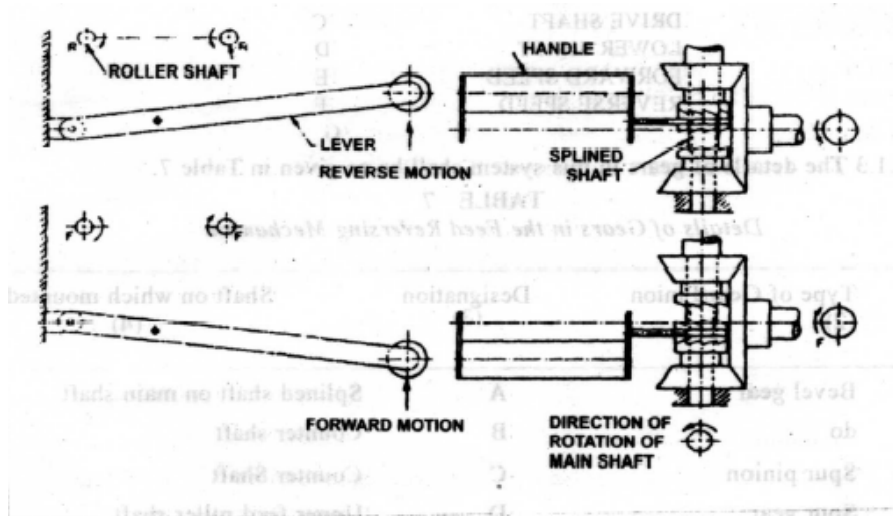




**Figure 10. Power Transmission Through It-1id-Reversing System For Conveyor Fed Chaff Cutter**

- Upper Shaft           A
- Counter Shaft       B
- Drive Shaft           C
- Lower Shaft          D
- Forward Speed       H
- Reverse Speed       F
- G





- |                                |                           |
|--------------------------------|---------------------------|
| <b>Roller Shaft</b>            | <b>Main Shaft</b>         |
| <b>Handle</b>                  | <b>Counter Shaft</b>      |
| <b>Roller Shaft</b>            | <b>Roller Handle</b>      |
| <b>Lever Shaft</b>             | <b>Upper Feed Roller</b>  |
| <b>Splined Shaft</b>           | <b>Upper Roller Shaft</b> |
| <b>Revers Motion</b>           | <b>Lower Roller Shaft</b> |
| <b>Forward Motion</b>          | <b>Lower FeedShaft</b>    |
| <b>Direction of Main Shaft</b> |                           |

**Figure 11. Functions of Feed Reversing Mechansim For Conveyor Fed Chaff Cutter**

